Does Agricultural Policy Reform Work?

The Impact on Egypt's Agriculture, 1996-2002

Edited by GARY ENDER and JOHN S. HOLTZMAN

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Abt Associates Inc.

This publication was made possible through support provided by the Office of Economic Growth, Competitiveness and Agricultural Development Division, United States Agency for International Development/Egypt, under the terms of contract No. 263-0219-C-00-7003-00. The opinions expressed herein are those of the author(s) and do not necessarily reflect the views of the United States Agency for International Development

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Foreword

In the early 1980s, the Government of Egypt (GOE) initiated an ambitious effort to reform agricultural policy to prepare the agricultural sector for the transition of the Egyptian economy to a free-market system. The Ministry of Agriculture and Land Reclamation (MALR), with the support of the US Agency for International Development (USAID), designed two agricultural policy reform programs; the first was implemented from 1987 to 1995, the second from 1996 to 2002.

The first policy reform program, implemented as a component of the Agricultural Production and Credit Project (APCP), focused mainly on the agricultural sector, with only limited policy reforms in related areas, such as fertilizer. By the end of APCP, it became apparent that a broader policy reform program was needed to deal with the entire food and fiber system, which includes the agricultural sector and parts of other sectors. The second program, the Agricultural Policy Reform Program (APRP), was designed to work with several ministries to liberalize the food and fiber system in Egypt.

A closer look at the types of reforms carried out shows that the policy reform process to date can be described as occurring in four phases, following the pre-reform period. During the pre-reform era (1982–1986), MALR began to study the impact of reducing credit and price subsidies on agricultural production and consumer prices. The results of these studies, which were key first steps in MALR's preparation for leading the way in economic liberalization, encouraged the GOE to begin step-by-step reductions of subsidies on some agricultural inputs, such as animal feed.

During the first phase of agricultural policy reform (1987–1989), the GOE began to promote the long-term goals of reform in the agricultural sector and to strengthen market-based incentives by introducing privatization as a way to reduce inefficiency in public sector management. Because the GOE preferred to have a transition period for the change from public management to private management of these companies, the privatization process was begun by issuing a new law to reorganize the public sector into what are called "holding companies." This process enabled the GOE to retain control over cotton and sugarcane production and marketing, while partially liberalizing the rice market.

The second phase of reform (1990–1995) involved the GOE's using privatization and liberalization more intensively to further improve economic efficiency. For example, in the agricultural sector, rice production and marketing were liberalized, and the GOE reduced the role of the Principal Bank for Development and Agricultural Credit (PBDAC) in agricultural input distribution and output procurement. The private sector started its involvement in agricultural input distribution with an eye toward full liberalization. The transition period between public management and private management gave private sector companies, cooperatives, and public sector companies the opportunity to prepare for competition in the agricultural input and output markets. In the domestic cotton market, private sector traders were permitted to buy seed cotton from farmers, gin

it, and sell lint cotton to textile holding companies, but private sector firms were not permitted to export cotton.

During the third phase of reform (1996–1999), the GOE continued to liberalize cotton marketing and proceeded with the privatization of some public cotton-spinning and -ginning companies. It also began the long process of changing the roles of the public and private sectors in providing cotton pest management products and services, reserving safety and quality control issues for the GOE, but turning over product and service provision to the private sector. The GOE also developed a strategy to deal with water use for rice and sugarcane, which was a precursor to the more challenging task of matching irrigation supply and demand in the context of farmers' choices of cropping pattern.

During the fourth phase of reform (2000–2002), the GOE began to better match water provision with needs. This required implementing a scientific and practical method to estimate water demand in real time and then allocating the available water supply. The Ministry of Water Resources and Irrigation also encouraged public participation in decision-making about the planning, development, and management of Egypt's water resources. Building on the Monitoring, Verification and Evaluation (MVE) Unit's studies of data quality, MALR improved the agricultural information system by using more scientific methods to collect farm income data and began in-season forecasting of cotton and wheat yields. Other MALR efforts included issuing a decree prohibiting the use of child labor in agriculture and restocking the Nile River in Upper Egypt with native fish species. During this phase, the GOE also supported the creation of a logo for Egyptian cotton, and the Cotton Arbitration and Testing General Organization improved not only its method for testing cotton quality, but also its method for disseminating fiber quality information.

The lesson to be learned from Egypt's experience is that reform is a continuous and dynamic process, which proceeds in phases and requires input from public and private stakeholders. At the same time, impact assessment (that is, understanding the benefits of reform and the issues that remain) is a critical part of the policy improvement process. It is the challenge of impact assessment that this book addresses.

Preface

Many individuals contributed to both the design and implementation of the Agricultural Policy Reform Program (APRP) and the assessment of its impacts. Some are authors in this book, but many more are not. While there are too many names to list here, all of these people deserve credit for their efforts.

The Government of Egypt (GOE) and USAID/Egypt developed the program and agreed on the reforms, and the GOE carried them out. The ministries collaborating to make the program a success were the Ministry of Agriculture and Land Reclamation (MALR), the Ministry of Water Resources and Irrigation, the Ministry of Foreign Trade, the Ministry of Supply and Home Trade, and the Ministry of Public Enterprise.

Dr. Saad Nassar, at the time Head of the Agricultural Research Center of MALR, was the Program Director of APRP for almost all of its life. Dr. Nassar always provided the program with his full support and technical guidance. Dr. Hussein Soliman provided strong leadership for the program after Dr. Nassar became Governor of Fayoum. Eng. Mahmoud Nour served APRP well as the Program Coordinator. Eng. Gamil Mahmoud, Chairman of the MWRI-WPRP Steering Committee, was always helpful to our efforts in monitoring and evaluation. Dr. Mohamed Omran was the USAID project officer for the Monitoring, Verification, and Evaluation (MVE) Unit, as well as for other components of APRP. He was instrumental in making the MVE Unit effective. For most of APRP's duration, Tom Olson very capably led the USAID team supporting the program. Dawn Thomas played this role at the end of APRP. Ali Kamel, Wadie Fahim Mankarious, Glenn Rogers, and Anne Williams, all of USAID/Egypt, also served the program in a technical capacity. We thank all of these individuals sincerely for their support and encouragement.

We were privileged to work in Egypt from 1996 to 2002 in the MVE Unit of APRP with our talented colleagues Drs. Morsy Ali Fawzy and Adel M. Mostafa. We were fortunate to have had strong collegial relationships with our technical assistance colleagues in the Water Policy Reform Program (led by Jeff Fredericks and Andrew Tczap) and the Reform Design and Implementation Unit (led by Max Goldensohn and Jane Gleason) of APRP, as well in the Cotton Sector Promotion Program of GTZ (under the direction of Heinz Burgstaller). We also had productive relations with APRP's Food Security Research Unit (led by Akhter Ahmed) and GreenCom unit (headed by Cheryl Groff).

Most of the papers in this book were published separately in longer versions by the MVE Unit and were presented at its final conference on impact assessment, June 1-3, 2002.

Errors of fact or interpretation are those of the authors or the editors, not our colleagues, USAID, or the GOE.

Gary Ender
John S. Holtzman

Acronyms

ACC	Agricultural Commodity Council
AERI	Agricultural Economic Research Institute (of MALR)
ALCOTEXA	Alexandria Cotton Exporters Association
APCP	Agricultural Production and Credit Project
APRP	Agricultural Policy Reform Program
ARC	Agricultural Research Center (of MALR)
ardeb	unit of volume (1 *ardeb* ≈ 150 kg wheat; 1 *ardeb* ≈ 140 kg maize)
BCWUA	Branch canal water user association
CAPMAS	Central Agency for Public Mobilization and Statistics
CAPQ	Central Administration for Plant Quarantine
CATGO	Cotton Arbitration and Testing General Organization
CRI	Cotton Research Institute
CSPP	Cotton Sector Promotion Program
EAFDT	Egyptian Association of Fertilizer Distributors and Traders
EAGA	Egyptian Agribusiness Association
EAS	Economic Affairs Sector (of MALR)
EATSAP	Egyptian Association of Traders of Seeds and Agricultural Pesticides
EEAA	Egyptian Environmental Affairs Agency
EIA	Environmental impact assessment
EIHS	Egypt Integrated Household Survey
ELS	Extra-long staple (cotton)
EPADP	Egyptian Public Agency for Drainage Projects
EPIQ	Environmental Policy and Institutional Strengthening IQC
ESA	Employee Stakeholder Association
ESAS	Egyptian Seed Association
E-SME	Established SME
EU	European Union
Fd	*feddan*, a unit of area equal to 0.520 hectares or 1.037 acres
FIHC	Food Industries Holding Company
FSR	Food Security Research (Unit of APRP)
GASC	General Authority for Supply Commodities
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
GOE	Government of Egypt
GOIEC	General Organization for Import and Export Control
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HBE	Home-based enterprise
HC	Holding company
HCRFM	Holding Company for Rice and Flour Mills
HEIA	Horticulture Export Improvement Association
HSU	Horticultural Services Unit
HVI	High-volume instrument (for testing cotton lint)
IAS	Irrigation Advisory Service
IFPRI	International Food Policy Research Institute
IIP	Irrigation Improvement Project

IMT	Irrigation management transfer
IPM	Integrated pest management
KAP	Knowledge, attitudes, and practices
kentar	unit of weight (1 cotton lint kentar [metric kentar] ≈ 50 kg)
LE	Egyptian Pound
LU	Local Unit
LS	Long-staple (cotton)
MALR	Ministry of Agriculture and Land Reclamation
Markaz	District (the third administrative level in Egypt)
MEFT	Ministry of Economy and Foreign Trade (former name of MFT)
MFT	Ministry of Foreign Trade
MIP	Market Information Project
MISD	Matching Irrigation Supply and Demand
mlk	million lint *kentars* (≈ 50,000 mt)
MOHP	Ministry of Health and Population
MOU	Memorandum of Understanding
MPE	Ministry of Public Enterprise
MPWWR	Ministry of Public Works and Water Resources (former name of MWRI)
MSHT	Ministry of Supply and Home Trade
MSM	Main system management
mt	Metric tons
MTS	Ministry of Trade and Supply (former name of MSHT)
MVE	Monitoring, Verification and Evaluation Unit (of APRP)
MWRI	Ministry of Water Resources and Irrigation
NOPWASD	National Organization for Potable Water and Sanitary Drainage
NTAE	non-traditional agricultural exports
OLS	ordinary least-squares
PAU	Policy Analysis Unit
PBDAC	Principal Bank for Development and Agricultural Credit
RDI	Reform Design and Implementation Unit (of APRP)
RMG	ready-made garment
S&O	situation and outlook
S,C,P	structure, conduct, performance
SME	Small and micro enterprise
SPS	Sanitary and phytosanitary
SSV	short-season rice variety
TCF	Textile Consolidation Fund
UD	Universal density (bales of cotton lint, approximately 480-500 lbs.)
USAID	United States Agency for International Development
WPAU	Water Policy Advisory Unit
WPRP	Water Policy Reform Program
WTO	World Trade Organization
WUA	Water user association

I The Context

1 Introduction

Gary Ender

This volume explores the process and substance of policy reform in agriculture, while also expanding the set of methods available to assess the actual and potential impact of such programs. The particular case is the Agricultural Policy Reform Program (APRP) in Egypt, sponsored by the Government of Egypt and USAID/Egypt. The authors find success in both the ways that policy change was implemented and in the various technical areas, and not surprisingly, also find remaining challenges. More than individual successes, however, what is compelling is the scale on which reform was attempted, the myriad details that must be attended to in order to be successful, and the richness of the analysis describes in detail what occurred and why.

APRP: Second-Generation Policy Reform in Agriculture

APRP was a second-generation policy reform program, implemented from 1996 through 2002, that followed the initial reforms made under the Agricultural Production and Credit Project (APCP, 1987–1995). The goal of APRP was to increase economic growth through (1) open and competitive agricultural markets; (2) growth of exports and trade based on Egypt's comparative advantage; (3) liberal conditions favoring private investment, including the privatization of GOE-owned enterprises; (4) increased efficiency and productivity of Egypt's Nile Water System and land resources; and (5) targeted food subsidies.

APRP consisted of a sector grant program and technical assistance. The sector grant program was an annual program of reforms, or "benchmarks," that were agreed to by the Government of Egypt, under the leadership of the Ministry of Agriculture and Land Reclamation (MALR), and USAID. After the accomplishment of these benchmarks was "verified" in an annual report, USAID made a disbursement of grant assistance to the Government. APRP implemented five tranches of such benchmarks. When APRP began, there were five ministries working[1] under the program (MALR, MWRI, MSHT, MFT, and MPE[2]), reflecting the broad scope of policy reforms to be undertaken by the Government in the second generation. Agricultural policy reform started primarily at the production level. APRP extended these efforts to the marketing system, exports, privatization, development of agricultural support services, irrigation management, food security, and related areas. Details about the reforms attempted under APRP are provided in chapter 2.

There were several specialized APRP technical assistance units. The Reform Design and Implementation Unit was the largest, and focused on the development and implementation of reform benchmarks in all program policy areas except water management, and collaborated on benchmarks that touched on both crops and water with the Water Policy Analysis Unit/EPIQ[3] team. The latter team performed the same functions of design and implementation for water-related reforms. Two specialized technical units provided supporting research and communications. The Food Security Research Unit (manned by the International Food Policy Research Institute) carried out a number of studies on food subsidies, wheat production and milling, and household demand, and suggested some specific benchmarks in these areas. GreenCOM III assisted MWRI with communications with farmers and other water users about water scarcity and other irrigation-related issues, and surveyed farmers on their irrigation knowledge, attitudes, and practices. Finally, there was a project management unit that helped coordinate benchmark development and implementation, as well as a monitoring and evaluation unit.

MVE Unit and Conference on Impact Assessment

The designers of APRP included technical assistance to implement the program as well as assistance to carry out verification, monitoring, and evaluation (impact assessment), in the form of the Monitoring, Verification, and Evaluation (MVE) Unit. The MVE Unit verified whether policy reforms had been accomplished by the Government of Egypt (GOE). On the basis of the MVE Unit's report, USAID allocated sector grant funds to the GOE. Once implementation of reforms was under way, the MVE Unit monitored key indicators of progress and published an analysis of these in its annual monitoring report.[4] The most important and challenging task for the MVE Unit was the assessment of APRP's impact. To fulfill this objective, the Unit carried out and published numerous studies, which sometimes consisted of baseline and "endline" studies of a subsector. There were also important studies that cut across commodities to analyze improvements in the agricultural information system and the principles and methods that resulted in successful implementation. The endline and cross-cutting studies were presented at a final conference and are summarized in this volume. For the conference, the MVE Unit invited papers from other participants in APRP. Conference papers on APRP's impact on irrigation management and policy and on a method for determining the impact of agricultural reform in different geographic regions are also included. Finally, the Unit looked broadly at the agricultural sector and the potential of agricultural growth to create employment. One major paper created a model of this process, and a companion paper delved deeply into the relationships in rural areas among small and micro enterprise development, agricultural growth, and employment.

Outline of Book

This section of the volume concludes with a chapter describing the main areas in which APRP attempted reform. Subsequent sections cover methods that were tailored to the reform process (proxy indicators of income) and for impact assessment (structure-conduct-performance); the impact of APRP in key commodity subsectors (cotton, rice, wheat, horticulture, fertilizer, and water); cross-cutting topics such as the process of reform and the impact of APRP at the farm level; and the relationships among agricultural growth, SMEs and employment. The final section provides summaries of APRP's impact, lessons learned, and recommendations, and suggests agendas for future reform and research.

References

Ender, Gary and John Holtzman. *The Impact of the Agricultural Policy Reform Program (1996-2002) in Egypt: Conference Proceedings.* MVE Unit – APRP, Impact Assessment Report No. 30. Abt Associates Inc. Cairo, Egypt. July 2002.

Holtzman, John, Gary Ender, Adel Mostafa, Sherif Fayyad, Samar Maziad, Ezz Eldin Abdel Kader, and Nabil El Santricy. *Intermediate Effects of Policy Reform Under APRP: Progress Indicators, 1990-2001.* MVE Unit - APRP, Monitoring Report No.4. Abt Associates Inc. Cairo, Egypt. July 2002.

Endnotes

[1] Each ministry agreed to implement certain reforms and thus shared in the resources of the grant disbursement.

[2] In addition to MALR, they are the Ministry of Water Resources and Irrigation, the Ministry of Supply and Home Trade, the Ministry of Foreign Trade, and the Ministry of Public Enterprises. These are the names of the ministries at the end of the project; there were slight changes in ministry names and responsibilities during APRP.

[3] Environmental Policy and Institutional Strengthening Indefinite Quantity Contract.

[4] Some examples from this annual monitoring report are provided in chapter 6.

2 Main Thrusts of APRP

Gary Ender

Under the Agricultural Policy Reform Program (APRP) the Government of Egypt (GOE) agreed to and carried out many different types of agricultural policy reforms, which covered every aspect of the agricultural economy, from production through domestic marketing and processing to exports (and imports). Examples of these reforms and their benchmarks are shown in Table 2-1.

Table 2-1. TYPES OF APRP BENCHMARKS AND INDICATORS

Benchmark/Indicator Type	Example(s)
Conduct study (tranche I only)	Determine economic and technical feasibility of introducing short-season cotton varieties
Prepare plan of action	Develop phased comprehensive plan to liberalize and privatize cotton ginning
Conduct pilot program to test new policy	Match irrigation supply and demand, test new model for research/extension, test block planting/irrigation of short-season rice varieties
Make decree or approve policy statement to change policy	Reduce or eliminate GOE participation in cotton pest control activities, form water user organizations at branch canal level
Fully implement new policy	Publish trade statistics, privatize a company
Meet performance standard	Reduce dwell time of imported refrigerated containers, create jobs in cotton ginning and spinning

Specifically, over the course of APRP's five tranches**,** the GOE and the U.S. Agency for International Development (USAID) agreed to 151 policy reform benchmarks that included 242 separate subparts or indicators for verification. Their distribution by tranche is shown in Table 2-2. Since the verification indicators (and their precursor benchmark subparts of the earlier tranches) correspond most directly to a specific individual reform, the terms *indicator* and *reform* are used somewhat interchangeably in this discussion. Each denotes one potential change in policy. Nevertheless, it should be remembered that the number of indicators is only a crude measure of the number of reforms. Some benchmarks had three related indicators of accomplishment. In some cases, these indicators were three different parts of the reform; in other cases, the indicators were three different ways to verify that a policy change had been made.

Table 2-2. APRP BENCHMARKS AND INDICATORS, BY TRANCHE

Tranche	Number of Benchmarks	Number of Indicators
I	55	72
II	29	53
III	29	48
IV	20	37
V	18	32
Total	**151**	**242**

The level of accomplishment of agreed reforms was generally high, as shown in Table 2-3.

Table 2-3. LEVEL OF ACCOMPLISHMENT OF BENCHMARKS/INDICATORS, BY TRANCHE

Tranche	Level of Accomplishment				Percent Accomplished or Exceeded
	Exceeded	Accomplished	Partially Accomplished	No Progress	
I	5	55	12	0	83
II	6	16	7	0	76
III	3	17	6	2	71
IV	8	18	9	2	70
V	2	30	0	0	100
Total	**24**	**136**	**34**	**4**	**81**

Notes: Data on accomplishment follow the reporting practice in each tranche. In tranche I, where benchmarks sometimes had separately numbered subcomponents, determinations of accomplishment were made for each subcomponent. In tranches II and III, one determination was made for each benchmark, even though sometimes more than one indicator was specified for a benchmark. In tranches IV and V, separate determinations of accomplishment were made for each indicator, as the indicators by this time had become more accurate reflections of the reform to be accomplished. In tranche III, one indicator could not be verified, so the total number of benchmarks in Table 2-3 is one less than the total in Table 2-2.

Classifying Benchmarks by Goal and Thrust

The Memorandum of Understanding (MOU) assigned each benchmark in each tranche to one of five categories[1] according to the benchmark's medium- or long-term goal. Table 2-4 lists these goals and gives examples of reforms under each category.

Only tranches I, II, and III had benchmarks in the first two categories, although the subjects of some benchmarks in tranches IV and V were similar to those of the benchmarks in those categories in the first three tranches. Because of these similarities and because other benchmarks were sometimes categorized arbitrarily in the MOUs, *in this analysis all benchmarks are reclassified into the above categories according to their actual subject, regardless of where they were listed in the MOUs*. Table 2-5 shows the distribution of APRP benchmarks by goal.

The Agricultural Sector Support Services (ASSS) category contained the largest number of agreed indicators because this category covers areas as diverse as government procedures and regulations, institutional development, information systems, and the roles of the public and private sectors in such key areas as research/extension, seed production and distribution, and pesticide use and control. Other key areas of APRP were privatization of firms in key agriculture-related industries, market liberalization, and the management of basic resources such as water and land. There were also a small number of benchmarks on food security–related topics.

Below the goal level, two methods of classification are used in this analysis. First, the author classified the main thrust of each indicator using commodities (e.g., agricultural outputs such as cotton and rice or inputs such as fertilizer and seed). Reforms that were not focused on a commodity were assigned another topic, like privatization or liberalization.

Indicators that were assigned to a commodity group also had relevant topics that could be assigned to them; for example, some cotton indicators deal with the privatization of spinning companies or the liberalization of seed cotton marketing. Thus, a second way to classify the thrust of all indicators is by these topics. Using both of these methods of classification enriches the analysis and gives better perspective on the scope and nature of APRP. The results of these classifications are shown in Tables 2-6 and 2-7.

Table 2-4. APRP GOALS AND ILLUSTRATIVE REFORM BENCHMARKS

Goal	Illustrative Benchmarks
Prices, Markets and Trade (PMT)	• The floor price for cotton is set so as to: (i) provide protection for the cotton growers, and (ii) not to interfere with private sector participation in cotton domestically. (Tranche I) • GOE will issue instructions to fertilizer factories to sell fertilizers without quotas for any group, under commercial conditions, and will develop an overall fertilizer policy framework emphasizing fertilizer production, pricing, trade and private sector participation. (Tranche II)
Private Investment and Privatization in Agribusiness[2] (PIPA)	• The GOE will privatize at least three Affiliated Companies of the Textile Holding Companies, or a majority of the units thereof. (Tranche II) • Based on the study of fertilizer production to be completed by February 1996, the GOE will adopt a time-phased liberalization and privatization plan for fertilizer production, marketing, and international trade. (Tranche I)
Agricultural Land and Water Resource Investments, Utilization and Sustainability (ALWRIUS)	• The GOE (MPWWR, later MWRI) will implement policies and procedures to shift from distributing Nile River water based on water levels to distributing water based on water volumes using the Main System Management Telemetry System at main canal intakes, barrages on the Nile River.... (Tranche III) • The GOE (MWRI) will adopt a policy to facilitate public participation in decision-making regarding planning, development, and management of Egypt's water resources. (Tranche V)
Agricultural Sector Support Services (ASSS)	• The GOE (MALR) will establish a policy that facilitates the renewal of the stock of fruit and other tree crop planting materials in Egypt. (Tranche IV) • The GOE will revise and reissue open and transparent regulations to register pesticides and will issue regulations to license pesticide companies and applicators. (Tranche III)
Food Security and Poverty Alleviation (FSPA)	• The GOE (MALR, in cooperation with the MWRI) will restock the Nile in Upper Egypt with indigenous species of fish. (Tranche V) • The GOE (MOTS) will reduce illicit leakage of subsidized wheat flour. (Tranche IV)

Table 2-5. APRP INDICATORS, BY GOAL

Goal	Number of Indicators
Prices, Markets, and Trade	49
Private Investment and Privatization in Agribusiness	42
Agricultural Land and Water Resource Investments, Utilization and Sustainability	50
Agricultural Sector Support Services	90
Food Security and Poverty Alleviation	11
Total	**242**

Grouping the data in Table 2-6 reveals that commodity-related thrusts can be used to classify 73 percent of the indicators. Inputs and outputs received approximately the same amount of attention (as measured crudely by the number of indicators): 36 percent of the indicators fall under outputs, and 37 percent under inputs. Cotton and water received the most attention, but rice, seed, and pest control were also important. This emphasis is not surprising because cotton is the largest agricultural subsector in Egypt, containing several key industries like trading, ginning, spinning, and weaving and providing significant export revenues; and water is perhaps the most important agricultural resource. In fact, water policy in APRP was the main focus of an entire unit, the Water Policy Advisory Unit (WPAU) and Environmental Policy and Institutional Strengthening IQC (EPIQ), in the project, as well as an important component of the work of the Reform Design and Implementation (RDI) Unit.

The rice crop is a major user of water and leads to important exports. Pest control (of cotton) is an important area in which the GOE took the dramatic step of withdrawing from management and turning it over to the private sector, after making provision for government regulation in the areas of safety and quality control. Horticulture is an area in which the GOE hopes to significantly increase exports, so it has strived to make its policies even more conducive. The liberalization of the critical nitrogenous fertilizer market began during APCP, and the steps taken at the beginning of APRP consolidated this progress.

When indicators are grouped with a commodity emphasis, the main thrusts, other than outputs and inputs, reflect important contributions of APRP to changes in the roles of the public and private sectors and to the development of each. Thus, the following thrusts had numerous indicators:

- Government Services – Information (12 indicators)
- Institutional Development – Public (11 indicators)
- Government Services – Research/Extension (10 indicators)
- Institutional Development – Private (5 indicators)

Table 2-6. MAIN THRUSTS (COMMODITY EMPHASIS) AND REFORMS

Thrust	Number of Indicators	Nature of Reforms Attempted
Cotton	51	Market liberalization in lint and yarn privatization of gins and spinning companies through sale and leasing, testing of short-season and *Hirsutum* varieties, support for cotton logo development, and required HVI testing of quality and dissemination of results.
Seed	22	Faster and cheaper registration and importation of modern varieties, primarily of vegetables.
Water Management Policy	18	Improved utilization of available water through more effective and decentralized management.
Rice	14	Conservation of water through adoption of short-season, high-yielding varieties in coordination with changes in water-release policies, privatization of mills, and some market liberalization.
Government Services – Information	12	Enhancement of scope of data collected and improvements in methods of collection.
Pest Control (Cotton)	11	Major shift in GOE role to regulation and quality control, allowing private sector to provide all goods and services.
Institutional Development – Public	11	Creation of PAU, institutionalization of IAS, restructuring of PBDAC, public participation programs at MWRI and MEFT.
Water Quality	10	Strategy development, establishment of policies, and revision of basic law for drainage reuse.
Government Services – Research/Extension	10	New role for public extension workers and introduction of private extension services (especially vis-à-vis horticultural exports), renewal of planting materials for horticultural research.
Horticulture	9	Lowering refrigerated truck tariff, allowing private airport cold storage, coordinated inspections of imported refrigerated containers, renewal of planting materials.

Table 2-6. MAIN THRUSTS (COMMODITY EMPHASIS) AND REFORMS (CONT'D)

Thrust	Number of Indicators	Nature of Reforms Attempted
Subsidies (8) and Taxes (1)	9	Studies of food subsidies and taxes (including land tax), better targeting of food rationing.
Water	9	Enhancement of private participation in water management through WUAs and IMT.
Fertilizer	8	Reduction of import tariff, liberalization of distribution, privatization of production.
Fish (4), Milk (2), and Meat (1)	7	Restocking of Nile with fish, improved regulations on fish exports, improved milk labeling, meat tariff adjustment.
Land (3) and Land and Water (3)	6	Studies of land divestiture/land tenure, allocating reclaimed land, providing land to use wastewater for irrigation.
Farmer Cost Sharing	5	Studies, development of plans, implementation of public awareness campaign, finalization of procedures.
Institutional Development – Private	5	Establishment of and GOE support for advocacy councils (made up of private trade associations).
Sugarcane	4	Plans and programs to enhance efficiency of irrigation water use in production of sugarcane.
Wheat	3	No price restrictions on 72% flour, reduce leakage in 82% flour by mixing maize at the mill.
Cooperatives	3	Promotion of commercial cooperatives independent of GOE by amending the basic law and other means.
Government Services – Regulation	3	Checking if phytosanitary regulations are technically justified, studies of needed market regulation
Other	12	
Total	**242**	

This significant number of non-commodity topics leads naturally to an examination of the thrusts of APRP from a non-commodity, or more conceptual, point of view. Table 2-7 shows the emphases of APRP when all benchmarks/indicators are classified first according to topical area rather than to

commodity. When categorized without a commodity emphasis, the thrusts of APRP fall naturally into the following logical groups:

Table 2-7. APRP THRUSTS (NON-COMMODITY EMPHASIS)

Thrust	Number of Indicators
Government Services – Regulation	34
Privatization/Private Investment	33
Liberalization – Marketing	24
Water Management Policy	22
Government Services – Research/Extension	22
Trade and Tariffs	18
Institutional Development – Private	14
Government Services – Information	14
Institutional Development – Public	11
Water Quality	10
Production	9
Liberalization – Pricing/Subsidies	8
Food Security	8
Farmer Cost Sharing	5
Government Services – Marketing	4
Cooperatives	3
Land	3
Total	**242**

- Reforming Markets—Privatization, liberalization, changes in regulations, trade, pricing, and cost sharing

- Improving Key Resource Management—Water management efficiency and effectiveness, and water quality

- Reforming and/or Developing Public Institutions—Research and extension, information systems, institutional development, development of cooperatives

- Developing the Private Sector—Providing opportunities for the private sector to advocate for policy change and promoting private participation in decision-making, as well as training to empower private entities to play a strong role in providing private goods and services (like pesticides)

- Enhancing Production—Land use planning and freedom to allocate resources in agricultural production

- Improving Food Security—Targeting food subsidies and reducing leakage of subsidized flour

Interplay of Commodity and Non-Commodity Thrusts

What does the pattern of reforms look like when we consider both their commodity and non-commodity aspects? Let us examine some of the more important commodities and topics.

Pest Control. Most of the pest-control benchmarks and indicators were concerned with changing the role of the public and private sectors in the provision of goods and services for pest control in cotton. Nearly all pest-control activities for other crops had been opened to the private sector before APRP began in 1996. The GOE retained a central role in pest control for cotton because of the strategic nature of the crop and the pernicious nature of the pests that need to be controlled or kept out of Egypt. Efforts in this area spanned tranches I through IV, culminating in a decree allowing the private sector to fully participate in pest control for cotton. This decree was accompanied by revisions to pesticide registration, training for those in the industry, and a clear intention by MALR to remain involved in regulations.[3]

Seed. Some of the early seed benchmarks were related to cotton, in that the GOE was producing cotton seed and the program was encouraging the use of acid delinted seed. Most of the seed benchmarks, however, were targeted to horticultural products (mostly vegetables), where the ability to develop, import, test, and deploy up-to-date seed varieties is truly critical to developing a modern and export-oriented horticultural subsector. These benchmarks were implemented in tranches II through V. In addition, horticulture and extension were also linked (in tranches I through IV) through efforts to develop new extension models for export-oriented horticulture. One benchmark (in tranche IV) addressed the need to modernize the stock of horticultural planting materials in the research system.

Privatization. Much of the emphasis of APRP in privatization concerned entities in the cotton subsector. There were successful privatizations of public ginning and spinning companies (the latter through both sale and leasing), and a benchmark requiring privatization of public cotton trading companies. Rice was also a focus of privatization efforts. In addition, there were several benchmarks aimed at privatization of water-related functions, including *mesqa* (on-farm canal) improvements, creation of water user associations, and transfer of irrigation management.

Liberalization. Liberalization efforts were concentrated on the cotton market, but also (at the beginning of APRP) on the rice and fertilizer markets. Changes in the marketing of seed cotton and lint continued from APCP throughout APRP. The cooperatives as well as private companies have increased their roles in domestic marketing as a result of achieving these benchmarks.

By the end of APRP, there was much more emphasis on the role of the GOE in providing reliable, timely information to private sector participants in reformed markets (see Table 2-8). Thus, MALR began collecting and publishing farm income data, Cotton Arbitration and Testing General Organization (CATGO) enhanced its publication of seed cotton quality data during the marketing season, and Ministry of Foreign Trade (MFT) began publishing more detailed trade data, as well as the texts of key trade agreements. These institutions and organizations also began putting important data on the Internet to make it more easily and more widely available.

Focus, Sequence, and Continuity of Reform Efforts

What patterns emerged as the different reforms were agreed to and implemented? This section explores the changes in focus and the timing and consistency of reforms under APRP over the period of the five tranches.

Focus. Building on the accomplishments of APCP, APRP was anchored in agricultural production–related and domestic marketing–related issues—particularly issues related to cotton and fertilizer—and moved logically to export and other liberalization issues, to privatization, to new commodities like seed and horticulture, as well as to institutional, information, and other issues. Thus, the first task of APRP in tranche I was to consolidate the gains made from achieving the APCP cotton benchmarks. To this set of carryover benchmarks was added a "laundry list" of benchmarks—starting with those covering fertilizer—that was developed before the technical assistance teams arrived and that resulted in a large number of benchmarks to be accomplished at the very outset of the program. (Recognizing the challenge involved in accomplishing so many reforms in such a short period of time, USAID extended the deadline for accomplishment of those carryover benchmarks that were not completed by the original deadline.)

APRP became more focused with each subsequent tranche, which is demonstrated by the decreasing number of benchmarks with each tranche (see Table 2-2), and by approximating the number of substantive areas of focus as well. Thus, the number of goal/thrust pairs (e.g., "PMT/cotton" or "ASSS/Information") that were sufficient to characterize all the benchmarks in a tranche also decreased, from 34 in tranche I to 14 in tranche V (see Table 2-9).

Table 2-8. PREVALENCE OF INFORMATION THEME IN BENCHMARKS OF TRANCHE V

Benchmark	New Policy	Relation to Information Theme
D.2	CATGO publishes HVI test results	Potential traders and clients get access to complete information on key characteristics of cotton.
D.4	Publication of trade data and trade agreements	Potential traders get access to detailed information on Egypt's imports and exports, and thus on potential markets.
D.7	E-trade	Cotton lint and yarn traders encouraged to share information about their exportable products through the use of electronic technology
D.8	Vegetable Seed "Screening"	Seed producers allowed to import samples for testing to acquire valuable information about their suitability for sale in Egypt.
D.9	Technology Commercialization	Private companies gain access to embedded genetic information in seeds and other ARC discoveries.
D.10	Transparency in Decision-Making	MFT shares information with stakeholders on potential impacts of new regulations.
D.11	Fish Export Regulations	Egypt establishes SPS and quality/labeling standards for fish. Such standards, when enforced by GOE, are information valuable to EU importers, who then need not verify the information directly themselves.

Table 2-9. GOAL/THRUST COMBINATIONS,* BY TRANCHE

Tranche	Number of Category/Thrust Combinations Covering All Benchmarks
I	34
II	21
III	20
IV	15
V	14

*Commodity emphasis.

Although there were some new topics added as the end of the program approached (e.g., women, fish production, and child labor, which had never been addressed or mentioned in previous work), the number of such new topics was not significant, and one can still say that overall, the program became more focused as it proceeded.

In discussing focus, it is also necessary to consider the relationship of the benchmarks and indicators to the APRP work program. Each successive tranche

generally brought with it a greater backlog of implementation work. For example, many benchmarks required that pilot programs be established, and when these pilot programs succeeded, the GOE continued and, more important, expanded them in the following years, with help from APRP. The number of technical assistance professionals available in APRP did increase somewhat over the course of the program (especially in the RDI Unit). Nevertheless, given the accumulating workload created through the benchmarks and associated implementation activities, it was important for the feasibility of the program that both the number of benchmarks and the number of thrusts decline. Similarly, the amount of implementation work that could have been undertaken based on the number of benchmarks in tranche I was beyond the capability of the technical assistance teams to carry out in a satisfactory fashion. From this point of view, it was imperative that the program become more focused as it progressed.

Despite more focus (i.e., a somewhat narrower technical scope of operations), the APRP work program expanded year by year. Indeed, many more field activities were undertaken over the term of the program, with an increasing number of ministries and agencies. Table 2-10 shows that the number of workshops and seminars, and the number of participants, generally increased each year. Workshops and seminars are a key activity for implementing either the benchmarks themselves or the programs that continue after the benchmark is accomplished. These activities are used to build consensus on the relevant policy reforms being undertaken, to draw up action plans for implementation of the reforms, and to monitor actual implementation; and training programs impart required new technical skills in the same context.

Table 2-10. NUMBERS OF RDI-APRP WORKSHOPS, SEMINARS[4] AND TRAINING PROGRAMS, AND NUMBERS OF PARTICIPANTS, 1997-2001

	Workshops		Seminars		Training by RDI Unit	
Year	**Number**	**Participants**	**Number**	**Participants**	**Number**	**Participants**
1997	10	347	12	465	3	15
1998	51	1,713	12	239	18	244
1999	89	4,842	32	925	13	490
2000	106	6,440	27	807	0	0
2001	117	5,007	24	1,150	2	89
Total	373	18,349	107	3,586	36	838

Source: RDI Unit - APRP.

Sequence. With the exception of cotton and rice, on which efforts were more prolonged than on other issues, market *liberalization* efforts were heavily concentrated in tranches I and II (most occurred in tranche I). The commodities

involved in market liberalization included fertilizer, pest control, seed, tractors, horticulture, meat, and wheat. Efforts to liberalize the domestic cotton market extended through tranche V. In this final tranche, one benchmark continued to address the balance between the public and private sectors in marketing, while another broadened the reform effort to include the need for the public sector to publish timely information on the size and quality of the crop as the season progressed.

Privatization benchmarks were common in the early part of APRP. In tranches I through III, these benchmarks were designed primarily to transfer nationalized firms or their factories to the private sector. Such privatization was attempted in cotton ginning, cotton spinning, and cotton trading; fertilizer plants; rice mills; and seed. Such benchmarks were absent thereafter, and the privatization program of the GOE generally stalled after tranche III. In some cases, the easy privatizations had been accomplished; this was true in cotton spinning as well as in non-agriculture-related industries. In other cases, there were valuation issues that held up further action; for example, in the cotton ginning industry, the Monitoring, Verification and Evaluation (MVE) Unit documented successful privatization of Arabeya Ginning,[4] but three of the five public cotton ginning companies remain public, largely because of a lack of agreement on how to value and/or transfer the valuable land on which these companies' assets are located. During the last two tranches of APRP, the emphasis of privatization benchmarks shifted to attempts to turn over certain functions to the private sector, such as management of irrigation and cooperatives, production and distribution of seed, and provision of cotton pest-control services.

Reforms under the ASSS category were mainly in the areas of *regulations and procedures*, *institutional development*, and *information*. Taken as a whole, this often meant a new balance between the role of the public sector and that of the private sector, a balance more appropriate for a market-based economy. There were benchmarks addressing issues in research and extension in all five tranches, including benchmarks to craft a new role for the private sector, to transfer some extension activities to the private sector, and to develop the use of intellectual property rights in the Agricultural Research Center (ARC) and its private partners. There were ASSS benchmarks in four of the five tranches covering cotton, pest control, information, and seed. Cotton benchmarks covered new varieties, import regulations, the new logo for Egyptian cotton, quality testing, and information dissemination. Benchmarks on information addressed issues of market information systems, collection and publication of data on farm income and gender-disaggregated data, information sharing to balance irrigation supply and demand, and publication of trade data and agreements. Seed benchmarks covered seed testing and registration, a new seed law, promotion of the private seed association, and breeders' rights.

Private institutional development was concentrated in tranches III, IV, and V, and was focused on the development of trade associations for policy advocacy. In the public sector, institutional development benchmarks promoted the establishment of the Policy Analysis Unit in MALR, institutionalized the Irrigation Advisory Service (IAS) in Ministry of Water Resources and Irrigation (MWRI), led to changes in the structure of the Principal Bank for Development and Agricultural Credit (PBDAC), and promoted public participation in policy-making at Ministry of Economy and Foreign Trade (MEFT, now MFT) and MWRI. There were benchmarks in tranches III and IV targeted at horticulture, including efforts to enhance air and sea cargo service, allow exporters to bring refrigerated containers to farms, allow the private sector to operate cold storage at airports, promote the renewal of planting materials for research and distribution, and institute coordinated inspection procedures for imports to move refrigerated containers to export faster.

Benchmarks in the Agricultural Land and Water Resource Investments, Utilization and Sustainability (ALWRIUS) category were focused largely on *water* and *its management*, *conservation*, *quality*, and *optimal allocation* to crops and regions. Associated topics included rice, sugarcane, and cropping pattern; fish; land; and cost sharing. Efforts in water management and water quality began in tranche I and continued through all tranches of the program. Improvements in water management policy included decentralization of water allocation decisions, partly through better utilization of previously installed telemetry technology. MWRI also developed revisions to Law 12 that were intended to improve water management. Probably the most critical effort in this area is the work to "establish a system that improves the flow of real-time information between the Ministries [MALR and MWRI] with respect to irrigation demands and supplies."[5] This work corrected a gap in the water management system that had been present since the mid-1980s, when farmers were given the right to plan their own cropping patterns, but there was little corresponding adjustment in the way water was allocated. Water quality was addressed mostly through a program of better management of the reuse of irrigation water discarded into "drains," the channels that carry used irrigation water away from fields and that also contain various pollutants (including salts).

The *food security* benchmarks were an attempt to serve the needs of the MSHT for rationalizing the food subsidy system, a goal supported by the previous and current ministers, but political sensitivity prevented significant action in this area (tranches II and IV). Tranche I contained the largest number of food security benchmarks, and the number of such benchmarks decreased thereafter. Almost all of the work on food security was in the form of studies; the only successful non-study effort was to begin mixing maize flour with wheat flour to reduce illicit leakage from the subsidized flour and bread system (tranche IV), an action that was recommended in a study by the MVE Unit on the wheat subsector.[6]

There were also a number of opportunistic or one-time benchmarks that were not part of a larger coherent thrust:

- Fish—MALR was moving in the direction of restocking the Nile River with fish, so one benchmark was incorporated in tranche V; fish export regulations were a perceived export problem for trade to the EU.

- Milk (Powder) Labeling—One benchmark was included in tranche V as an indirect way to promote domestic milk production against the unfair competition of subsidized imported milk powder.

- Women—After a study was completed, several actions were proposed and two were selected as indicators.

- Child Labor—This benchmark was generated by a political issue in the United States, and the GOE agreed to rescind an old decree.

- Contract Farming—The benchmark was formulated in a general way, but it complemented other improvements in horticulture-related policies.

There were also attempts to insert such one-time benchmarks as protecting antiquities from the water damage caused indirectly by agricultural policies and fortification of subsidized bread with iron, but these were not accepted for inclusion in the MOU.

During the design of benchmarks in tranches IV and V, there was discussion of a "legacy" for the program, considering the sustainability of reforms. In the end, however, this consideration was more relevant to the implementation activities of the project than to the design of benchmarks. Generally, if it is not possible to conclude a set of reforms by virtue of previous progress, it is not possible to do so simply by introducing concern for a legacy. Thus, in the implementation activities of APRP, the technical assistance teams made provision for training and completion of any necessary hand-over, but there is no apparent significant effect on the nature of the benchmarks and indicators in tranche V as a result of concern for sustainability.

Continuity. The continuity of efforts in key areas reveals much about the emphases of APRP. Since the pattern and sequence of reforms was discussed previously, continuity is summarized by grouping the thrusts by occurrence over the five tranches (with the thrusts listed alphabetically within the groups):

Throughout APRP (at least four tranches):
- Cotton marketing
- Cotton pest control
- Cotton varieties and quality
- Food security/subsidies
- Information
- Research/extension

- Seed regulation
- Water management
- Water privatization
- Water quality

In the first three tranches:
- Cotton privatization
- Rice privatization

In the last three tranches:
- Private sector development

In three tranches but not continuously:
- Cooperatives
- Seed privatization

Summary

APRP was a very broad program of reform. It encompassed many types of benchmarks, several major input and output commodities, and numerous types of reform, including major changes in the roles of the public and private sectors. Important areas of activity included liberalization of input and output markets, privatization of public companies, improved management of irrigation, development of public services in the agricultural sector, and food security. Starting from a very long list of reforms (in tranche I), the program steadily became more focused and gave consistent attention to certain areas, while retaining the capability to address one-time issues.

References

Holtzman, John, Gary Ender, Adel Mostafa, Sherif Fayyad, Samar Maziad, Ezz Eldin Abdel Kader, and Nabil El Santricy. *Intermediate Effects of Policy Reform Under APRP: Progress Indicators, 1990-2001.* MVE Unit – APRP, Monitoring Report No. 4. Abt Associates Inc. Cairo, Egypt. July 2002.

Krenz, Ronald D. and Adel Mostafa. *The Impacts of Privatization on the Cotton Ginning Industry in Egypt.* MVE Unit – APRP, Special Study No. 3. Abt Associates Inc. Cairo, Egypt. May 2000.

Tyner, Wallace, B. Adair Morse, Ragaa El-Amir, Adel Mostafa, and Sherin Sherif. *Wheat Subsector Baseline Study.* MVE Unit – APRP, Impact Assessment Report No. 6. Abt Associates Inc. Cairo, Egypt. May 1999.

Endnotes

[1] The tranche I MOU had only four categories: essentially there was one category that combined ASSS and ALWRIUS. The name of the last category was Taxes, Subsidies, and Food Security.

[2] "In Agribusiness" was added to the title of this category in tranche IV.

[3] This is discussed further in chapter 16.

[4] Cf. Krenz, and Mostafa, 2000.

[5] Partly to emphasize improvements in information systems, this benchmark is categorized in this analysis as falling in the information area. In reality it also falls in the water management category, as the information is transferred for the sake of better matching the supply of irrigation water to its demand, as reflected in actual crop planting decisions.

[6] Cf. Tyner et al., 1999.

II Methods for Reform and Assessment

Overview

This section discusses indicators identified by APRP for planning reforms or tracking their initial effects and the methods used by APRP to assess the longer-term impacts of policy reform. Chapter 3 describes how APRP's Food Security Research Unit (FSR) developed proxy indicators of income for categorizing Egyptian households and targeting food subsidies. This analytical effort drew on data collected by the FSR Unit's household survey. Chapter 4 makes novel use of data from the Demographic and Health Surveys, in combination with district typologies, to show the geographic distribution of impacts of recent policy reforms. Chapter 5 provides an overview of the impact assessment methods used by the MVE Unit of APRP to analyze and attribute impacts on multiple levels (producer, subsector, public and private participants, rural enterprises, and agricultural economy) of a complex policy reform program. Chapter 6 describes progress indicators, which were used to measure the first effects of policy reforms implemented under APRP and formed the basis for the MVE Unit's annual monitoring reports. The chapter discusses the process by which these indicators were conceived, refined, and reported. Chapter 7 discusses the approach used in subsector studies of the cotton, rice, wheat, fertilizer, and horticultural subsectors. The author delineates an analytical framework—the structure, conduct, performance paradigm—as it has been adapted to subsector analysis. The chapter explains why this approach was used to examine the impact of policy reform on key subsectors, and describes its strengths and weaknesses.

3 Proxy Indicators of Income for Targeting Food Subsidies[1]

Akhter U. Ahmed and Howarth E. Bouis

Despite achieving a significant cost reduction over the past two decades, the absolute cost of food subsidies in Egypt is still high relative to the benefits received by the poor. There is scope for better targeting food subsidies, in particular those for rationed cooking oil and sugar, both because reforms in this area are perceived to be far less politically sensitive than adjusting subsidy policies for bread and wheat flour and because higher-income groups presently receive a significant percentage of the benefits. Targeting the high-subsidy green ration cards to the poor and the low-subsidy red ration cards to the nonpoor will require identification of both poor and nonpoor households. An International Food Policy Research Institute research team in Egypt, in collaboration with the Egyptian Ministry of Trade and Supply, developed a proxy indicator of income ("proxy means test") for targeting ration cards. This paper describes the process of moving from the optimal income-predicting model to the final model that was both administratively and politically feasible. An ex ante evaluation of the levels of accuracy of the proxy means testing model indicates that the model performs quite well in predicting the needy and nonneedy households.

Since the mid-1980s, the Government of Egypt (GOE) has used a variety of strategies to gradually reduce the cost of food subsidies. These strategies have included increasing the price of subsidized food commodities, reducing the number of ration card holders, and reducing both the number and quantity of subsidized food items available to consumers. As a result, the explicit cost of the food subsidy system has declined appreciably in real terms. As a share of total government expenditures, the cost decreased from about14 percent in 1980/81 to 5.6 percent in 1996/97. The current food subsidy system includes only four foods: *baladi* bread, wheat flour, sugar, and cooking oil. Subsidized *baladi* bread and wheat flour are available to all consumers without restriction, while a monthly quota of sugar and cooking oil is available at subsidized prices only to those with ration cards. The Ministry of Trade and Supply (MTS) administers and monitors the food subsidy system through a nationwide administrative network. Research by the International Food Policy Research Institute's (IFPRI) Food Security Research (FSR) Unit of the Agricultural Policy Reform Program (APRP) (Ahmed et al. 2001; Ahmed, Bouis, and Ali 1999) indicates that, while the current system of food subsidies is generally effective as a social safety net to help protect the poor during economic restructuring, it is weak in four areas:

1. The absolute cost of the present food subsidy system is still high relative to the benefits received by the poor. The total cost of Egypt's food subsidy system, in 1996/1997 prices, was LE 3.74 billion, or about US$1.1 billion,[2] of which *baladi* bread accounted for 62 percent; wheat flour, 15 percent; sugar, 13 percent; and oil, 10 percent.

2. The current system is not well targeted toward the poor; almost 60 percent of benefits go to higher-income households, which constitute the top 60 percent of the population in income distribution.

3. A significant number of the poor has limited access to subsidy benefits.

4. A considerable portion of the benefits is misappropriated in the distribution system. In 1997, leakage in the Egyptian food subsidy system accounted for about 16 percent of the total cost of food subsidies.[3]

Thus, through a combination of poor targeting and systemic leakage, only about one-third of the food subsidy costs incurred by the government goes to the poorest 40 percent of the population. There is scope for better targeting the food subsidy system in ways that reduce benefits to the nonneedy (thereby cutting costs) while protecting the poor. In particular, there is scope for reforming the subsidies for rationed cooking oil and sugar because changes in this area are perceived to be far less politically sensitive than it would be to adjust the subsidy policy for *baladi* bread and flour (Gutner, Gomaa, and Nasser 1999). The *baladi* bread subsidy is a relatively effective means for protecting the poor, particularly the urban poor, from shocks that may arise from Egypt's ongoing economic reform process. Targeting bread subsidies toward the poor, although technically and administratively feasible, is not a priority of the GOE because the political cost may be too high (Ahmed et al. 2001).

Ration Card Subsidy System

About three-fourths of the Egyptian population hold ration cards that guarantee a monthly quota of sugar and cooking oil at subsidized prices. In 1997, the total cost of these ration card subsidies was LE 874 million. In that year, 590,000 metric tons of subsidized sugar and 220,000 metric tons of subsidized cooking oil were supplied to outlets. Consumers holding ration cards buy subsidized sugar and cooking oil at outlets (*tamweens*) located in private groceries, which also sell nonsubsidized consumer goods. The *tamweens* register with MTS to receive rations from the government wholesale companies it operates. Ration card holders register their cards with the grocer of their choice, and the grocer records monthly purchases of sugar and cooking oil on the card, which has enough space to record purchases over a full decade.

The ration card holders are required to report any changes in family size that result from deaths or migration of members to the local offices operated by MTS. MTS stopped registering newborn children for the ration system in 1989.

There are two categories of ration cards for sugar and cooking oil, a green card and a red card. The green card, originally a ration (not subsidy) card that was started during World War II, now has a high rate of subsidy and is intended for low-income families. The red card, initiated in 1981, has a low rate of subsidy and is intended for people with higher incomes. Table 3-1 shows the distribution of green and red ration cards, and the population that was covered under the ration card system in 1999.

The monthly quota for subsidized cooking oil varies from region to region. In metropolitan Cairo, Alexandria, coastal cities, and the frontier governorates,[4] the per capita monthly quota is 500 grams, while it is 300 grams in all other parts of the country. Cooking oil is sold for LE 1.00 per kilogram to green card holders, while red card holders pay LE 1.25. The private unsubsidized price for cooking oil of similar quality was about LE 3.50 in 1997.

Table 3-1. DISTRIBUTION OF RATION CARDS, 1999 (thousands)

Type of Ration Cards	Number of Ration Cards	Number of Beneficiaries
Green ration cards	8,452	36,447
Red ration cards	1,610	6,834
Total	10,062	43,281

Source: Ministry of Trade and Supply (unpublished data)

The monthly quota per capita for sugar is 1 kilogram, which is uniform throughout the country. Sugar costs LE 0.50 per kilogram for green card holders and LE 0.75 for red card holders. The private unsubsidized market price for sugar of similar quality was about LE 1.60 in 1997.

Policy Issues

The current ration card system is very loosely targeted, in the sense of providing subsidies only to the poor. In fact, a majority of wealthy Egyptians carry the high-subsidy green ration cards rather than the low-subsidy red cards, while some of the poorest Egyptians hold red cards or no cards.

The data in Table 3-2, derived from IFPRI's 1997 Egypt Integrated Household Survey (EIHS), highlight ways in which the ration card system is poorly targeted. First, while it is generally assumed that households without ration cards are richer, 11 percent of households in the poorest quintile and 16 percent in the second poorest quintile do not hold ration cards at all. Second, 11 percent of households in the poorest quintile and 9 percent of households in the richest quintile hold red ration cards, which are in principle intended for those with higher incomes. Red

ration cards are distributed more or less evenly across all income groups. In fact, 61 percent of households that hold green ration cards, which are intended for the poor, belong to the three richest expenditure quintiles. There is clearly room to improve equity by reducing benefits to the nonpoor while expanding coverage to better protect the poor. At present, the GOE is prepared to reform the cooking oil and sugar subsidies.

Table 3-2. HOUSEHOLDS HOLDING RATION CARDS IN EGYPT, BY EXPENDITURE QUINTILE

	Per Capita Expenditure Quintile					
	Highest (1)	(2)	(3)	(4)	Lowest (5)	Total
Percent of All Survey Households						
Green card	78.0	74.3	78.0	70.8	63.5	72.3
Red card	11.0	9.5	10.8	12.4	9.3	10.6
No card	11.0	16.2	11.2	16.8	27.2	17.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Percent of Households That Hold Ration Cards						
Green card	18.8	19.8	20.0	20.4	21.0	100.0
Red card	18.3	17.4	18.9	24.5	20.9	100.0

Source: IFPRI Food Security Research Project in Egypt, "Egypt Integrated Household Survey, 1997."
Note: Green ration cards provide a higher rate of subsidy to consumers than do the red ration cards.

A policy reform might seek to transfer nonpoor consumers from the high-subsidy green card to the low-subsidy red card and transfer poor consumers from the low-subsidy red card to the high-subsidy green card. Simultaneously, the policy might also bring the poor who currently do not hold any ration card into the green card system. Such a demonstration of the GOE's desire to provide a ration card safety net to the poor who have slipped through the system should enhance the political feasibility of the reform. Moreover, conversion of red cards to green cards for poor families would reflect government efforts to provide a higher level of food subsidy benefits to the poor, which should mitigate public criticism that the reform is aimed mainly at reducing overall subsidy costs by transferring people from green to red cards.

Identifying the Poor

Targeting the green ration cards to the poor and the red ration cards to the nonpoor will require the GOE to define and identify both poor and nonpoor households. In any administrative targeting effort, however, the major challenge facing

policymakers is how to create a system to identify these households accurately and cost effectively.

The per capita income of a household can be considered a measure of its welfare. MTS has a standard application form for ration cards that records self-reported incomes of household members. MTS administers this form every three years to all holders of ration cards to "clean" or update the ration card system (i.e., remove the names of the deceased and out-migrants and convert green cards to red cards for wealthy households).

The ration card holders, however, have an incentive to understate their incomes so that they can qualify for full subsidy benefits, and verifying income is difficult in Egypt because it is difficult to document the level and sources of income of household members. Because measurement of household income or expenditure requires expensive and time-consuming surveys, such measures of welfare are rarely used in developing countries to determine eligibility or benefit levels.

An alternative method to measure household welfare is to administer a "proxy means test." Instead of asking about income directly, this approach relies on indicators that are highly correlated with household income (or total consumption expenditure), yet are easy to collect, observe, and verify. Points are assigned to selected indicators, and eligibility for program benefits is determined on the basis of a total score, as a proxy for household income (Grosh and Glinskaya 1997). A comparative study of 30 targeted social programs in Latin America reveals that, among all targeting methods, the proxy means tests used in Chile resulted in the highest targeting rate to the poor (Grosh 1994).

Developing Proxy Means Tests: Technical Versus Political and Administrative Considerations

Task Force. MTS asked FSR to develop a scientific yet simple-to-administer method for targeting the green ration cards to the poor and the red ration cards to the nonpoor. FSR selected the proxy means testing method.

IFPRI's experience in developing targeted food interventions in Bangladesh indicates that the researchers must work closely with the officials of the implementing agency in the design stage if the proxy means test is to be implemented successfully (Ahmed and Bouis 1998; WGTFI 1994). Therefore, FSR initiated the formation of a Task Force for Food Security, composed of 12 high-level MTS officials, project officers of the U.S. Agency for International Development (USAID), and IFPRI's Cairo-based research staff. MTS approved the Task Force and its members in November 1998.

The Task Force, which met twice per month from November 1998 to March 1999 and once per week from April to September 1999, was instrumental in developing

the proxy means tests. The FSR team presented their progress in these meetings, and the Task Force members provided feedback.

Data Source. The proxy means test model was developed using the dataset from the Egypt Integrated Household Survey (EIHS) undertaken by FSR in collaboration with the Ministry of Agriculture and Land Reclamation (MALR) and the Ministry of Trade and Supply in 1997. The EIHS was a nationally representative survey that included urban and rural households. The survey sampled 2,500 households from 20 (out of a total 26) governorates using a two-stage, stratified selection process. The population of the 20 sampled governorates makes up about 98 percent of Egypt's total population.

The EIHS collected information on a wide variety of topics, including income, expenditures, food consumption, nutrition and health status, education, employment, credit and savings, remittances and transfers, migration, farming, and the use of the food subsidy system by households.[5]

Predicting Household Welfare. Which variables best measure household welfare and what weight should be assigned to selected indicators for calculating household scores in implementing the proxy means test?

Although income data are available in the 1997 EIHS survey, per capita consumption expenditure was chosen as the most reliable measure of household welfare for two reasons. First, consumption expenditures are likely to reflect permanent income and are, therefore, a better indicator of consumption behavior. Second, data on consumption expenditure are generally more reliable and stable than income data.

Ordinary least-squares (OLS) regression, with standard errors that were corrected for the two-stage, stratified sample design,[6] was used to predict per capita household consumption, which, in effect, assigns weights to the individual indicators.[7]

In selecting indicators for the proxy means test, the explanatory variables selected were statistically significant in "explaining" per capita household consumption. These variables were selected because they are easy to record and verify by MTS field staff and are politically acceptable. The weights assigned to the indicators are given by the values of the coefficients of the selected explanatory variables.

Indicator Selection Process. For predicting household welfare using per capita expenditure, a large number of variables were selected from the EIHS dataset that were expected to correlate with per capita household consumption. These variables can be broadly classified into seven categories: household demographic makeup, education, utility use, dwelling characteristics, ownership of assets, occupation, and location. Appendix Table 1 describes the variables and gives their average, minimum, and maximum values.

Initially, two regression models were estimated to predict household welfare. Appendix Table 2 presents the results of the first model, in which the dependent variable is monthly per capita consumption. Out of 56 explanatory variables, 31 are statistically significant determinants of household consumption. Household size, education, use of electricity and telephone, number of rooms, ownership of assets, and location of residence by governorate were important in explaining changes in per capita consumption, while the dwelling characteristics and occupation (except agriculture) were not statistically significant. The model explains 58 percent of variation in per capita consumption in the sample (i.e., R-square value = 0.58).

The second model uses a semi-log functional form (taking the natural logarithm of per capita expenditure as the dependent variable), and most of the statistically insignificant variables are dropped. The R-square value of the model is 0.63. This model is considered to be technically optimal for predicting household consumption from the EIHS dataset. The results are presented in Appendix Table 3.

Despite the fact that the second model (i.e., semi-log, optimal model) fits the data better than the first model, the Task Force recommended against using the logarithmic transformation of the dependent variable in order to simplify the calculation of household scores (taking anti-log of the sum of scores) by MTS field staff.

The model was revised many times, and various iterations were presented to the Task Force. Task Force members evaluated the results from a practical perspective and suggested retaining those independent variables that could realistically be used for proxy means testing. Thus, a number of statistically significant variables was dropped because they would require calculations by field staff (e.g., the dependency ratio, rooms per capita, squared household size), would require judgment of field staff to define (e.g., female-headed household, urban or rural location of residence), and would require more resources to gather (e.g., asset variables), and hence, could increase calculation errors.

Eventually, a model was developed that included 9 household-level variables (e.g., household size, education, electricity and telephone bills, and ownership of some assets) and 19 location dummy variables to control for the governorate-level fixed effects. All variables had statistically significant coefficients. This model was presented at a training program conducted by the IFPRI-FSR team for a large group of MTS trainees that included representatives from all 26 governorates. The trainees were concerned that the governorate-specific targeting of ration card benefits, as the model implies, might lead to political discontent, as there would be differences in the allocation of average per capita benefits among the governorates. To avoid such risks, the Task Force concluded that governorate dummy variables should be excluded from the model.

Final Model. The description of the nine indicator variables and their average, minimum, and maximum values are presented in Table 3-3. Table 3-4 provides the results of the final estimated regression model with monthly per capita consumption as the dependent variable.[8] All nine independent variables are statistically significant at the 1 percent level. The R-square value is 0.43. A comparison of the regression models used for proxy means testing in other countries indicates that the model performs well in predicting household welfare. Grosh and Glinskaya (1997) achieved an R-square value of around 0.2 in Armenia, while Grosh and Baker (1995) achieved an R-square value of 0.3 to 0.4 in Latin American countries.

Table 3-5 presents statistics for the nine explanatory variables used in the final model for the lowest 20 percent and the highest 20 percent of households in the income distribution. A brief discussion of the set of indicators produced by the final model for the proxy means tests follows.

Household size (i.e., the number of people in a household) has a strong negative effect on consumption; that is, poorer households tend to be larger. The average household size is 8 people for the poorest 20 percent of households and decreases to an average size of 4.3 people for the richest 20 percent of households. This pattern is consistent with similar data from other developing countries. For proxy means tests, household size can be verified from the "family identification card" of the household head, which registers the names of household members, their gender, and dates of birth. In Egypt, it is mandatory for every family to have a "family identification card," and for every adult Egyptian citizen to have a "personal identification card."

Education plays a key role in alleviating poverty in Egypt (Datt and Jolliffe 1999; Haddad and Ahmed 1999; Datt, Jolliffe, and Sharma 1998). Three education-related variables were included in the model: (1) highest level of education obtained by any working family member (which has a strongly positive effect on household welfare); (2) whether the household sends a child to private school (which reflects the demand for high-quality education by rich families); and (3) whether any household member older than 15 years never attended school (which captures the negative relationship between illiteracy and household welfare). Even in the richest quintile, a large percentage of households (31.5) have at least one member older than 15 years who never attended school (usually an elderly female, such as grandmother or wife of the household head).

Table 3-3. DESCRIPTION OF EXPLANATORY VARIABLES USED IN REGRESSION MODEL FOR PROXY MEANS TESTS

Variable Name	Variable Description	Average	Minimum	Maximum
Hhsize	Household size (number of household members)	5.91	1	28
Eduemp	Highest number of years of schooling of any employed household member	7.32	0	16
Pvtsch	Dummy: 1 if a child goes to private school, 0 otherwise	0.04	0	1
Noedu1 5	Dummy: 1 if any household member aged above 15 years never attended school, 0 otherwise	0.64	0	1
Elecbil	Monthly electricity bill in LE	11.76	0	90
Phonebil	Monthly telephone bill in LE	3.53	0	150
Npvtoilt	Dummy: 1 if the household has no private toilet, 0 otherwise	0.15	0	1
Car_veh	Dummy: I if the household owns a motor vehicle, 0 otherwise	0.04	0	1
Norefrig	Dummy: 1 if the household has no refrigerator, 0 otherwise	0.40	0	1

Note: Number of observations = 2,203 for all variables.

Monthly electricity and telephone bills can be verified from bill stubs. The monthly electricity bill is an excellent composite indicator of the level of household welfare because it reflects the ownership and use of electrical appliances.

Not having a private toilet is more common among poor city dwellers than others and is a good indicator for identifying very poor households.

As expected, ownership of a motorized vehicle (car or truck) is strongly and positively related to household welfare.

Table 3-4. RESULTS OF FINAL REGRESSION MODEL FOR PROXY MEANS TESTS

Variable Name	Variable Description	Coefficient	t-Statistic
Hhsize	Household size (number of household members)	-10.364	-12.61**
Eduemp	Highest number of years of schooling of any employed household member	1.240	3.12**
Pvtsch	Dummy: 1 if a child goes to private school, 0 otherwise	52.210	4.24**
Noedu1 5	Dummy: 1 if any household member aged above 15 years never attended school, 0 otherwise	-22.756	-4.78**
Elecbil	Monthly electricity bill in LE	1.934	8.12**
Phonebil	Monthly telephone bill in LE	1.486	4.01**
Npvtoilt	Dummy: 1 if the household has no private toilet, 0 otherwise	-19.451	-3.81**
Car_veh	Dummy: I if the household owns a motor vehicle, 0 otherwise	87.676	5.95**
Norefrig	Dummy: 1 if the household has no refrigerator, 0 otherwise	-33.674	-8.02**
Intercept		208.460	27.55**

Notes: Dependent variable is per capita household consumption expenditure per month in LE. ** Significant at the 1% level.
F-statistic = 79.80** R^2 = 0.43 Number of observations = 2,203

A household tends to be poor if it does not own a refrigerator, which is reflected by the significant and negative relationship of this variable with per capita consumption.

Table 3-5. STATISTICS OF FINAL SET OF INDICATORS FOR LOWEST AND HIGHEST INCOME EGYPTIAN HOUSEHOLDS

Indicators	Per Capita Expenditure Quintile	
	Quintile 1 (lowest 20%)	Quintile 5 (highest 20%)
Household size (people)	8.0	4.3
Highest schooling of any employed household member (years)	4.8	10.5
Children go to private school (%)	ne	10.9
Any household member aged above 15 years never attended school (%)	91.3	31.5
Monthly electricity bill (LE)	7.3	17.8
Monthly telephone bill (LE)	ne	11.8
No private toilet (%)	29.6	0
Owns a motor vehicle (%)	ne	15.7
Has no refrigerator (%)	79.8	9.8

Source: IFPRI Food Security Research Project in Egypt, Egypt Integrated Household Survey, 1997.
Notes: ne = negligible.

Assessing Prediction Performance of Model

How well does the model predict the poor and the nonpoor? Since prediction by any model is never exact, it is expected that some poor will be incorrectly identified as nonpoor and that some nonpoor will be incorrectly identified as poor. The first type of misidentification is an "error of exclusion"; the second, an "error of inclusion." Any action taken to decrease the first type of error will normally increase the second type of error, and vice versa (Grosh 1994).

The population living below a specified poverty line is classified as poor. However, recent head-count poverty measures of absolute poverty in Egypt have varied widely. For example, the *1996 Egypt Human Development Report*, prepared by the Institute of National Planning (INP), provides poverty measures based on the *1995/96 Household Income and Expenditure Survey* conducted by the Central Agency for Public Mobilization and Statistics (CAPMAS). The INP poverty estimate yields a national-level head-count index of 22.9 percent (INP 1996). Based on the same dataset, Cardiff (1997) finds that 44.5 percent of the Egyptian population was below the poverty line in 1995/96. IFPRI completed a poverty profile for Egypt based on the 1997 EIHS data. Reference poverty lines are estimated following the cost-of-basic-needs approach, which takes into

account regional differences in food and nonfood prices, age and composition of households, and food and nonfood consumption preferences. The head-count index of the IFPRI study suggests that 26.5 percent of the population of Egypt were poor in 1997 (Datt, Jolliffe, and Sharma 1998).

For evaluating the performance of the proxy means test model, the Task Force suggested using the IFPRI estimate of poverty head-count for consistency, as both the model and the poverty head-count estimate are based on the same data. However, the Task Force advised that 10 percent of the population be added to the head-count estimate of 26.5 percent to define the needy, because households just above the poverty line may also be deserving of higher-subsidy green ration cards. Therefore, 36.5 percent of the population was considered needy and 63.5 percent was considered nonneedy.

Table 3-6 provides the results of an ex ante evaluation of the levels of accuracy of the model for predicting the needy and the nonneedy. The actual per capita consumption of sample households (as measured from the EIHS data) was ranked in descending order and ranked the cumulative household members of the corresponding households. The bottom 36.5 percent of the sample population (29.2 percent of the households) was selected to represent the actual needy. Then, per capita consumption of the sample households was predicted from the estimated regression model.[9] This predicted household consumption represents the total "score" of the households. The household scores were ranked in descending order and the bottom 36.5 percent was selected as the predicted needy. The maximum household score among the bottom 36.5 percent of the population is 149, representing the cutoff point. Any household with a score at or below the cutoff is considered needy. Finally, the accuracy of the prediction was assessed by comparing the actual with the predicted needy. The results of the assessment, presented in Table 3-6, indicate that 71.8 percent of the actual needy are correctly predicted, while 28.2 percent of the actual needy are misidentified as nonneedy. In other words, the error of exclusion is 28.2 percent; and the error of inclusion (nonneedy inaccurately predicted as needy) was only 16.3 percent.

The situation was also assessed with no error of exclusion (i.e., 100 percent of the actual needy are included). The results of this assessment (Table 3-7) indicate that the error of inclusion in such a situation increases from 16.3 to 33.6 percent. Moreover, 57.8 percent of the total population is included as needy. The resulting cutoff is 217.

The Task Force members debated what cutoff to use for proxy means testing, taking into consideration the trade-off between the errors of exclusion and inclusion and their cost implications. The Task Force finally recommended a cutoff of 217 to avoid misidentification of the actual needy as nonneedy by the proxy means tests.

Table 3-6. Assessing Levels of Accuracy of Proxy Means Test Model in Predicting the Needy and the Nonneedy

	Predicted as Needy by Model	Predicted as Nonneedy by Model
Actually needy according to household survey (EIHS)	71.8 percent of true needy are correctly predicted as needy	28.2 percent of true needy are incorrectly predicted as nonneedy
Actually nonneedy according to household survey (EIHS)	16.3 percent of true nonneedy are incorrectly predicted as needy	83.7 percent of true nonneedy are correctly predicted as nonneedy

Source: Estimated by the authors using the 1997 EIHS data and the proxy means test model.
Notes: Cutoff = 149; Needy as defined = 36.5 percent of the population

Table 3-7. Assessing Proxy Means Tests When All Needy Are Included

	Predicted as Needy by Model	Predicted as Nonneedy by Model
Actually needy according to household survey (EIHS)	100 percent of true needy are included	None of true needy are excluded
Actually nonneedy according to household survey (EIHS)	33.6 percent of true nonneedy are incorrectly included as needy	66.4 percent of true nonneedy are correctly excluded as nonneedy

Source: Estimated by the authors using the 1997 EIHS data and the proxy means test model.
Notes: Cutoff = 217; included as needy = 57.8 percent of the population

An example of the proxy means test calculations for two households—a needy and a nonneedy—from the EIHS sample is provided in Table 3-8. The coefficients (rounded to whole numbers) are obtained from the final regression model. Scores are calculated for the needy and the nonneedy households by multiplying the values of the indicators (variables) for the respective households with the coefficient values. The total scores of the two households are compared with the cutoff of 217 to determine the eligibility of the households for the green and the red ration cards.

Conclusions for Policy

Ration cards for subsidized sugar and cooking oil can be made more progressive by converting green ration cards of nonneedy households to red ration cards, converting red cards of needy households to green cards, and providing green cards to needy households without cards. This reform of the Egyptian ration card food subsidy system would require identification of both needy and nonneedy

Table 3-8. PROXY MEANS TEST RESULTS FOR TWO HOUSEHOLDS FROM EIHS SAMPLE

Indicators	Needy Household			Nonneedy Household		
	Value	Coefficient	Score	Value	Coefficient	Score
Household size (number of household members)	5	-10	-50	4	-10	-40
Highest number of years of schooling of any employed household member	6	1	6	12	1	12
1 if a child goes to private school, 0 otherwise	0	52	0	1	52	52
1 if any household member aged above 15 years never attended school, 0 otherwise	1	-23	-23	0	-23	0
Monthly electricity bill in LE	9	2	18	32	2	64
Monthly telephone bill in LE	0	1	0	21	1	21
1 if household has no private toilet, 0 otherwise	1	-19	-19	0	-19	0
1 if household owns a motor vehicle, 0 otherwise	0	88	0	1	88	88
1 if household has no refrigerator, 0 otherwise	1	-34	-34	0	-34	0
Constant			208			208
Total score			106			405
Cutoff point			217			217
Ration card eligibility	Green Card			Red Card		

households, something that is not always easy. To effectively implement a targeted program, it would be necessary to rely on a method such as proxy means testing.

In developing a proxy means testing method, this paper describes the process of moving from the optimal consumption-predicting model to the final model that is both administratively and politically feasible. Targeting ration cards either through the "technically optimal" model or through the selected "practical" model would have differential impacts on consumers and subsidy costs

Effective and full implementation of targeting ration card subsidies using the selected "practical" proxy means testing model (with zero exclusion error) would yield the following results:

- 48 percent of the high-subsidy green ration cards (4.1 million cards), currently held by the nonneedy, would be converted to low-subsidy red ration cards. The GOE would save about LE 98 million annually by converting these green cards to red cards.[10]

- 43 percent of the low-subsidy red ration cards (686,000 cards), currently held by the needy, would be converted to high-subsidy green ration cards. This would lead to an additional annual cost of about LE 16 million.

- 32 percent of households that currently do not hold any ration cards should receive the high-subsidy green ration cards. These are the needy households among the noncard holder households. This would require MTS to issue approximately 558,000 additional green ration cards, costing about LE 51 million annually.

The above-mentioned redistribution of ration cards would increase the equity in the ration card food subsidy system and would benefit the poor. At the same time, the total annual budgetary cost of rationed food subsidies would decrease by about LE 31 million.

The effects that could be expected from implementation of the reforms using the "technically optimal" model for targeting include the following:

- 4.9 million high-subsidy green cards held by the nonneedy would be converted to low-subsidy red cards, resulting in an annual saving of about LE 117 million.

- 647,000 red cards held by the needy would be converted to green cards, with an additional annual cost of about LE 15 million.

- 526,000 new green cards would be issued to the needy with no cards, costing about LE 48 million annually.

The resulting net annual budgetary saving to the GOE if the "technically optimal" model were used would amount to about LE 54 million, about 74 percent more than the estimated saving from the use of the selected "practical" model. However, taking into consideration the administrative difficulties (e.g., compared to the "practical" model, the use of the "technically optimal" model would require at least four times more time to collect data and to calculate scores, and, consequently, would be more prone to errors) and political risks, the "practical" model might nevertheless be a better choice.

IFPRI research shows that targeting can be achieved at a minimal cost, especially because current MTS staff could manage the targeting without any need for new hiring. The one-time cost of training and materials is around LE 14 million, a relatively small amount that corresponds to 1.6 percent of the total ration card subsidy cost in 1997.

The proxy means tests will serve a much wider purpose than simply helping to rationalize the food ration card system, important as that is. The experience gained under this reform will facilitate targeting future social interventions to reduce and prevent poverty because lower cost methods of identifying the poor will be possible using the proxy means tests. These targeted interventions will be crucial to the political survival of the ongoing macroeconomic policy reforms for economic growth as well as to the welfare of individuals who are unable to participate in the growth process.

Appendix Table 1. DESCRIPTION OF EXPLANATORY VARIABLES USED IN INITIAL REGRESSION EQUATIONS

Variable Name	Variable Description	Mean	Minimum	Maximum
Hhsize	Household size	5.91	1	28
Hhsize2	Household size, squared	43.58	1	784
Hhage	Household head: Age in years	47.58	16	96
Depratio	Dependency ratio	0.98	0	7
Femhead	Dummy: Female-headed household =1	0.141	0	1
Avgsch	Household average: Years of schooling	4.95	0	16
Pvttutor	Dummy: Has private tutor =1	0.383	0	1
Pvtsch	Dummy: Children go to private school =1	0.04	0	1
Noedu15	Dummy: Any household member aged above 15 years never attended school=1	0.64	0	1
Roompc	Number of room per capita	0.73	0.1	3
Elecbil	Monthly electricity bill in LE	11.76	0	90
Phonebil	Monthly telephone bill in LE	3.53	0	150
Floor	Dummy: Cement/concrete floor =1	0.72	0	1
Wall	Dummy: Brick/concrete wall=1	0.79	0	1
Roof	Dummy: Concrete roof =1	0.64	0	1
Rent	Dummy: Living in rented house = 1	0.22	0	1
Pipewtr	Dummy: Piped water supply =1	0.76	0	1
Npvtoilt	Dummy: No private toilet =1	0.15	0	1
Kerosene	Dummy: Fuel source is kerosene =1	0.72	0	1
Ownland	Owned arable land in feddan	0.21	0	20
Car_veh	Dummy: Owned motor vehicle =1	0.04	0	1
Tv_vid	Dummy: Owned television or video =1	0.81	0	1
Washer	Dummy: Owned washer =1	0.79	0	1

Appendix Table 1. DESCRIPTION OF EXPLANATORY VARIABLES USED IN INITIAL REGRESSION EQUATIONS (CONT'D)

Variable Name	Variable Description	Mean	Minimum	Maximum
Wtrheatr	Dummy: Owned water heater =1	0.23	0	1
Fan	Dummy: Owned electric fan =1	0.56	0	1
Norefrig	Dummy: Has no refrigerator =1	0.40	0	1
Tractor	Dummy: Owned tractor =1	0.01	0	1
N_lstck	Number of owned livestock	0.28	0	13
Ownbusi	Dummy: Owned business =1	0.13	0	1
Casual	Dummy: Casual labor is primary income source of household head =1	0.17	0	1
Agricul	Dummy: Agriculture is primary income source =1	0.20	0	1
Manuf	Dummy: Manufacturing industry is primary income source =1	0.13	0	1
Trade	Dummy: Trade & service is income source =1	0.06	0	1
Unem_m	Number of unemployed males, last week	1.23	0	8
Unem_f	Number of unemployed females, last week	2.17	0	9
Retired	Dummy: Household head is retired =1	0.21	0	1
Cairo	Dummy: Living in Cairo =1	0.09	0	1
Alex	Dummy: Living in Alexandria =1	0.06	0	1
Suez	Dummy: Living in Suez =1	0.01	0	1
Damietta	Dummy: Living in Damietta =1	0.03	0	1
Dakahlia	Dummy: Living in Dakahlia =1	0.06	0	1
Sharkia	Dummy: Living in Sharkia =1	0.05	0	1
Kalyoub	Dummy: Living in Kalyoubia =1	0.10	0	1
Kafrshkh	Dummy: Living in Kafr El-Sheikh =1	0.03	0	1
Gharbia	Dummy: Living in Gharbia =1	0.05	0	1
Menoufia	Dummy: Living in Menoufia =1	0.04	0	1
Behera	Dummy: Living in Behera	0.05	0	1

Appendix Table 1. DESCRIPTION OF EXPLANATORY VARIABLES USED IN INITIAL REGRESSION EQUATIONS (CONT'D)

Variable Name	Variable Description	Mean	Minimum	Maximum
Ismailia	Dummy: Living in Ismailia =1	0.02	0	1
Giza	Dummy: Living in Giza =1	0.12	0	1
BeniSuef	Dummy: Living in Beni Suef =1	0.02	0	1
Fayoum	Dummy: Living in Fayoum =1	0.04	0	1
Menia	Dummy: Living in Menia =1	0.06	0	1
Assyout	Dummy: Living in Assyout =1	0.05	0	1
Sohag	Dummy: Living in Sohag =1	0.05	0	1
Quena	Dummy: Living in Qena =1	0.06	0	1
Urban	Dummy: Living in urban area =1	0.46	0	1

Note: Number of observations = 2,203 for all variables

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Appendix Table 2. INITIAL MODEL OF PER CAPITA CONSUMPTION EXPENDITURE, OLS ESTIMATES

Variable Name	Variable Description	Coefficient	t-Statistic
Hhsize	Household size	-14.457	-6.77**
Hhsize2	Household size, squared	0.510	4.61**
Hhage	Household head: Age in years	-0.077	-0.35
Depratio	Dependency ratio	-2.440	-1.17
Femhead	Dummy: Female-headed household =1	-5.946	-1.24
Avgsch	Household average: Years of schooling	5.031	6.27**
Pvttutor	Dummy: Has private tutor =1	6.840	2.11*
Pvtsch	Dummy: Children go to private school =1	38.753	3.31**
Noedu15	Dummy: Any household member aged above 15 years never attended school=1	-3.728	-0.88

Appendix Table 2. INITIAL MODEL OF PER CAPITA CONSUMPTION EXPENDITURE, OLS ESTIMATES (CONT'D)

Variable Name	Variable Description	Coefficient	t-Statistic
Roompc	Number of room per capita	51.412	7.55**
Elecbil	Monthly electricity bill in LE	1.221	5.21**
Phonebil	Monthly telephone bill in LE	0.734	2.55*
Floor	Dummy: Cement/concrete floor =1	-1.158	-0.32
Wall	Dummy: Brick/concrete wall=1	4.713	1.09
Roof	Dummy: Concrete roof =1	3.407	0.83
Rent	Dummy: Living in rented house = 1	-2.903	-0.57
Pipewtr	Dummy: Piped water supply =1	-3.484	-1.10
Npvtoilt	Dummy: No private toilet =1	-8.687	-2.15*
Kerosene	Dummy: Fuel source is kerosene =1	-0.466	-0.09
Ownland	Owned arable land in feddan	0.992	0.27
Car_veh	Dummy: Owned motor vehicle =1	72.485	4.98**
Tv_vid	Dummy: Owned television or video =1	6.852	1.69
Washer	Dummy: Owned washer =1	12.611	3.32**
Wtrheatr	Dummy: Owned water heater =1	33.587	5.17**
Fan	Dummy: Owned electric fan =1	14.252	4.05**
Norefrig	Dummy: Has no refrigerator =1	-9.340	-2.21*
Tractor	Dummy: Owned tractor =1	26.810	1.16
N_lstck	Number of owned livestock	5.885	3.38**
Ownbusi	Dummy: Owned business =1	12.070	2.56*
Casual	Dummy: Casual labor is primary income source of household head =1	2.683	0.62
Agricul	Dummy: Agriculture is primary income source =1	8.998	2.29*
Manuf	Dummy: Manufacturing industry is primary income source =1	-7.266	-1.97
Trade	Dummy: Trade & service is income source =1	-13.613	-2.14*

Appendix Table 2. INITIAL MODEL OF PER CAPITA CONSUMPTION EXPENDITURE, OLS ESTIMATES (CONT'D)

Variable Name	Variable Description	Coefficient	t-Statistic
Unem_m	Number of unemployed males, last week	-2.851	-2.33*
Unem_f	Number of unemployed females, last week	-0.261	-0.20
Alex	Dummy: Living in Alexandria =1	79.668	5.78**
Suez	Dummy: Living in Suez =1	125.448	13.15**
Damietta	Dummy: Living in Damietta =1	41.747	3.28**
Dakahlia	Dummy: Living in Dakahlia =1	21.519	2.04*
Sharkia	Dummy: Living in Sharkia =1	45.407	4.66**
Kalyoub	Dummy: Living in Kalyoubia =1	33.419	3.44**
Kafrshkh	Dummy: Living in Kafr El-Sheikh =1	14.194	0.98
Gharbia	Dummy: Living in Gharbia =1	21.866	1.93
Menoufia	Dummy: Living in Menoufia =1	68.778	6.08**
Behera	Dummy: Living in Behera	36.451	3.08**
Ismailia	Dummy: Living in Ismailia =1	51.341	4.06**
Giza	Dummy: Living in Giza =1	79.092	7.47**
BeniSuef	Dummy: Living in Beni Suef =1	69.873	7.28**
Fayoum	Dummy: Living in Fayoum =1	85.046	10.40**
Menia	Dummy: Living in Menia =1	43.912	3.48**
Assyout	Dummy: Living in Assyout =1	60.940	5.42**
Sohag	Dummy: Living in Sohag =1	42.474	5.04**
Quena	Dummy: Living in Qena =1	51.304	5.21**
Urban	Dummy: Living in urban area =1	-1.486	-0.27
Intercept		64.089	3.33**

Notes: Dependent variable is per capita household consumption expenditure per month in LE. * Significant at the 5% level. ** Significant at the 1% level. F-statistic = 424.82** $R^2 = 0.58$ Number of observations = 2,203

Appendix Table 3. RESULTS OF TECHNICALLY OPTIMAL MODEL FOR PROXY MEANS TESTS, OLS ESTIMATES

Variable Name	Variable Description	Coefficient	t-Statistic
Hhsize	Household size	-0.0979	-7.57**
Hhsize2	Household size, squared	0.0031	4.16**
Depratio	Dependency ratio	-0.0515	-4.25**
Femhead	Dummy: Female-headed household =1	-0.0690	-2.68**
Avgsch	Household average: Years of schooling	0.0214	5.56**
Pvttutor	Dummy: Has private tutor =1	0.0834	4.37**
Pvtsch	Dummy: Children go to private school =1	0.1365	2.88**
Noedu15	Dummy: Any household member aged above 15 years never attended school=1	-0.0273	-1.39
Roompc	Number of room per capita	0.2919	8.87**
Elecbil	Monthly electricity bill in LE	0.0070	6.69**
Phonebil	Monthly telephone bill in LE	0.0023	2.42*
Floor	Dummy: Cement/concrete floor =1	0.0518	2.20*
Wall	Dummy: Brick/concrete wall=1	0.0498	2.29*
Npvtoilt	Dummy: No private toilet =1	-0.0786	-2.90**
Ownland	Owned arable land in feddan	0.0272	1.39
Car_veh	Dummy: Owned motor vehicle =1	0.2513	4.37**
Tv_vid	Dummy: Owned television or video =1	0.0898	3.36**
Washer	Dummy: Owned washer =1	0.0865	3.54**
Wtrheatr	Dummy: Owned water heater =1	0.1615	5.33**
Fan	Dummy: Owned electric fan =1	0.0994	4.26**
Norefrig	Dummy: Has no refrigerator =1	-0.1073	-4.46**
N_lstck	Number of owned livestock	0.0531	4.56**

Appendix Table 3. RESULTS OF TECHNICALLY OPTIMAL MODEL FOR PROXY MEANS TESTS, OLS ESTIMATES (CONT'D)

Variable Name	Variable Description	Coefficient	t-Statistic
Oownbusi	Dummy: Owned business =1	0.0787	2.67**
Casual	Dummy: Casual labor is primary income source of household head =1	-0.0372	-1.47
Agricul	Dummy: Agriculture is primary income source =1	0.0698	2.60*
Trade	Dummy: Trade & service is income source =1	-0.0875	-2.30*
Unem_m	Number of unemployed males, last week	-0.0142	-1.63
Cairo	Dummy: Living in Cairo =1	0.4303	8.83**
Alex	Dummy: Living in Alexandria =1	0.3632	7.85**
Suez	Dummy: Living in Suez =1	0.5641	17.99**
Damietta	Dummy: Living in Damietta =1	0.2837	4.46**
Dakahlia	Dummy: Living in Dakahlia =1	0.1122	3.08**
Sharkia	Dummy: Living in Sharkia =1	0.3055	8.98**
Kalyoub	Dummy: Living in Kalyoubia =1	0.1769	3.80**
Kafrshkh	Dummy: Living in Kafr El-Sheikh =1	-0.0673	-0.37
Gharbia	Dummy: Living in Gharbia =1	0.0823	1.55
Menoufia	Dummy: Living in Menoufia =1	0.4318	13.80**
Behera	Dummy: Living in Behera	0.1754	3.30**
Ismailia	Dummy: Living in Ismailia =1	0.3179	4.72**
Giza	Dummy: Living in Giza =1	0.4605	9.68**
BeniSuef	Dummy: Living in Beni Suef =1	0.4335	9.09**
Fayoum	Dummy: Living in Fayoum =1	0.5619	23.19**
Menia	Dummy: Living in Menia =1	0.1579	2.86**
Assyout	Dummy: Living in Assyout =1	0.3611	6.38**
Sohag	Dummy: Living in Sohag =1	0.2323	5.65**

Appendix Table 3. RESULTS OF TECHNICALLY OPTIMAL MODEL FOR PROXY MEANS TESTS, OLS ESTIMATES (CONT'D)

Variable Name	Variable Description	Coefficient	t-Statistic
Quena	Dummy: Living in Qena =1	0.2981	8.28**
Urban	Dummy: Living in urban area =1	-0.0190	-0.65
Intercept		4.4020	51.47**

Notes: Dependent variable is log (ln) of per capita household consumption expenditure per month in LE. * Significant at the 5% level. ** Significant at the 1% level.

F-statistic = 2,066.46**

R^2 = 0.63

Number of observations = 2,203

References

Ahmed, A. U., and H. Bouis. "Weighing What's Practical: Proxy Means Tests for Targeting Food Subsidies in Egypt." *Food Policy* 27 (2002), pp. 519–540.

Ahmed, A. U., and H. Bouis. *A Review of International Experience on Food Subsidy Programs: Lessons Learned for Egypt.* Report of the Food Security Research Project in Egypt. International Food Policy Research Institute, Washington, D.C. 1998.

Ahmed, A. U., H. Bouis, and S. M. Ali. *Performance of the Egyptian Food Subsidy System: Distribution, Use, Leakage, Targeting, and Cost-Effectiveness.* Report of the Food Security Research Project in Egypt. International Food Policy Research Institute, Washington, D.C. 1999.

Ahmed, A. U., H. Bouis, T. Gutner, and H. Lofgren. *The Egyptian Food Subsidy System: Structure, Performance, and Options for Reform.* Research Report 119. International Food Policy Research Institute, Washington, D.C. 2001.

Cardiff, P. W. *The 1995/96 Household Income, Expenditure, and Consumption Survey: Final Analysis Report*. USAID/Egypt and U.S. Bureau of the Census, Washington, D.C. 1997.

Datt, G., and D. Jolliffe. *Determinants of Poverty in Egypt: 1997*. Report of the Food Security Research Project in Egypt. International Food Policy Research Institute, Washington, D.C. 1999.

Datt, G., D. Jolliffe, and M. Sharma. *A Profile of Poverty in Egypt: 1997. Food Consumption and Nutrition Division Discussion Paper No. 49*. International Food Policy Research Institute, Washington, D.C. 1998.

El-Ganainy, A., A. Hegazy, and A. Tawfik. *A Training Manual for Implementing Proxy Means Tests to Determine Eligibility for Food Subsidy Benefits.* Prepared in Arabic for the Ministry of Trade and Supply, Government of Egypt. Report of the Food Security Research Project in Egypt. International Food Policy Research Institute, Food Security Research Project, Cairo, Egypt. 1999.

Grosh, M. E. *Administering Targeted Social Programs in Latin America: From platitudes to practice.* World Bank, Washington, D.C. 1994.

Grosh, M., and J. Baker. *Proxy Means Tests for Targeting Social Programs: Simulations and Speculation.* Living Standard Measurement Study Working Paper No. 118. World Bank, Washington, D.C. 1995.

Grosh, M., and E. Glinskaya. *Proxy Means Testing and Social Assistance in Armenia. Draft Report.* World Bank, Washington, D.C. 1997.

Gutner, T., S. Gomaa, and S. Nasser. *The Political Economy of Food Subsidy Reform in Egypt.* Report of the Food Security Research Project in Egypt. International Food Policy Research Institute, Washington, D.C. 1999.

Haddad, L., and A. U. Ahmed. *Poverty Dynamics in Egypt: 1997-1999.* Report of the Food Security Research Project in Egypt. International Food Policy Research Institute, Washington, D.C. 1999.

INP (Institute of National Planning). *Egypt Human Development Report 1996.* Nasr City, Cairo, Egypt. 1996.

WGTFI (Working Group of Targeted Food Interventions). *Options for Targeting Food Interventions in Bangladesh.* Report prepared by WGTFI, chaired by IFPRI. International Food Policy Research Institute, Washington, D.C. 1994.

Endnotes

[1] This paper was published in almost identical form in *Food Policy* (27 (2002), pp. 519–540) and is reprinted here with permission from Elsevier. We gratefully acknowledge the contribution of the members of the Task Force for Food Security, particularly, the officials of the Egyptian Ministry of Trade and Supply, in developing the proxy means tests. Our thanks are due to Amina Hegazy, Asmaa El-Ganainy, and Ayman Tawfik, staff of the IFPRI Food Security Research Project in Egypt, for their research assistance. We also thank the U.S. Agency for International Development for funding the Food Security Research Project in Egypt, under which this research was accomplished.

[2] The exchange rate in 1997 was LE 3.40 to US$1.

[3] Leakage is defined as the amount of subsidized food that disappears at the wholesale level without reaching the intended consumer. The difference between government supply of subsidized foods and purchases by consumers measures the extent of leakage. For details on the estimation method and data, see Ahmed et al. 2001.

[4] Egypt is divided into 26 provinces called governorates.

[5] For more information on the 1997 EIHS, see Datt, Jolliffe, and Sharma 1998.

[6] The regression equations have been estimated using the *"svyreg"* command of the Stata statistical software.

[7] One problem with using an OLS regression model is that some of the explanatory variables to be used on the right-hand side of the regression equation may be "endogenous" (i.e., some may not be independent of household consumption used in the left-hand side of the regression equation). This is sometimes referred to as simultaneity bias. Nevertheless, the use of OLS regression for proxy means tests is justified because the purpose is to identify the poor rather than to explain why they are poor.

[8] Consumption per adult equivalent would be a more appropriate measure of household welfare than consumption per capita because the former takes into account the age and sex composition of household members. However, using per adult equivalent consumption as dependent variable would require the household size variable on the right-hand side of the regression model to be expressed in adult equivalent household size for consistency. This may not be practical, because the MTS field staff would then have to convert household size into adult equivalent household size to calculate household scores, which would involve a complicated and lengthy calculation. For practical reasons, therefore, per capita consumption was used as the dependent variable.

[9] The values of the regression coefficients have been rounded to whole numbers, as recommended by the Task Force to avoid errors that might result from the MTS field staff using decimal points in the calculation of household scores. In the prediction, the whole numbers of the coefficients were used.

[10] The changes in budgetary costs of subsidy arising from the stated reforms in the ration card subsidy system are estimated at the 1997 levels of purchases of subsidized sugar and cooking oil, based on the 1997 EIHS data. We assume that any change in prices of sugar and oil rations due to the change in the level of subsidy would not affect the demand for these commodities. This is a valid assumption, as a recent IFPRI study suggests that subsidized sugar and oil rations are "inframarginal" for Egyptian consumers (Ahmed et al. 2001). Therefore, in theory, any change in ration prices of subsidized sugar and cooking oil would not affect household budget allocation except through an income effect, which is negligible.

4 Measuring Socioeconomic Impact of Agricultural Policy on Geographic Regions in Egypt[1]

Glenn Rogers

Egypt has been engaged in agricultural policy reform with USAID assistance for over two decades. This chapter presents a method of geographic analysis to identify long-term impacts of these reforms. Socioeconomic survey data are combined with agricultural census data to identify changes in household wealth for residents in local economic areas dominated by five different crop rotations. Residents of areas in which reform specific to their local crop rotation was more comprehensive realized faster growth in wealth during the 1990s. The conclusion, based on the model and data available, is that agricultural policy reform caused significant increases in household wealth. Farm and non-farm households as well as poor and non-poor households benefited from these reforms. Strengths and weaknesses of the method are discussed and socioeconomic characteristics of the local areas are presented. Implications for next-generation policy reform are identified in the findings.

The concern for more equitable development is encouraging debate on how to better target reform to achieve the Millennium Development Goals for reducing poverty worldwide. The need to ensure that less-developed countries benefit from the future global trading and development framework has been highlighted in the Doha Round of trade negotiations. Both of these concerns reflect a growing consensus that policy reform without explicit attention to the geographic definition of winners and losers is too blunt an instrument to ensure that the poor will benefit in a timely fashion.

Since the 1980s the economic strategy of many poorer countries has evolved from government-driven industrialization and technology extension in agriculture to a focus on reform of "price and marketing" policies (Hyami and Ruttan, 1985). Policies rather than absolute limits on natural resources or technology became viewed as the primary constraint to growth. This approach led to calls for government policy reform that would induce the private sector to lead the growth process through appropriate technical and institutional innovations. Measuring and communicating policy outcomes is becoming a necessary step to build consensus on next generation reforms and to facilitate transitional support to groups that are dislocated by reforms. Thus, a key question for policy makers is how to identify,

measure, and communicate the long-term outcomes of the very complicated sequences of policy reform needed to make the emerging vision a reality.[2]

Even though growing attention is paid to the geographic distribution of development, the welfare impacts of national level policy reforms are difficult to measure across sub-national areas. Due to the direct and indirect benefits of policy reform over multiple year periods, the data and feasible analytical approaches to impact evaluation are limited. Evaluation of policy reforms has used geographic analysis to a much more limited extent than evaluation of project assistance for infrastructure or social services. This is a result of at least three characteristics of policy reforms compared to non-policy development interventions. First, policy reforms are often economy-wide and not believed to be implicitly geographically targeted. Second, whether true or not, many reforms are politically marketed as "helping everyone" without geographic distinction, to help build a political consensus for implementation. Finally, the geographic structure implicit in any policy reform is often poorly understood due to limited data analysis. This paper explores one method of geographic analysis to identify welfare impacts of agricultural policy reform. As a contribution to addressing the difficulties cited above, the weaknesses and strengths of this method are discussed in the conclusions.

Egypt has been implementing important macroeconomic and agricultural sector policy reforms for over a decade, and many of these reforms have been successfully implemented (see the descriptions in other chapters of this book and in Fletcher [1996]). We also know that economic welfare in Egypt has increased substantially during the 1990s (World Bank, 2002). The objective of this chapter is to address the question of whether the increases in wealth of farm and non-farm households are associated with implementation of agricultural policy reforms.

The following sections describe the context of Egyptian agricultural policy reform, a model for household wealth creation, data, and analytical approach. Findings and conclusions are presented in the final sections.

Egyptian Agricultural Change and Reform

From the 1960s to the mid-1980s the Egyptian government controlled prices and specified the area to be planted for most major crops,[3] except for fruits, vegetables, and livestock fodder. There was a net capital outflow from agriculture to other sectors of the economy as a result of government taxation driven by the industrial-based paradigm of development. Profitability for most crops was decreasing in the early 1980s. This decline was a result of artificially fixed low farmgate prices, rising labor costs or labor shortages related to temporary international labor outmigration, and a reduction in water availability between 1979 and 1987 from low rainfall in the headwaters of the Nile River. Egypt's agricultural trade balance, which showed a surplus of $300 million in 1970,

recorded a deficit of $2.6 billion in 1983/84 (Dethier,1987). With rapid population growth between 1960 and 1980, Egypt made progress in large-scale land reclamation and increasing agricultural output per unit of land, but made more limited progress in output per agricultural worker (Hyami and Ruttan, 1985, cited in Timmer, 1988).

In the 1980s the dynamics of rural Egypt were driven by international labor migration, integrated rural development (provision of electricity, water, health, and education services), and rapid adoption of technology in cereals and horticulture.[4] By 1990 nearly all villages had electricity and net enrollment ratios for children were relatively high. Beginning in the late 1980s, and increasingly during the 1990s, these investments were complemented by a broad series of price, marketing, and macro-economic reforms.[5] Most of the direct government controls on production, crop handling, delivery quotas, crop area allocations, and rotational crop sequencing were removed in 1987, except for those on rice, cotton, and sugarcane. However, in a recent survey, 90 percent of farmers claimed to have begun choosing their cropping patterns only after 1991, and more than 56 percent exercised the freedom to choose their cropping pattern only in the late 1990s (Fawzy et al., 2002).

Until 1991, the production of rice, cotton, and sugarcane was subject to extremely heavy indirect taxation and monopoly marketing through public trading companies. In 1990, producers received only two-thirds of the world price for rice or sugarcane and only 41 percent for cotton, though cotton farmers received far less for the previous two decades if the effects of exchange rates are included (Goueli and Miniawy, no date). Subsidies on fertilizer, animal feeds, and most other inputs were phased out by 1991, which partly offset the benefits for farmers of the early liberalization of pricing and exchange rates in the late 1980s. The implicit taxation of major agricultural crops was reduced from more than LE 5.5 billion in 1985 to LE 1 billion in 1991 (Dethier, 1989).

An overvalued exchange rate was the major indirect tax and barrier to export. For example, no rice could be exported when the official export price, converted at the overvalued official exchange rate, exceeded world prices. The official exchange rate was adjusted from LE 0.70 per $US1 in 1988 to 3.35 per $US1 in 1991, which dramatically changed the profitability of farming tradable crops. During the same time period the cost of agricultural labor declined by roughly one-third (Radwan, 2002) due to economic recession and the net return of international migrant workers. In response to these changes, agricultural productivity and the economic yield per unit area began to increase in the early 1980s and sharply increased after 1991. Before 1986 increased tomato and livestock fodder (long berseem) production were key sources of agricultural sector growth. After 1986, wheat, maize, and rice became increasingly important sources of growth (Nassar et al., 1996).

In 1991, the Government of Egypt began implementing a comprehensive Economic Reform and Structural Adjustment Program (ERSAP) to lessen reliance on the public sector, develop a stronger market economy, and open more opportunities for the private sector. This was driven in part by the decline of expatriate remittances from the Persian Gulf, which created a $1 billion drop in the balance of payments in 1990. In support of this transition, Egypt received massive debt relief and approximately $5 billion per year in foreign aid during 1990-1992 (Glasser, 2001). As a result of the Paris Club and other debt agreements during 1991, Egypt's external debt decreased from $US51.1 billion in 1990 to $39 billion in 1992, dramatically reducing Egypt's debt service payments and enabling increased investments (World Bank, 1993).

In the 1996-2001 period, farmers benefited from implementation of agricultural reforms in the cotton and rice sectors, but also from broader reforms for commodities like seed and horticultural crops, and from improvements in institutional, information, and other bureaucratic constraints to agricultural growth (Ender, 2002). At the same time the GOE greatly increased the percentage of the national budget allocated to social sector public investment, with public expenditure on education alone increasing from LE 4.5 billion to 13 billion in 2000. This reflects accelerated investment in human capital in the form of education and health.

Many improved agricultural technologies were available, but they were not broadly utilized by producers because of the poor policy environment.[6] The shift in profitability due to policy reform was expected to induce productivity increases through change in land use and technology adoption, such as new varieties, machinery, and management practices. A spiral of increasing productivity and profitability was then expected to increase income of farm as well as non-farm households within relevant local market areas.

Many of the welfare benefits of policy reform are indirect and evolve through a dynamic sequence of change. However, we do know from national household income and consumption surveys that between 1995 and 2000 there were sharp reductions in poverty nationwide, except in southern Egypt. Exports and foreign direct investment fell steadily after 1991, so these are not considered prime sources of growth. Private transfers and remittances were, on average, not an important source of income growth. Tourism, construction, and the manufacture of import-substituting goods were strong sources of growth at a national level. However, private consumption remained the most important component of growth, and rising farm income and self-employment income drove the decrease in poverty between 1995 and 2000 (World Bank, 2002). The research question is whether the increase in household economic welfare is associated with agricultural policy reform or if it can be fully explained by other trends and sources of growth. In the following section a model of household wealth creation is outlined that will subsequently be used to test hypotheses to address this question.

Model of Increased Household Wealth

This study uses the following conceptual model to test for a statistical association between implementation of agricultural policy reform and changes in economic wealth of farm and non-farm households. In the simple conceptual model used for this analysis, changes in household wealth are a function of three factors shown in Figure 4-1:

1. Increased human capital at the household level
2. National macro-economic and social sector trends common to all areas
3. Sub-national area specific policy reforms

The stock of human capital refers to the skills, education, knowledge, or physical health of household members. Schultz (2003) summarizes the consensus in the literature that recent periods of sustained growth in total factor productivity and reduced poverty are closely associated with improvements in child nutrition, adult health, and schooling, particularly in low-income countries. Both macro and micro data strongly suggest that human capital is a contributing cause of growth, but the measurement of the returns to investments in health and education are uncertain due to limitations in data and analytical methods. In this analysis of Egypt, the stock of human capital is considered independent of agricultural policy reform in the short term and a result of public sector investments to create access to education and health services. In the long term, human capital is also a result of prior investments of household income and time for utilizing education and health services. Thus, in the long term, the stock of human capital is indirectly the result of policy reform that creates increased income and raises the return to investments in human capital. This paper is a short-term analysis covering the 1992-2000 period, which is considered too short for the effects of policy reform to create increased human capital through income linkages and higher returns to private investment in human capital.

Human capital has a direct as well as an indirect effect on household wealth. Higher wages in the non-farm sector or higher labor productivity for self-employed households are both expected to be associated with higher levels of human capital, regardless of agricultural policy. However, improvements in the policy environment increase the return to human capital, which is underutilized in a poor policy environment. An alternative view of the same point is that when policy reform is implemented, a household's ability to benefit directly or indirectly may be dependent on its human capital. This study does not pretend to develop a fully specified model of the simultaneous long-term and interactive effects of human capital and policy reform on economic wealth. For the short-term model used in this analysis, the stock of human capital that increases household wealth through increased labor productivity is considered exogenous to agricultural policy reform.[7]

National economic and social trends, such as public sector employment, remittances from international migration, as well as public social services and infrastructure investment in housing, transportation, and utilities, can all result in increased household economic wealth and human capital. Many of these trends have been nationwide and are shared by all sub-national areas in Egypt. In this analysis, these national trends refer to change and investments that provide the same opportunities to all sub-national areas. Other non-agricultural income sources for households in local areas outside metropolitan areas, such as industrial employment or in-migration of population, are not explicitly included in this model because there was no evidence that these were significantly related to differences in growth of household wealth across geographic areas.

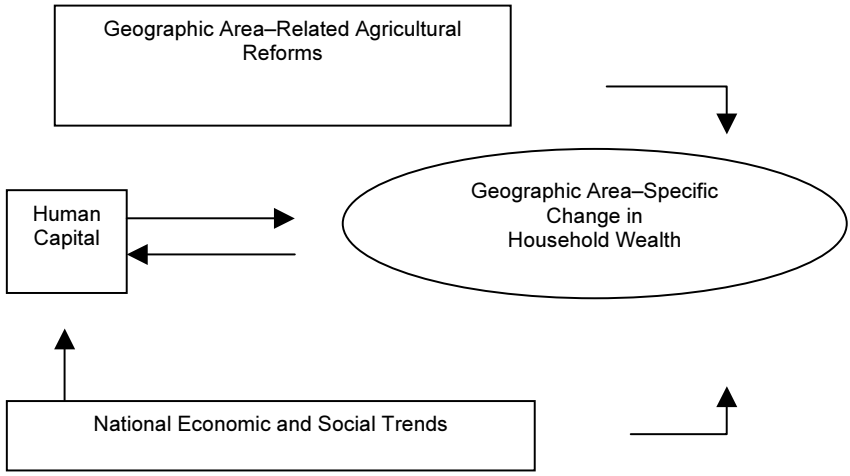


Figure 4-1. CONCEPTUAL MODEL OF CHANGE IN HOUSEHOLD WEALTH

The 1992-2000 change in household wealth in a specific geographic area is given by:

dW/dT = (dw/dH)*(1992-2000 change in human capital at the household level)

+ (dw/dM)*(1992-2000 national trends)

+ (dw/dRi)*(area-specific policy reforms generating impact in 1992-2000)

where

W = index that measures household wealth.

T = time period 1992-2000.

H = household-level human capital, measured by women's educational achievement as a proxy for knowledge, experience, and health that result in higher labor productivity and enable faster household wealth accumulation.

M = macro-economic and other national trends that are common to all households in Egypt between 1992-2000. This would include access to better transportation services, information, and access to employment in the construction, tourism, and manufacturing sectors or international migration. [8]

Ri = reforms that affect the sub-national economy in area "i."

dW/dT	=	total change in household wealth during time period T.
dw/dH	=	partial derivative of wealth wrt to household human capital, H.
dw/dM	=	partial derivative of wealth wrt national trends, M.
dw/dRi	=	partial derivative of wealth wrt to reform related to region "I," Ri.

The total 1992-2000 change in household wealth in a specific geographic area is the sum of the effects of increased human capital for households in that region, the national trends affecting all regions, and change due to region-specific (primarily agriculture related) policy. Policies related to human capital investments are captured in variation in human capital at the household level. The specific hypotheses and expectations for the effects of agricultural policy reform are explained in the following section, "Hypotheses on Effects of Policy Reforms." Quantitative estimates of the impacts of policy reform on household wealth are presented in the section "Findings."

Hypotheses on Effects of Policy Reforms

Agriculture-related policy reforms can be place-specific, meaning they help some geographic areas more than others. If policy reforms benefit certain crop production and marketing systems more than others, then people who live in geographic areas that have an advantage in growing these crops may benefit more

than those in areas that do not. If there are geographically identifiable groups of policy beneficiaries and non-beneficiaries, then these groups can be used for a "with-versus-without" empirical comparison. This quasi-experimental geographic analysis of multiple actual outcomes is complementary to modeling that compares actual versus hypothetical counterfactual outcomes.

For the purposes of this analysis, the agricultural areas of Egypt are divided into five mutually exclusive groups of crop rotations based on the following summer land use: horticulture, non-export cotton varieties used exclusively in domestic mills, rice, sugarcane, and diversified cropping. Based on the model described above, this study has the following two hypotheses that will be statistically tested to answer the research question.

Hypothesis One: Higher household wealth in 1992 is not associated with 1990 crop rotations that benefited from pre-1992 agricultural policy.

Hypothesis Two: Change in household wealth between 1992 and 2000 is not positively associated with 1990 crop rotations that benefited from policy reforms during the 1990s.

If these hypotheses are statistically rejected, the conclusion that agricultural policy reform resulted in increased household wealth will be accepted. The expectations for household wealth in each Agricultural area are based on policies affecting the important crop rotations in those areas. The policy conditions and expected impact of policy reforms for each of these areas are explained in the following five sections.

Horticulture: Source of Growth in 1980s with Minimal Reform in 1990s. It is expected that households in horticultural areas will have higher wealth levels in 1992 than households in other areas. This is expected because a key engine of rural welfare in the 1980s was the increasing supply of horticultural products (vegetables and fruits) resulting from rapid technology adoption and sufficient domestic demand for horticultural products based partly on remittances from international labor migration. Horticultural-cropped area increased from 1.2 million feddans in 1980 to 1.8 million feddans by 1990 (MALR, 1990). New tomato varieties increased yields from 8–10 tons per feddan to 30 tons across a wide number of governorates (USAID, 1985). In 1990, Horticulture areas included 26 percent of the Egypt's cropped area and one-fourth of the farm population. However, these areas had over 60 percent of all summer and winter vegetable crop area and two-thirds of all fruit trees. Over 10.7 million people live in these areas.

In the 1980s, low taxation and relatively free marketing of horticultural crops enabled these crops to be more profitable per unit crop area than either cotton or rice. Production of vegetables and fruits increased by 54 percent and 86 percent, respectively, over the 1980s, with most of the increase occurring between 1980

and 1985 (World Bank, 1993). The greater profitability of horticultural crops was coupled with greater risk and required new skills and information that were not available to all farmers. For example, based on dramatic growth in productivity in the 1980s, tomatoes became the most important vegetable crop for the domestic market, but prices gyrated cyclically when production boomed.

Prior to 1986, fresh fruit and vegetable exports were handled primarily by state trading companies, with four governorates near Cairo accounting for 50 percent of national vegetable production. Harrison (1996) describes how in the late 1980s the private sector increasingly provided the leadership and management for these crops, and exports started to increase. Key opportunities identified were fresh vegetable exports to Europe and the Near East in the winter season. Potatoes were the major vegetable export, with the largest sales to the United Kingdom. Oranges were the primary fruit export. Potato production was concentrated geographically, in four northern governorates,[9] and production of oranges was concentrated in five northern governorates.[10]

In the 1990s overall productivity and output growth in the horticultural sector were constrained due to policies that slowed access to new varieties and limited incentives for adoption of new management and marketing techniques. Exports have accounted for a small share of total horticultural output, and the value of total horticultural exports stagnated in the late 1990s (World Bank, 2001). Private sector leadership of the horticultural sector, however, has enabled rapid growth in some non-traditional crops as both domestic and export demand for horticultural crops increased. Smaller niche exports such as grapes, strawberries, and fine green beans increased rapidly, by over $50 million between 1996 and 2001. In 1998, total fresh and processed fruit and vegetable exports were about 535,100 tons, with a value of $138.2 million. This compares to a value of cotton exports for the same year of $158.2 (World Bank, 2001).

Vegetable and fruit production dominates the cropping patterns on Egypt's reclaimed lands because of soil quality among other factors. These "New Lands" make up approximately 25 percent of the total cultivated land. However, reclaimed lands are also characterized by more recent settlement, with the result that the community, land ownership, and household structure are quite distinct from that in the Old Lands. These special characteristics are not accounted for in the model and may affect the ability of households in these areas to benefit from agricultural policy reform.

Non-Export Cotton: Slow Reform and Long-Term Sector Decline. Households in Non-Export Cotton areas are expected to have lower household wealth in 1992 and limited growth in wealth during the 1990s. This is expected because cotton was a key source of government revenue in the 1980s and the sector has continued to struggle under government regulation in the 1990s. Over 5.3 million people live in these areas.

Between 1960 and 1980 cotton production became less profitable due to rising indirect taxation. Over this period the total cotton area declined from 2 million to 1 million feddans, despite government efforts to require producers to plant at least one-third of their land to cotton. In the early 1980s farm-level profitability of cotton was near zero (USAID, 1983). Production declined dramatically in the 1980s as yields dropped from over 1 ton to 0.68 tons per feddan, and by 1991, Egypt was a net importer of cotton lint. In 2000, total cotton area planted was the lowest on record—just over 500,000 feddans. However, even after three decades of decline, cotton is still the most important agricultural subsector, employing up to 1 million farm workers and over 175,000 people in cotton trading, ginning, and spinning. At the end of the 1990s, Egypt was still exporting nearly $200 million of cotton lint and $161 million in yarn (Holtzman and Mostafa, 2002).

Farmgate cotton prices increased from 41 percent of the world price in 1990 to 66 percent in 1992, and rose to world levels by 1994. Rigid pricing remained, however, and the government continued to be heavily involved in cotton marketing, partly to ensure a stable supply of non-export lint cotton to the government-owned spinning and weaving industry (Holtzman and Mostafa, 1998). Large public sector companies continued to dominate cotton trading and accounted as well for nearly two-thirds of the ginning and spinning industries throughout the 1990s.[11] In a 2001 farmer survey reported in Fawzi et al. (2002), over 90 percent of cotton farmers said they could not bargain over output prices, and only 40 percent felt they were free to market their output. Cotton was the only crop for which the majority of farmers (73%) felt they were not free to choose their seed dealers. Production of this non-export cotton is geographically concentrated in the eastern Delta and Middle Egypt, for reasons explained below.

In the 1990s farmers were increasingly free to choose their cropping pattern, but not their cotton seed varieties. Since 1958 the GOE has designated geographic regions to grow specific cotton varieties, some for cotton lint that is primarily exported and some used in the domestic, public sector–dominated mills. If farmers in southern Egypt and the eastern Nile Delta grew cotton they were only allowed to grow varieties used almost exclusively in domestic spinning of coarse- and medium-count yarn and not exported (Holtzman and Mostafa, 1998 and ALCOTEXA, 2000).[12] *Markaz* that allocated the largest percent of total cropped area to these varieties are referred to as "Non-Export Cotton" areas in this study. In 1990, 14 percent of the cropped area in these *markaz* was planted to cotton.

Rice Areas Benefited Substantially from Reforms. Rice areas contain one-fourth of the farm population and one-third of the land in Agricultural areas. These Nile Delta households allocated 32 percent of their cropped area to rice, which accounted for 81 percent of the total Rice area in 1990. Households in Rice areas are expected to have increased their household wealth faster than any other area during the 1990s as a result of comprehensive reforms and liberalization of the sector. Over 10.9 million people live in these areas.

Rice area, real net revenue per unit area, and production stagnated during the early 1980s.

In 1990, however, total rice production started to increase sharply (Abdel-Latif and El-Laithy, 1996). These increases were associated in part with the elimination of delivery quotas in 1991, but to a greater extent with the elimination of the overvalued exchange rate between 1988 and 1992 (Khedr and others, 1996).

Price controls for rice were removed in 1991. Following this, in 1992 and 1993, the rice marketing system was liberalized, leading to private sector entry into paddy assembly, paddy and rice wholesale trading, rice exporting, and several years later, rice milling (Holtzman et al., 2002). Agricultural reforms continued to be implemented throughout the 1990s, which enabled farmers to more fully benefit from liberalized cropping choice and opened the export and domestic markets to private traders. By the late 1990s, the shorter season varieties of rice had been adopted on most of the area planted. This resulted in higher yields and created additional opportunities for farmers to use their fields for other crops during the 12 month rotation (Holtzman, 2000).

By 2000, rice yields had nearly doubled to 3.9 tonnes per feddan from 2 tonnes twenty years earlier. Between 1990 and 2000, rice area increased by nearly half from under 1.2 million to 1.6-1.8 million feddans (MALR, unpublished data and Holtzman, 2000). In 2001, all rice producers interviewed said they were free to market their output and over 90 percent of rice farmers could negotiate output prices (Fawzy et al., 2002). Analysis of MALR data for the Nile Valley concluded that the vast majority of new farm employment during the 1990s occurred in the Nile Delta area of northern Egypt, largely as a result of increased summer rice production (Krieger et al., 1999).

Sugarcane: Government Crop Promoted in 1980s, But with Limited Reform. Over 3.4 million people live in Sugarcane areas, including 10 percent of the farm working population. Though these Upper Egypt areas have only 7 percent of total cropped area, they accounted for 87 percent of all sugarcane area in 1990. Households in Sugarcane areas are expected to have increased their household wealth more slowly than any other region in Egypt. This is because there is no evidence that agricultural reforms of the 1990s benefited the producers in Sugarcane areas.

In the era of government-led industrialization, Sugarcane area households benefited from early access to off-farm employment related to sugarcane-based rural industrialization and access to social services associated with employment in government mills. The close proximity of Sugarcane areas to the new High Aswan Dam completed in the late 1960s facilitated access to electricity and increased water supplies in the 1970s and 1980s. Serious efforts to increase the cultivated area and yield of wheat, sugar, and edible oil crops were initiated in the early 1980s to increase the degree of self-sufficiency in these food commodities

that were sold to consumers at subsidized prices (Abdel-Latif and El-Laithy, 1996). One result of this convergence of events was that total production of sugarcane increased by 97 percent between 1975 and 1992/93. The net financial return for sugarcane was similar to that of horticultural crops, even though the net economic return was negative due to high water costs (World Bank, 1993).

By the end of the 1990s, however, sugarcane remained the only summer land use for which the entire production continued to be delivered to public sector mills for domestic consumption. Although there have been steady technological improvements for several decades, these gains continue in the 1990s to be similar to the growth experienced in the pre-reform period.

Diversified Cropping Areas: Unknown or Mixed Effects of Reform. Diversified Cropping areas include all areas that could not be classified as Rice, Horticulture, Non-Export Cotton, or Sugarcane areas. These areas include roughly one-fourth of both the active farm population and cropped area. There is no basis for expectations on the trends in household wealth in these areas, except that a more diversified cropping system may mean that these areas were more responsive to liberalization of cropping choice. Over 12.5 million people live in these areas.

Summary of Expectations Based on Review of Policy Environment. This study has four expectations for trends in household wealth:

1. It is expected that Horticultural area households had higher wealth in 1992 than households in any other region.
2. Non-Export Cotton area households are expected to have had lower wealth in 1992 than households in any other region.
3. Household wealth is expected to have increased more rapidly between 1992 and 2000 in Rice areas than in any other area.
4. Household wealth is expected to have increased more slowly between 1992 and 2000 in Sugarcane areas than in any other area.

Based on the stages of rural income growth presented in Rogers (1993), the ratio of increased household income (among the farm and non-farm population) to increased agricultural output during the 1990s is expected to be higher in Agricultural areas with rising per capita income and access to a diverse set of non-tradable goods and services. The impact on household wealth of differences in agricultural growth across regions are accentuated by these differences in multipliers that result in non-linear responses to agricultural reform by regions. This leads to the expectation that differences in rates of change in household wealth across regions will be sharper than might otherwise be predicted. This facilitates statistical comparisons of change in household wealth at a local market level and is one reason this level of analysis was chosen rather than focusing on farm income at the farm household level.

The following section presents the data and analytical approach for statistically testing the hypotheses and expectations.

Data and Analytical Approach

Based on the expectations presented in the previous sections, household wealth in the five areas should have increased to different degrees or at different times depending on policy reform. This variation in policy across crop rotation areas within Egypt provides the opportunity for empirically comparing associated changes in wealth, education, and health indicators in rural Egypt between 1992 and 2000.[13]

The previous section entitled "Model of Increased Household Wealth" outlined a model of household wealth creation and provided sufficient details on Egyptian agricultural policy to establish specific expectations for empirical findings. To test the hypotheses necessary to answer the research question, this study spatially structures secondary data to examine levels of wealth in 1992 and changes in wealth between 1992 and 2000 in the five Agricultural areas. This section explains the data sources and the steps in the analysis to answer the research question.

The following four steps constitute the method used to test the two hypotheses:

1. Crop rotations built around the 1990 summer land use for rice, cotton, sugarcane, and horticulture were chosen to represent four sets of crop rotations that experienced different sequences and degrees of policy reform over the last 20 years. The year 1992 is considered an appropriate point in time to measure the spatial variation in household wealth resulting from many pre-1992 agricultural and rural development-related policies. It is also considered a baseline year to examine the 1992–2000 population changes resulting from implementation of agricultural sector policy reform during the 1990s.
2. The local geographic units (*markaz*) most specialized in the four crop rotations were then identified. *Markaz* that could not be classified into one of these four categories were defined as Diversified Agriculture areas. These five mutually exclusive sets of *markaz* are the Agricultural areas used for this analysis.
3. Egyptian Demographic and Health Survey (EDHS) data for women from a 1992 survey and a 2000 survey were pooled into one dataset and classified by year and by Agricultural area of residence.
4. Sub-sets from this pooled EDHS dataset are then compared to identify statistical differences in household wealth over time and across Agricultural areas. These comparisons are the basis for the statistical findings and the final conclusions.

Data Sources. Two broad categories of data were used for this analysis. The first is the 1990 Egyptian Agricultural Census data (MALR) on land use by *markaz*.[14] These were used to classify local areas[15] based on cropping patterns. The year 1990 is chosen to represent baseline conditions one year before the 1991 macro-economic changes, which in combination with micro-economic and sectoral reforms gathering momentum since the mid-1980s, kick-started economic growth in rural Egypt. The second category of data includes sample data from the EDHS conducted by ORC Macro, International in 1992 and 2000. The EDHS data used for this analysis are drawn from the household, child-specific, and woman-specific datafiles. Descriptive statistics for Agricultural areas (see tables in the "Findings" section) are based on the data from these three datafiles. The commonly available EDHS data are more fully described in El-Zanaty et al. (1993) and El-Zanaty and Way (2000).

When policy reform results in increased disposable income, that income is partly allocated to building economic wealth in the form of housing, durable consumer goods, and agricultural assets such as land or animals. Ownership of these household assets is an indicator of long-term household income and consumption levels. An index of asset ownership at the household level was developed by ORC Macro, International specifically for analysis of change in wealth in Agricultural areas in Egypt (see Appendix A).

The first step in linking policy reform to geographically defined population groups is to identify geographically defined crop rotations. First, based on analysis of policy reforms presented in the section "Egyptian Agricultural Change and Reforms," we selected geographically concentrated crop rotations amenable to spatial comparisons. Second, local areas that were most specialized in the selected crop rotations were classified into five mutually exclusive groups. The selection of these five crop rotations is explained below. The second step of classifying local areas by these crop rotations is explained in the section "Classification of Agricultural Areas and Geographic Coding of EDHS Data."

Selection of Crop Rotations for Classification of Agricultural Areas. Policy reforms affect the total profitability of alternative crop rotations and, over a multi-year period, the choice of rotations traditionally was anchored by key summer crops. The 1990 Egyptian Agricultural Census recorded total holdings (excluding Desert Governorates) of 6,820 thousand feddans, of which over 90 percent were used during the summer/nili season for cotton (16%), sugarcane (4%) , rice (18%), horticulture (21% for fruit and vegetables), and maize (32%). These crops not only accounted for nearly the entire summer crop area, but also in combination with three winter crops (berseem, wheat, and horticultural crops) accounted for the bulk of total annual crop value. Areas specialized in summer horticultural production also tend to grow more winter horticultural crops.

The area planted to cereals (rice, wheat, and maize) was almost the same in 1980 as in 1940, but increased by over 1.3 million feddans during the late 1980s.

Wheat, which is a winter crop, showed the most dramatic changes of all crops in the late 1980s due to yield and price increases (Nassar and others, 1996). However, even though farmgate wheat prices increased from 45 percent to 88 percent of international prices, the consumer price index doubled over this same period, while the effective price per calorie for wheat bread tripled (Goueli, no date). Thus, rural income from increased wheat prices and production is not viewed as a major engine of improved rural welfare in the 1980s.

The crop systems anchored by rice, non-export cotton, sugarcane, and horticulture production are amenable to a geographic analysis because they tend to be geographically concentrated within Egypt, as shown in Table 4-1. In contrast, berseem, wheat, and maize production are spread more evenly across the country and, thus, the reforms affecting these crops are not considered a major cause of differences in household wealth across geographic areas.

Classification of Agricultural Areas and Geographic Coding of EDHS Data. A frequent problem in combining agricultural and socioeconomic data is identifying a geographic unit of analysis that is both relevant and feasible. To be relevant, the units must be related to the real-world processes that determine outcomes. To be feasible, the data must be able to be linked at an appropriate unit of observation for which data were collected in multiple datasets. Based on conceptual relevance and feasibility considerations, the Egyptian *markaz* was chosen as the geographic level at which to develop local area classifications based on agricultural cropping patterns.

In 1996 the Egyptian Census of Population reports that nearly 86 percent of the total working population in agricultural areas is classified as farm population. Outside metropolitan areas, changes in the entire local economy are closely linked to the agricultural economy. Agricultural growth is emphasized not only for national food security but also to foster a favorable employment-oriented demand structure leading to increased effective demand among the poor (Mellor and Johnston, 1984). As further explained in chapter 17 and chapter 18 in this book, policy makes some farmers better off and lowers the cost of agricultural products for all households. Farm households spend their increased income in nearby areas in ways that make non-farmers in the same *markaz* better off. These geographically defined local markets for non-tradable crops, labor, and services make it more appropriate to measure the impact of agricultural changes on the wealth of all households at the local market (*markaz*) level rather than only at the farm household level.

Agricultural change at the *markaz* level was expected to have an important effect on population outcomes for both farm and non-farm households sampled in the EDHS. For this reason, ORC Macro (2002) was requested to use agricultural census data to classify *markaz* within Egypt by crop rotations based primarily on summer/nili land use. Rice and Sugarcane areas include *markaz* that have a percentage of their 1990 cropped area allocated to these crops at least one standard

Table 4-1. LAND USE AND POPULATION CHARACTERISTICS OF AGRICULTURAL AREAS

	All Agricultural Areas	Rice Area	Horticulture Areas	Non-Export Cotton Areas	Sugarcane Areas	Diversified Areas
Total Cropped Area (feddan)	11,864,109	3,781,930	3,046,948	1,309,989	772,931	2,952,311
Percent of Total Area	100%	32%	26%	11%	7%	25%
Percent of Fruit Trees	100%	10%	66%	4%	1%	15%
Percentage in Summer Crops						
Summer Vegetables	6%	5%	23%	4%	7%	7%
Sugarcane	2%	0%	0%	1%	30%	0%
Rice	10%	25%	3%	2%	0%	4%
All Cotton Varieties*	8%	12%	5%	14%	1%	8%
Maize	18%	8%	21%	20%	20%	24%
Percentage in Winter Crops						
Berseem	20%	26%	17%	15%	8%	20%
Wheat	18%	17%	16%	22%	18%	20%
Winter Vegetables	3%	1%	6%	1%	2%	2%
Total Area Accounted for Above	83%	95%	85%	77%	85%	84%

Table 4-1. LAND USE AND POPULATION CHARACTERISTICS OF AGRICULTURAL AREAS (CONT'D)

	All Agricultural Areas	Rice Area	Horticulture Areas	Non-Export Cotton Areas	Sugarcane Areas	Diversified Areas
1996 Population (thousands)						
Total Population**	42,774	10,880	10,684	5,335	3,354	12,521
Number of Observations for Model* **						
1992	7,013	1,661	1,781	879	814	1,878
2000	11,605	2,494	2,941	1,407	948	2,873

Sources: Data provided by ORC Macro, International derived from Egyptian 1990 Agricultural Census and Egyptian 1996 Census of Population

Notes: *Rice, Horticulture, and Diversified areas had cotton varieties other than non-export varieties.

**Metropolitan areas had a 1996 population of 11 million.

***Metropolitan areas had 2487 observations in 1992 and 3067 observations in 2000.

deviation above the mean for all *markaz* in Agricultural areas. [16] Non-Export Cotton areas include *markaz* that have a percentage of their 1990 cropped area allocated to cotton at least 0.7 standard deviation above the mean and were allocated the Giza 80, 83, or 85 varieties in the 2000/2001 season (see section "Non-Export Cotton: Slow Reform and Long-Term Sector Decline"). Horticulture areas include *markaz* with either summer or winter vegetable area or average number of fruit trees per cultivated feddan greater than 0.7 standard deviations above the mean. For a few *markaz* that could be classified into multiple categories, the final classification was chosen as the crop rotation in which the *markaz* was most strongly specialized.[17] *Markaz* that met the criteria for none of these four categories were classified as Diversified Agriculture areas.

The area classification allocated the 145 non-metropolitan *markaz* in Egypt into five groups relevant to past and on-going Egyptian agricultural policy reforms discussed previously. This includes 38 Rice *markaz*, 39 Horticultural *markaz*, 19 Non-Export Cotton *markaz*, 15 Sugarcane *markaz*, and 34 Diversified Agriculture *markaz*. For simplicity, these geographic areas are referred to by the summer land use or crop. However, the classification is used to capture the dynamics of reform affecting a particular set of crop rotations, defined by the key summer land use. The location of areas specializing in these crops are shown in the Map of Agricultural Areas in Egypt in Figure 4-2. Land use and other characteristics of these five sets of *markaz* are shown in Table 4-1.

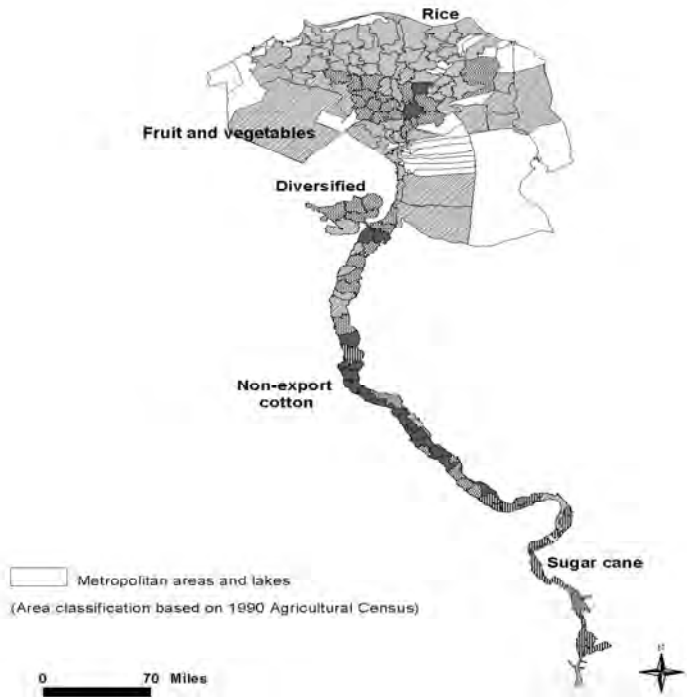


Figure 4-2. AGRICULTURAL AREAS IN EGYPT

To facilitate comparisons across agricultural areas, the household wealth, education, and health data from the EDHS for both 1992 and 2000 were coded for the agricultural area in which the household was located. The impact analysis in this paper uses data on 10,500 married women who were interviewed in 1992 and 14,672 married women interviewed in 2000 in hundreds of community clusters that make up a representative nationwide survey (El-Zanaty et al., 1993; El-Zanaty and Way, 2000). Each married woman is considered an independent observation and the Wealth Index score for the household in which she lives is assigned to each woman interviewed. The statistical analysis uses the EDHS women's datafile with the Wealth Index score, a woman's educational achievement, and location of residence drawn together into one datafile.

The dataset is not strictly a "panel dataset" in that it does not use the same sample households in 1992 and 2000 or even exact locations in subsequent surveys. However, the number of households surveyed in each area are considered numerous enough to represent trends over time within each of the five Agricultural areas defined as groups of *markaz* classified by cropping patterns.

Analysis of Household Wealth to Answer Research Question. Based on the conceptual model described in the section "Model of Increased Household Wealth," human capital levels, national trends, and agricultural reforms explain household wealth levels and changes in household wealth levels over time. If this simplified model of household wealth is accepted, then the hypotheses outlined earlier can be "tested" statistically using the dataset described above. Any variation in household wealth not accounted for by increased human capital[18] or national trends shared by all sub-national areas, is attributed to geographic area–specific causes. If this residual variation in household wealth is associated with policy reforms implemented across geographic areas, then the conclusion is that the policy reforms directly and indirectly caused the changes in household wealth.

The statistical model is presented in Appendix B, but the analysis using the coefficients from that statistical model is explained below.

The statistical model for household wealth estimates three sets of coefficients:

1. The effect of changes in human capital, dw/dH
2. The effect of pre-1992 policy and trends, which is estimated as the Wealth Index score for each Agricultural area relative to Sugarcane areas in 1992
3. The 1992-2000 combined effect of national trends and policy reform, which is the sum of dw/dM and dw/dRi for each area

Rejection of hypothesis one requires that the coefficient for Horticulture areas is significantly higher than that of Non-Export Cotton areas. Rejection of hypothesis two requires that the dw/dRi coefficients for areas with more complete reform in the 1990s are significantly higher than dw/dRi in areas with more limited reform. Based on these tests the research question can be answered.

Based on acceptance that policy reform is associated with increased household wealth, the magnitude of impact of reform during the 1990s is estimated for each Agricultural area. Sugarcane areas are considered to be the "without-policy-reform" case for the 1992-2000 period, which means that dw/dRi equals zero and the estimated 1992-2000 change coefficient for Sugarcane areas equals dw/dM. To isolate the 1992-2000 effects of policy for Horticulture, Rice, Non-Export Cotton, and Diversified Agriculture areas of Egypt, the Sugarcane Area coefficient for 1992-2000 change is subtracted from the coefficient for each of the other area 1992-2000 change coefficients. This subtraction of dw/dM removes the shared national trends from each of the other coefficients and the difference is interpreted as the area-specific impact of policy reform relative to the case of no policy reform.

In this analysis, if there is a statistical association between crop rotations and household economic wealth after isolating the effects of national trends common to all areas and household-level differences in human capital levels, the remaining spatial or temporal differences among areas are interpreted as the result of policy reforms that affected these crop rotations. The statistical association is accepted as a causality after all other explanations in the model have been accounted for. This comparison of multiple actual outcomes across geographic areas can be considered a quasi-experimental design.

Findings: Evidence that Policy Reform Led to Increased Household Wealth

Household wealth increased in Agricultural areas of Egypt between 1992 and 2000 for the vast majority of households. As shown in Table 4-2, Wealth Index scores increased for households in all areas of the country except in Sugarcane areas. This new wealth was shared by the poorest households in most Agricultural areas, as shown by the large increase in the percentage of households with access to a minimum set of assets. This is consistent with recent findings based on the Egyptian Household Income, Expenditure, and Consumption Surveys that show that rising farm income and self-employment income drove a decrease in poverty between 1995 and 2000 (World Bank, 2002).

As expected, the statistical model of household wealth (see Appendix B) shows a positive and significant association between human capital, as measured by women's educational attainment, and household wealth. Because women's education increased much faster in some areas, the overall importance of the human capital effect varies across regions. For example, as shown in Table 4-3, the proportion of women with secondary schooling in Rice areas increased from 23 percent to 50 percent (a 27 percentage point increase) between 1992 and 2000. In contrast, the proportion of women with some secondary schooling in Sugarcane areas increased from 16 percent to 22 percent (only a 6 percentage point increase). These differences in change over time are reflected as the impact of human capital on household wealth shown in Figure 4-3.[19]

Table 4-2. CHANGE IN EGYPTIAN HOUSEHOLD WEALTH BY GEOGRAPHIC AREA, 1992-2000 (BASED ON INDEX OF ASSET OWNERSHIP)

	Percentage of Households with Minimum Set of Assets			Wealth Index Mean (Dependent Variable)		
Geographic Area	1992	2000	Change	1992	2000	Change
Metropolitan areas	97	99.7	+ 3	0.69	1.10	.40
Rice	68	95	+27	-.46	0.48	0.95
Horticulture	69	86	+17	-.34	-.20	0.13
Cotton	56	83	+27	-.68	-.26	0.42
Sugarcane	70	73	+ 3	-.38	-.55	-.18
Diversified	63	87	+24	-.63	-.05	0.58
National level	74	89	+15	-.16	0.15	0.31

Source: ORC Macro (2002). Index mean based on data prepared by ORC Macro, International.

Notes: Households with Minimum Set of Assets: Defined as being in the top four quintiles of the wealth index nationally. The interpretation is the percentage of households that are asset poor. Increases in this distributional measure over time indicate that the poorest households improved their economic status.

Wealth Index Mean: Values are unweighted means for the households of each woman in the relevant area. See Appendix A for definition of the index designed for comparing change in Egypt during the 1990s.

Table 4-3. WOMEN'S EDUCATIONAL LEVEL BY GEOGRAPHIC AREA, 1992-2000

	Percentage of Women with Some Secondary Education			Women's Education Index Mean (Independent Variable)		
Geographic Area	**1992**	**2000**	**Change**	**1992**	**2000**	**Change**
Metropolitan areas	44	67	+23	2.15	2.99	0.84
Rice	23	50	+27	1.20	2.26	1.05
Horticulture	20	33	+13	1.18	1.39	0.21
Cotton	17	29	+12	0.89	1.31	0.42
Sugarcane	16	22	+ 6	0.88	0.93	0.06
Diversified	21	33	+12	1.00	1.49	0.49
National level	26	40	+14	1.36	1.80	0.44

Source: ORC Macro (2002). Based on Egypt Demographic and Health Survey, 1992 and 2000.
Notes: Women's Secondary School: Percentage of women with some secondary schooling. Women's Education Index is defined in Appendix B as the independent variable in the statistical model.

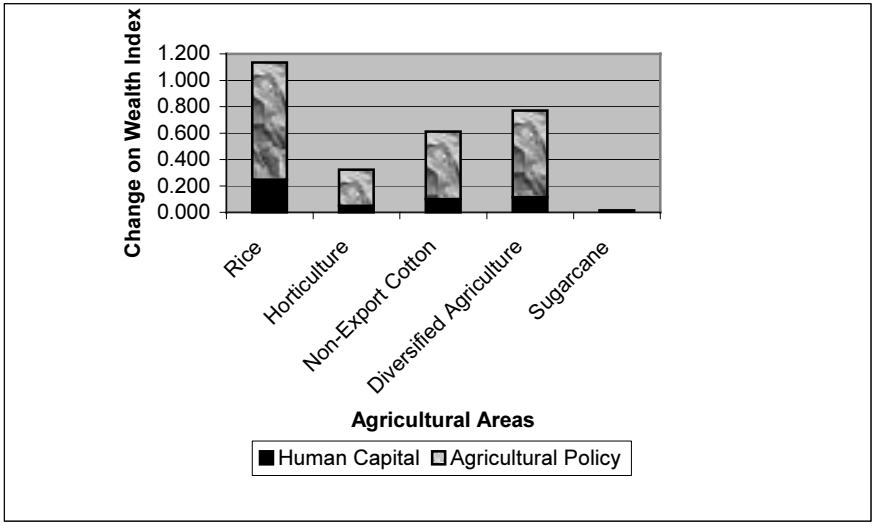


Figure 4-3. IMPACT OF AGRICULTURAL POLICY AND INCREASED HUMAN CAPITAL ON HOUSEHOLD WEALTH FOR EGYPTIAN FAMILIES, 1992-2000

The findings related to the impact of agricultural policy on household wealth are detailed in the following two sections. The first section, "Comparison of Agricultural Areas I 1992: Evidence of Pre-1992 Policy Impact," compares agricultural areas in 1992 and provides a test of Hypothesis One. The second section, "1992-2000 Impact of Policy Reform o Household Wealth," presents findings on Hypothesis Two and the association between policy reform and

change in household wealth between 1992-2000, as shown in Figure 4-3. Implications of the findings relative to the research question are summarized in the section "Implications of Findings."

Comparison of Agricultural Areas in 1992: Evidence of Pre-1992 Policy Impact. A comparison across Agricultural areas in 1992 provides insight on the outcome of human capital investments, trends, and policies from the pre-1992 period. Table 4-3 shows that the proportion of women with some secondary education was low in most agricultural areas. Especially in Sugarcane, Non-Export Cotton, and Diversified Agriculture areas, girls appear less likely to have attended school in 1992. Maternal health, another dimension of human capital, was lowest in Sugarcane and Non-Export Cotton areas. Table 4-4 shows that all areas were similar in 1992 in terms of child malnutrition, with the exception that Sugarcane areas may have been better off.

Table 4-2 shows that Horticulture area households had the highest wealth levels and Non-Export Cotton area households had the lowest levels. Hypothesis One can be rejected because there are significant differences between Agricultural areas in 1992 and the expected ranking of the areas by household wealth is observed in the data. Table 4-5 shows that after accounting for human capital, Horticulture area households had an average Wealth Index score that was 0.12 higher than those in Rice areas, 0.25 higher than Diversified Agriculture area households, and 0.27 higher than Non-Export Cotton households.[20]

Table 4-4. EGYPTIAN HEALTH MEASURES BY AGRICULTURAL AREA, 1992-2000 CHILD MALNUTRITION AND MATERNAL HEALTH

	Percentage of Children Malnourished			Medical Assistance at Delivery		
Geographic Area	1992	2000	Change	1992	2000	Change
Metropolitan Areas	17	9	-8	68	67	-1
Rice	27	19	-8	40	77	+37
Horticulture	31	21	-10	35	53	+18
Cotton	29	18	-11	27	50	+33
Sugarcane	23	22	-1	29	43	+14
Diversified	28	23	-5	31	55	+24
National level	26	19	-7	41	61	+20

Source: ORC Macro (2002). Based on Egypt Demographic and Health Survey, 1992 and 2000.

Notes: Children malnourished: Children under age 5 whose height-for-age is 2 or more standard deviations below the mean of the WHO/NCHS reference population. This type of malnutrition is referred to as stunting.

Medical assistance at delivery: Births in the 5 years prior to the survey, which were assisted by a doctor, nurse, or trained midwife.

Table 4-5. SUMMARY OUTPUT FOR MODEL OF HOUSEHOLD WEALTH

Regression Statistics	Multiple R	R Square	Adjusted R Square	Standard Error	Observations
	0.70	0.49	0.49	0.69	25437

ANOVA	df	SS	MS	F	Significance F
Regression	12	11901	992	2068	0.000
Residual	25424	12191	0.48		
Total	25436	24091			

DEPENDENT VARIABLE IS HOUSEHOLD WEALTH INDEX (see Annex One)	Coefficient	St Error	t Statistic	P-value	Lower 95%	Upper 95%
PRE-1992 EFFECTS OF POLICY REFORM AND NATIONAL TRENDS						
Intercept (based on Sugarcane households in 1992)	-0.520	0.013	-40	0.00	-0.545	-0.494
1992 Difference between Rice and Sugarcane Area Households	-0.223	0.021	-11	0.00	-0.265	-0.182
1992 Difference between Horticulture and Sugarcane Area Households	-0.095	0.021	-5	0.00	-0.136	-0.055
1992 Difference between Diversified Agriculture and Sugarcane Area Households	-0.346	0.020	-17	0.00	-0.386	-0.306
1992 Difference between Metropolitan and Sugarcane Area Households	0.702	0.019	37	0.00	0.665	0.740

Table 4-5. SUMMARY OUTPUT FOR MODEL OF HOUSEHOLD WEALTH (CONT'D)

DEPENDENT VARIABLE IS HOUSEHOLD WEALTH INDEX (see Annex One)		Coefficients	St Error	t Statistic	P-value	Lower 95%
1992-2000 EFFECTS OF POLICY REFORM AND NATIONAL TRENDS						
1992-2000 Change in Wealth Index for Rice Area Households	0.696	0.022	32	0.00	0.653	0.740
1992-2000 Change in Wealth Index for Horticulture Area Households	0.083	0.021	4	0.00	0.042	0.124
1992-2000 Change in Wealth Index for Non-Export Cotton Area Households	0.321	0.030	11	0.00	0.263	0.379
1992-2000 Change in Wealth Index for Sugarcane Area Households	-0.254	0.026	-10	0.00	-0.305	-0.204
1992-2000 Change in Wealth Index for Diversified Agriculture Area Households	0.465	0.021	23	0.00	0.424	0.505
1992-2000 Change in Wealth Index for Metropolitan Area Households	0.206	0.019	11	0.00	0.169	0.243
EFFECT OF HUMAN CAPITAL ON HOUSEHOLD WEALTH						
Women's Education (effect of approximately 3 years of schooling)	0.236	0.003	92	0.00	0.231	0.241

The significant differences in household wealth in 1992 are associated with 1990 crop rotations and expectations based on our understanding of pre-1992 policies. Households in Horticulture areas are the wealthiest households in Agricultural areas in 1992, but after accounting for differences in human capital Sugarcane area households are slightly wealthier. This is consistent with the high financial returns to horticultural and sugarcane rotations. Non-Export Cotton area households have the lowest wealth levels. This is consistent with the history of Egyptian government cotton policy that required farmers to produce cotton and heavily taxed cotton production before 1992. Diversified Agriculture area households also had low average wealth levels and a low percentage of households with the minimum set of assets.

The conclusion is that human capital was an important, but not the primary, explanation of differences in household wealth across agricultural areas in 1992. Pre-1992 policies and crop rotations explain much of the variation in household wealth in 1992.

Based on pre-1992 policy, the Rice area households were notably wealthier than Non-Export Cotton and Diversified Agriculture areas. This may be evidence that policy liberalization began to affect Rice areas before 1992 or that the Cotton policy was substantially worse than Rice policy before 1992.

In summary, the comparisons across Agricultural areas in 1992 support the conclusion that areas with a better agricultural policy environment have higher levels of household wealth.

1992-2000 Impact of Policy Reform on Household Wealth. The results from the statistical model shown in Table 4-5, Summary Output for Model of Household Wealth, support the conclusion that households in agricultural areas with more complete policy reform experienced faster household wealth accumulation during the 1990s. Inclusion of measures of human capital in the statistical model allows an assessment of wealth change associated with human capital, but, more important, it facilitates interpretation of the policy-related variables after accounting for differences in human capital.

Hypothesis Two, that changes in household wealth between 1992 and 2000 are not positively associated with crop rotations related to reform, is rejected. First, changes in household wealth are statistically different across Agricultural areas. Second, the size of the increase in wealth meets expectations related to reforms explained in the section "Horticulture: Source of Growth in 1980s with Minimal Reform in 1990s." Table 4-5 shows that a combination of national trends common to all areas plus policy reform are associated with a 0.04 to 0.12 increase in the Wealth Index score for Horticulture area households, a 0.26 to 0.38 increase for Non-Export Cotton area households, a 0.42 to 0.51 increase in Diversified Agriculture area households, and a 0.64 to 0.74 increase for Rice area households.

The four calculated ranges of change in household wealth together suggest that households in areas for which the primary crop rotation benefited from more complete agricultural policy reform achieved more progress in creating household wealth. First, in regions where agricultural policy change and technology transfer accelerated during the 1990s, as in the case of Rice areas, there has been rapid creation of household wealth. Second, even partial reform can lead to substantial increases in household wealth, such as for Non-Export Cotton and Diversified Agriculture areas, where household wealth improved substantially between 1992 and 2000. Third, when early technology transfer and reforms from the 1980s are not followed up with second-generation reforms, as was the case for horticulture during the 1990s, the creation of household wealth lags. Fourth, household wealth levels in areas dominated by crop rotations experiencing little reform, such as in Sugarcane areas, have declined.

Relative to the without-reform case of Sugarcane areas and based on the conceptual model used, tens of millions of Egyptians in Agricultural areas of the country experienced significant increases in wealth that are associated with policy reform. As shown in Figure 4-1, policy reform is associated with substantial new household wealth for Rice and Diversified Agriculture area households. As expected, Non-Export Cotton area households did increase wealth, but to a more limited extent. Horticulture area households experienced much slower improvements in wealth, as expected on the basis of limited policy reform between 1992 and 2000.

Implications of Findings. The statistical differences in household wealth and changes in household wealth across Agricultural areas are significant even after accounting for differences in human capital at the household level. This statistical evidence supports the conclusion that household wealth increased more rapidly in Agricultural areas specializing in crop rotations for which agricultural policy reforms were more comprehensive.

The concept of geographic groups receiving or not receiving new infrastructure assistance, such as a road, is fairly clear. However, local complementary conditions such as health status, transportation infrastructure, natural resources, growing conditions, or human capital can make the impacts of national-level policy reform vary geographically. Some population groups will have the complementary conditions to respond and benefit, while others will not. Communities without the pre-conditions that enable them to benefit from a policy reform can be classified as not having received policy reform assistance. The statistical findings imply that broad areas of rural Egypt have the pre-conditions that enabled them to benefit from policy reform.

These findings must be qualified in three ways. First, if there are unidentified causes of household wealth creation that are systematically associated with both the geographic areas identified and the degree of related policy reform implemented, the conclusions of this analysis overestimate the importance of

policy reform.[21] Second, women's education as a proxy variable may not fully capture the importance of human capital for household wealth. The third qualification is that, if this model of household wealth creation is accepted, these quantitative estimates of the impact of policy reform are considered lower bound estimates. These are lower bound estimates for two reasons. First, increased household wealth resulting from policy reform leads to higher private investments in human capital, including health care and school attendance for boys and girls, which leads to higher household wealth. Though this is not expected to have a large effect during the short 1992-2000 period under study, this indirect effect should be counted as a benefit of policy reform during the longer 1980-2000 period rather than an exogenous investment in human capital. Second, if Sugarcane areas did actually benefit to a limited extent from policy reform, the difference between the with-reform and without-reform cases would be larger than the estimated impact.

Households in Non-Export Cotton areas and Diversified Agriculture areas were able to increase wealth to a surprising degree over the last decade. Analysis of the aggregate impact of cotton policy is more complex than the policy for other crops, however. One reason is that a major benefit of reforms for cotton growers was the liberalization of cropping choice that enabled them to quit growing cotton and shift to other crops. An analysis of what crops replaced cotton in the Non-Export Cotton areas during the 1990s would shed more light on the impact of cotton policies and liberalization of cropping choice and pricing. It is also possible that households in these areas benefited more than others from growth of tourism and related construction activities along the Red Sea coast during the 1990s. Additional research is needed to better understand the mechanisms that enabled these areas to so rapidly increase household wealth in the last decade.

Based on this analysis, it is feasible to imagine that future growth in household wealth for the 11 million Egyptians living in Horticultural areas could be similar to that experienced during the 1990s by the 11 million Egyptians living in Rice areas. Currently planned reforms have the potential to increase horticultural exports by roughly the same value as rice production increased during the 1990s. If horticultural sector growth is specifically linked to households in Sugarcane areas, this sector has the potential to dramatically reduce poverty and address Egypt's need for higher value use of water resources.

Table 4-6 shows that in 2001 Cotton and Sugarcane area farmers reported being least constrained by water availability. A much larger proportion of farmers in Rice, Horticulture, and Diversified Agriculture areas reported losing crops due to water shortages and, thus, considered water requirements when choosing a crop. The 2001 data are interpreted to mean that throughout the 1990s decade of reform, farmers in Sugarcane and Non-Export Cotton areas, primarily Upper Egypt, faced less serious water constraints than farmers in Rice, Horticulture, or Diversified Agriculture areas. Rice and Diversified areas are potentially vulnerable areas that merit renewed attention in future reform efforts. Even though these areas did well

Table 4-6. INDICATIONS OF WATER SHORTAGES IN 2001, BY AGRICULTURAL AREA

Non-Metropolitan Areas (mutually exclusive areas)	Lost Crops[a]	Fallowed Land[a]	Crop Choice[b]
Rice Areas	59%	11%	46%
Horticulture Areas	28%	4%	28%
Cotton Areas	4%	1%	2%
Sugarcane Areas	3%	2%	6%
Diversified Agric Areas	37%	16%	30%
National Total	32%	8%	19%

Source: ORC Macro (2002). Based on Zanaty and Associates, Egyptian Farmer Knowledge Attitudes and Practices, 2001.

[a] Percent of farmers that consider water requirements in crop choice
[b] Percent of farmers that lost crops or fallowed land due to lack of water

in the 1990s, they now face water shortages that may require them to shift quickly to other crops and disrupt creation of household wealth. In addition, trade and price reforms could reduce value-added for crops that may be increasingly imported, such as wheat, maize, sugarcane, and sorghum (World Bank, 2001). The late 1990s was a period of surplus water and damaging floods. High financial returns to rice based on no explicit charge for water may have resulted in overplanting of rice from a national perspective. The next decade is expected to be a period of more limited water availability in the Nile Valley.

Conclusions

The overall conclusion from this analysis is that household wealth in Agricultural areas is positively associated with the degree to which agricultural policy reform is relevant to these specific geographic areas. Agricultural technology adoption and policy liberalization in Egypt during the 1980-2000 period affected the selected Agricultural areas in different ways. These differences were associated with the cropping patterns in each area, differences in human capital, and perhaps other systematic differences among the sub-national areas that have not been identified in this analysis. The decades of urban bias and restrictive agricultural policy are reflected in lower household wealth in 1992 for households in Agricultural areas. However, the implementation of agricultural policy reform as well as targeted social investments during the 1990s have enabled rural areas to partially catch up with metropolitan areas in socioeconomic status. Non-metropolitan populations in areas dependent on crop rotations with the most complete policy reform are now the richest rural regions, while areas specializing in crop rotations with limited reform stagnated and are now the poorest rural regions.

An important secondary conclusion is that in areas with rapidly rising farm productivity and employment opportunities, children and women go to school more, not less. Increased employment opportunities in rural Egypt resulting from policy change appear to increase the motivation for parents to have their children attend school, rather than drawing children out of school due to increased short-

term work opportunities. Use of health care that requires household expenditure, such as medical assistance for births, also increases in areas that benefit from agricultural-related policy reform. These findings suggest that additional agricultural policy reform designed to benefit specific regions of Egypt may be a key to more rapid advances in those areas.

In terms of Egyptian public policy, this study has helped quantify the relative importance of agricultural policy reform over the last 15 years in generating rural household wealth. This type of research can provide insights for decision-makers and investors as they seek to increase rural welfare through improving health, education, infrastructure, and economic opportunities. By any measure, policy reforms affecting Rice areas appear to have been a resounding success. This is a clear example that policy reform can be important in both absolute and in relative terms, compared to other investments. The importance of the direct effect of agricultural reform on wealth creation is not unexpected, but the estimated magnitude of this impact relative to the importance of education and other national development trends underlines the importance of continued rapid reform that benefits the agricultural sector.

Sugarcane and Horticulture areas are clearly lagging in household wealth improvement. The answer as to why is not sufficiently clear, but these two geographic areas present themselves as a potential priority for geographically targeting the next phase of agricultural policy reform and project assistance.

The method of analysis has several strengths and weaknesses. The quasi-experimental technique depends on identifying regions that are the same in all important ways, except that one control region did not receive the "program treatment," in this case policy reform, while the second region did. A strength of this approach for a with-versus-without comparison of policy reform is that it can rely on secondary data and eliminate a range of theoretically sound, but empirically unimportant, causes of the differences in household wealth. Access to irrigation water, industrial employment, and population growth were examined and were found to not explain the different rates of change in household wealth across Agricultural areas. This enabled the research design to consider all Agricultural areas as similar, except in terms of human capital and factors related to crop rotations. A second strength is the focus on changes in household wealth for both the farm and non-farm population, since a large share of the new income from reform is expected to be realized by the non-farm population.

A key assumption in this impact evaluation is that policy reform broadly defined is the primary factor of change related to areas defined by crop rotations. The magnitude and timing of what some may consider non-policy investments in technology adoption, such as agricultural extension services, delivery of credit, or access to information, may vary systematically across areas and explain differences in household wealth. Quantifying investments other than human capital by geographic areas and time period is difficult and data intensive. Two

other potential weaknesses in the method are related to the accuracy of classifying the Agricultural areas. The classification method focused on areas that were the most specialized in specific crop rotations defined by a summer land use. First, among *markaz* classified as being the same there was variation in the importance of the particular crop rotation, which could confound results. Second, within each Agricultural area there may be variation in how policy reform affected the other crops included in the rotation, such as maize or berseem. Reform related to other crops may affect the overall impact of reform on profitability of the rotation and subsequent household wealth creation.

This analysis shows that appropriately structuring secondary data is important to identify the association between policy reform and socioeconomic change. This is a benefit of computerizing and geographically referencing survey data from multiple sources. Similar datasets are available in numerous countries, but tend to be underutilized by sector specialists. Agricultural specialists rarely use the DHS data, and health specialists rarely rely on the agricultural census for analysis of their programs. DHS data and agricultural census data are available in many countries, so similar analyses could be conducted in other countries that seek to quantify the linkages between policy reform, rural growth, and household wealth, health, and education.

Appendix A: Household Wealth Index (text drawn from ORC Macro [2002])

The wealth index is based on asset information collected in the EDHS household questionnaire. The head of household is asked about the household ownership of a range of consumer items and housing characteristics that are related to economic status. Assets common to the three most recent EDHS surveys (1992, 1995, and 2000) were used to create the wealth index scores used in this report. The assets included are considered more relevant and appropriate for comparing household wealth within Agricultural areas than in metropolitan areas. These assets include:

- Water piped to residence
- Water piped to residence or yard and/or modern flush toilet
- Cement floor, carpet, ceramic, or parquet floor
- Dwelling owned alone
- Dwelling owned, owned jointly, or owned by the family
- Number of persons per room in household
- Cooking stove: electric or gas
- Water heater
- Sewing machine
- Automatic washing machine and/or other washing machine
- Own farm/other land
- Own livestock/poultry
- Has telephone and/or electricity
- Has radio, TV, VCR, and/or refrigerator
- Has electric fan
- Has bicycle, motorcycle/scooter, car/truck

Each asset was assigned a weight or factor score generated through principal components analysis. The resulting individual asset scores were standardized in relation to a standard normal distribution with a mean of zero and a standard deviation of one. Each household was then assigned a standardized score for each individual asset that the household owned. These scores were summed by household, and the households were then ranked according to the summed score. The households were then divided into population quintiles – five groups with the same number of households in each group.

To compare the relative wealth of households across the time period of the surveys, for this analysis the 1992, 1995, and 2000 EDHS survey data were pooled to generate the factor scores as described above, using the assets listed above. The pooled dataset was then divided into quintiles, and then split back into the original samples for 1992, 1995, and 2000. This allows for a comparison of relative wealth across the years.

The index has been compared against both poverty rates and gross state product per capita for India, and in household survey data where expenditure data were compared to assets data for the same households for Nepal, Pakistan, and

Indonesia (Filmer and Pritchett, 1998, 2001) and Guatemala (Rutstein 1999). Evidence from these two sources shows that the assets index is highly comparable to conventionally measured consumption expenditures.

Appendix B: Statistical Model for Hypothesis Testing

The dependent variable in the statistical model is a "Household Wealth Index," which measures asset wealth for the entire household, as explained in Appendix A. The unit of analysis is a married woman and the wealth index score refers to the household in which the woman resides. The wealth index is used as a proxy for long-term economic status of the household. The units are abstract, but comparable within this analysis to evaluate the relative importance of the various variables associated with increased household wealth in Egypt.

As described in the model the section "Model of Increased Household Wealth," household wealth is assumed to be a function of human capital, national trends, and policy reforms. The objective of this analysis is to identify the effects of policy on household wealth. To do this, a statistical model will be estimated that explicitly includes human capital and uses one regional dummy variable that captures, for each cropping system area, both the policy effects specific to that area and the national trends common to all areas.

The statistical model below estimates three categories of coefficients. First, the differences in 1992 between each area and the Sugarcane area households to look at the results of pre-1992 policies after adjusting for human capital differences. The second category of coefficients measure the 1992-2000 change in household wealth due to the combined effects of national trends and policy for each area, including Sugarcane area households. The third category is the effect on household wealth of human capital, as captured by the proxy variable of women's education level.

These three categories of independent variables for the model of household wealth determination are defined below:

1. Effects of pre-1992 policy

This is a group of five dummy variables, with Sugarcane area residents excluded. Each variable measures the difference in wealth between the households in the named agricultural area and households residing in Sugarcane areas. Each coefficient is the difference in household wealth in that area compared to those in Sugarcane areas.

The difference between coefficients is interpreted as the outcome of policies in that particular area relative to policies and investments in the other area. For example, the difference between the Horticulture area coefficient and the Non-Export Cotton area coefficient reflects the policy differences between the two

areas before 1992. Because each coefficient is the difference between two national areas, the pre-1992 national trends that are common to all areas is eliminated. This difference can be interpreted as due to policy. The five dummy variables are described below:

Variable 1: The first captures the 1992 wealth index difference between Rice and Sugarcane areas
= 1 if the household resides in Rice areas
= 0 otherwise

Variable 2: The second captures the 1992 wealth index difference between Horticulture and Sugarcane area households
= 1 if the household resides in Horticulture areas
= 0 otherwise

Variable 3: The third captures the 1992 wealth index difference between Non-Export Cotton and Sugarcane area households
= 1 if the household resides in Non-Export Cotton areas
= 0 otherwise

Variable 4: The fourth captures the 1992 wealth index difference between Diversified Agriculture and Sugarcane area households
= 1 if the household resides in Diversified Agriculture area
= 0 otherwise

Variable 5: The fifth captures the 1992 wealth index difference between Metropolitan and Sugarcane area households
= 1 if the household resides in Metropolitan areas
= 0 otherwise.

The interpretation of each coefficient is the 1992 difference in household wealth between residents of the specified Agricultural area and Sugarcane area residents, after accounting for differences in human capital.

2. 1992-2000 effects of region specific policy and national trends

These six geographic region and time interaction terms allow us to test the significance of policy for region-specific change between 1992 and 2000. The region component is set equal to one for residence in Rice, Horticulture, Non-Export Cotton, Sugarcane, and Diversified Agriculture areas, respectively, in each variable. The time component is set equal to zero for 1992 and equal to one for 2000.

This is a group of six dummy variables:
Variable 1
= 1 if the household resides in Rice areas and year = 2000

= 0 otherwise

Variable 2
= 1 if the household resides in Horticulture areas and year = 2000
= 0 otherwise

Variable 3
= 1 if the household resides in Non-Export Cotton areas and year = 2000
= 0 otherwise

Variable 4
= 1 if the household resides in Sugarcane areas and year = 2000
= 0 otherwise

Variable 5
= 1 if the household resides in Diversified areas and year = 2000
= 0 otherwise

Variable 6
= 1 if the household resides in Metropolitan areas and year = 2000
= 0 otherwise

The total change in household wealth in a specific area is predicted by the sum of the national trend, effect of increased human capital for households in the region, and change due to region-specific policy. This term captures both the area-specific policy impacts as well as the shared national trends due to broad economic and social development in Egypt during the 1990s that are common to all geographic areas. As explained in the section "Analysis of Household Wealth to Answer Research Question," the impact of policy reform for any one area is estimated by subtracting the coefficient for Sugarcane areas from that area's coefficient. These differences are shown in Figure 4-3 and interpreted as area-specific policy impact.

3. Human Capital

The selected proxy variable for human capital at the household level is the educational level of married women. This category includes one variable—education:

= 0 No education
= 1 Incomplete primary education
= 2 Complete primary education
= 3 Incomplete secondary education
= 4 Complete secondary education
= 5 Higher education

In the pooled 1992 and 2000 dataset, the indicator measures the education level of adult women within the household at the same point in time as household wealth. The interpretation of this variable is the level of household-specific human capital, because women's education is closely associated with several measures of human capital for the whole household. The coefficient is interpreted as the effect of human capital on household wealth. Given the unit scale, the coefficient can be interpreted as the effect on household wealth of approximately 3 years of schooling. A linear formulation was chosen because initial statistical tests suggest constant returns to incremental years of education.

Women's educational level is the proxy variable chosen for measuring human capital at the household level. This was chosen for three reasons. First, women's education is widely considered an important measure of human capital in developing countries (Schultz, 2003). Second, as shown in Table 4-7, there is simply not as great a geographic variation in the school attendance rates for boys as there is for girls. Third, agricultural technology adoption, skilled agricultural labor, and non-farm income generation all depend to an important degree on the skill levels of adult women. A decade ago, nearly 47 percent of the active female population in Egypt was engaged in agricultural work (World Bank, 1993). Due to male out-migration from agricultural areas, many women do in fact make the daily farming and non-farm business decisions.

The estimated coefficients for each variable and the regression statistics are shown in Table 4-5.

Table 4-7. SCHOOL ATTENDANCE FOR BOYS AND GIRLS, AGES 11-16 (1992 AND 2000)

	Boys' School Attendance			Girls' School Attendance		
Geographic Area	1992	2000	Change	1992	2000	Change
Metropolitan	86	86	0	85	88	+3
Rice	76	86	+10	71	83	+12
Horticulture	78	85	+7	67	77	+10
Cotton	78	85	+7	57	74	+17
Sugarcane	81	87	+6	57	68	+11
Diversified	74	82	+8	58	76	+18
National total	79	85	+6	69	78	+9

Source: ORC Macro (2002). Based on Egypt Demographic and Health Survey, 1992 and 2000.
Notes: Boys' school attendance: percentage of boys age 11-16 currently attending school. Girls' school attendance: percentage of girls age 11-16 currently attending school.

References

Abdel-Latif, Abla and El-Laithy, Heba. *"Protecting Food Security for the Poor in a Liberalizing Economy,"* in Egypt's Agriculture in a Reform Era, ed. Lehman B. Fletcher, Iowa State University, Ames, Iowa. 1996.

ALCOTEXA (Alexandria Cotton Exporters Association). 2000/20001 Cotton Map. Alexandria, Egypt. 2000.

Cook, Peggy J. and Karen L. Mizer. *The Revised ERS County Typology: An Overview.* US Department of Agriculture, Economic Research Service, Rural Development Research Report, No. 89. 1994.

Dethier, J.J. *Trade, Exchange Rate and Agricultural Pricing Policies in Egypt.* Quoted in World Bank 1993:21. 1989.

El Zanaty and Associates. *Knowledge, Attitudes, and Practices of Egyptian Farmers towards Water Resources: A National Survey.* Survey funded by USAID as part of the Egyptian Agricultural Policy Reform Program, Ministry of Agriculture and Land Reclamation, Cairo, Egypt. 2001.

El-Zanaty, Fatma and Ann A. Way. *Egypt Demographic and Health Survey 2000.*Calverton, Maryland: Ministry of Health and Population (Arab Republic of Egypt), National Population Council (Arab Republic of Egypt), and ORC Macro. 2000.

El-Zanaty, F., H.A.A. Sayed, H. Zaky, and A. Way. *Egypt Demographic and Health Survey 1992.* Calverton, Maryland: National Population Council (Arab Republic of Egypt) and Macro International Inc. 1993.

Ender, Gary. *Accomplishments in Agricultural Policy Reform In Egypt, 1997-2001*. MVE Unit - APRP, Impact Assessment Report No. 19. Abt Associates Inc. Cairo, Egypt. April, 2002.

Filmer, Deon and Lant Pritchett. *"Estimating Wealth Effects Without Expenditure Data – or Tears: An Application to Educational Enrollments in States of India."* Demography vol. 38, no. 1., February, pp. 115-132. 2001.

Filmer, Deon and Lant Pritchett. *Estimating Wealth Effects without Expenditure Data-or Tears: An Application to Educational Enrollments in States of India.* World Bank Policy Research Working Paper No. 1994. Washington, DC: Development Economics Research Group (DECRG), The World Bank. 1998.

Fletcher, Lehman B. ed. *Egypt's Agriculture in a Reform Era.* Iowa State University, Ames, Iowa, 1996.

Glasser, Bradley Louis. *Economic Development and Political Reform: The Impact of External Capital on the Middle East.* Edward Elgar Publishing, Cheltenham, UK. 2001.

Goueli, Ahmed and Ahmed El Miniawy. *Food and Agricultural Policies in Egypt: 1970-1990.* No date (1994?).

Harrison, Kelly M. *"Agricultural Processing, Marketing and Trade in the Reform Era,"* in Egypt's Agriculture in a Reform Era, ed. Lehman B. Fletcher, Iowa State University, Ames, Iowa, 1996.

Hayami, Y. and Ruttan, V. *Agricultural Development: An International Perspective.* Baltimore, MD: Johns Hopkins University Press. (referenced in Timmer 1988:307). 1985.

Holtzman, John and Adel Mostafa. *The Cotton/Textile Subsector in Egypt: Impacts of Policy Reform.* MVE Unit - APRP, Impact Assessment Report No. 26. Abt Associates Inc. Cairo, Egypt. July, 2002.

Holtzman, John, Abdel-Rahim Ismail and Samar Maziad. *The Impact of Policy Reform on the Rice Subsector in Egypt.* MVE Unit - APRP, Impact Assessment Report No. 25. Abt Associates Inc. Cairo, Egypt. July, 2002.

Holtzman, John S. Rice *Subsector Baseline Update.* MVE, APRP, Impact Assessment Report No. 10, Cairo, Egypt. January 2000.

Holtzman, John S. with Adel Mostafa. *Cotton Subsector Baseline Study.* MVE, APRP, Impact Assessment Report No. 5, Cairo, Egypt. December 1998.

Krieger, Douglas J., Ali Assem F. Abdel Aziz, and Sherif M.S. Fayyad. *Growth and Productivity of Inputs in Agriculture on Egypt's Old Lands:1990-1997.* MVE, APRP Special Study No. 2. Cairo, Egypt. July 1999.

Khedr, Hassan, Rollo Ehrich, and Lehman Fletcher. *"Nature, Rationale and Accomplishments of the Agricultural Policy Reforms:1987-1994,"* in Egypt's Agriculture in a Reform Era, ed. Lehman B. Fletcher, Iowa State University, Ames, Iowa, 1996.

MALR (Ministry of Agriculture and Land Reclamation). *The Sixth Agricultural Census 1990.* Undersecretariat for Agricultural Economics, General Department of Agricultural Census. Cairo, Egypt. 1990.

Mellor, J.W. and B.F. Johnston. *"The World Food Equation: Interrelations among development, employment, and food consumption."* Journal of Economic Literature, 22:531-574. 1984.

Morsy Ali Fawzy, Mamadou Sidibe, and Osman Salama. *The Impact of APRP at the Farm Level*. MVE Unit - APRP, Impact Assessment Report No. 28. Abt Associates Inc. Cairo, Egypt. July, 2002.

ORC Macro. *Typologies of Local Areas in Egypt. Draft report prepared under contract for USAID/Egypt.* ORC MACRO, International, Bethesda, Maryland. 2002.

ORC Macro. *Monitoring Geographic Equity of USAID SO16 Programs.* Draft report prepared under contract for USAID/Egypt. ORC MACRO, International, Bethesda, Maryland. October 2002.

Nassar, Saad, Fenton Sands, Mohamed Omran, and Ronald Krenz. *"Crop Production Responses to the Agricultural Reforms,"* in Egypt's Agriculture in a Reform Era, ed. Lehman B. Fletcher, Iowa State University, Ames, Iowa, 1996.

Radwan, Samir. *Employment and Unemployment in Egypt: Conventional Problems, Unconventional Remedies.* Paper presented at the Egyptian Center for Economic Studies conference on Employment and Unemployment, January 13-14, 2002. Cairo, Egypt. 2002.

Rogers, Glenn. *"Applications of a GIS in Program Impact Evaluation: Lessons from USAID Experience,"* in Geographical Targeting for Poverty Alleviation: Methodology and Applications, edited by Bigman, David and Hippolyte Fofack. World Bank Regional and Sectoral Studies. Washington: The World Bank. 2000.

Rogers, Glenn. *"Modelling the impact of land tenure on local income generation in rural Mauritania,"* in Risk and Tenure in Arid Lands: The Political Ecology of Development in the Senegal River Basin, edited by Thomas Park, University of Arizona Press, Tucson. 1993.

Rutstein, Shea. *Wealth versus Expenditure: Comparison Between the DHS Wealth Index and Household Expenditures in Four Departments of Guatemala.* Unpublished. 1999.

Schultz, T. Paul. *Human Capital, Schooling and Health Returns.* Yale University Economic Growth Center Discussion Paper No. 853. New Haven:Yale University. April 2003.

Timmer, Peter C. *"The Agricultural Transformation,"* chapter 8 in Handbook of Development Economics, ed. Chenery, Hollis and T.N. Srinivasan, vol. 1, North-Holland, Amsterdam, 1988.

USAID. *Mid-Term Evaluation of the Agricultural Development Systems Project*. 1983.

USAID. *Final Evaluation of the Agricultural Development Systems Project* (implemented by the University of California at Davis). 1985.

World Bank. *Arab Republic of Egypt: An Agricultural Strategy for the 1990s.* A World Bank Country Study. The World Bank. Washington. 1993.

World Bank. *Arab Republic of Egypt -Toward Agricultural Competitiveness in the 21st Century: An Agricultural Export-Oriented Strategy.* The World Bank. Washington, DC. 2001.

World Bank. *Arab Republic of Egypt: Poverty Reduction in Egypt Diagnosis and Strategy*. Vol 1: Main Report. Social and Economic Development Group, Middle East and North Africa Region. 2002.

Endnotes

[1] The author gratefully acknowledges the valuable comments on earlier versions of this work provided by Gary Ender, Livia Montana, Mark Henry, and Dominique Harre. Special acknowledgement is given to Livia Montana and other ORC Macro, Intl staff who developed the wealth index described in Appendix A, area classifications, and databases used for this analysis. The details of this earlier work used for this analysis are reported in ORC Macro (2002) and (October 2002). The Egyptian Agricultural and Population Censuses were provided in electronic format by CEDEJ (Centre d'Etudes et de Documentation Economiques, Juridiques et Sociales) in Cairo, based on official published versions of these data. The views expressed in this chapter are those of the author and are not meant to represent official USAID policy.

[2] U.S. President George W. Bush announced the Millennium Challenge Account at the Monterrey Conference on Financing Development in March 2002. If enacted by the U.S. Congress, the MCA will begin in Fiscal Year 2004 and grow to $5 billion per year in U.S. development assistance by Fiscal Year 2006.

[3] These included cotton, wheat, rice, sugar cane, and onions, with lesser degrees of quotas, price and marketing controls, and trade controls applied to other crops.

[4] USAID-financed agricultural technology programs in this period included Rice Research Training 1977-1986, The Major Cereals Improvement Program (1979-1986), and the ADS (Agricultural Development Systems Project) 1977-1986, which focused on horticulture, specifically tomato and cut flowers. There were also five USAID irrigation infrastructure and water management projects during the 1980s.

[5] The economics sub-component of the ADS Project 1977-1986 helped set the stage for subsequent policy reform by training large numbers of Egyptian economists and scientists abroad. Subsequent agricultural policy projects included Agricultural Data Collection and Analysis 1980-1986, National Agricultural Research Project with a Policy Analysis Component 1987-1992, the Agricultural Production and Credit Project 1986-1995, which emphasized cotton policy, and the Agricultural

(including water) Policy Reform Program 1995-2002. Since 1975 USAID has invested over $1.5 billion in the agricultural sector.

[6] Early policy work under the ADS, one of the first USAID projects in Egypt, focused on increased coordination among decision-making bodies to reduce conflicting policies within the government, improved policy implementation through increased decentralization of implementation responsibilities, and taking greater cognizance of the role of markets and private sector incentives (USAID, 1983:106).

[7] The direct effects of changes in human capital during the 1990s are associated with only a small part of the overall increase in household wealth. The interactive effects of human capital and policy reform are considered to be a result of policy reform for this with-versus-without analysis focused on policy reform. Analysis focused on the returns to human capital would require a different model specification.

[8] The EDHS data show that on average between 1992 and 2000, household wealth increased more slowly in the 14 *markaz* with a high percentage of employment in manufacturing than in Agricultural areas as a whole. In addition, local areas (*markaz*), where the 1986-1996 increase in the working age population (age 15-64) was at least 0.75 standard deviation above the mean, had the same 1992-2000 increase in household wealth as all Agricultural areas. On this basis, other types of geographically concentrated growth, such as industrial employment and residential construction, are not considered a source of variation of household wealth across Agricultural areas. The geographic effects of tourism are more difficult to estimate.

[9] Gharbeya, Menoufeya, Beheira, and Giza governorates accounted for 79 percent of total summer/nili potato area in 1990.

[10] Sharqeya, Qalyoubeya, Gharbeya, Menoufeya, and Beheira governorates accounted for 80 percent of area planted with oranges in 1990.

[11] Holtzman et al. (July 2002 Report 26:5) summarized the remaining government administrative allocation and pricing systems that still largely determine which varieties are grown and ginned where, pricing throughout the marketing chain, allocations to gins, and allocations to public spinning companies. See also World Bank (2001).

[12] As of the 2000/2001 Cotton Map produced by ALCOTEXA, the areas south of Cairo were allowed to grow the Giza 80 and 83 cotton varieties, while the eastern delta region was allowed to grow Giza 85. All three varieties are used primarily in the domestic textile industry and not exported. Non-Export Cotton areas include the *markaz* most specialized in production of cotton in 1990 that were allocated these three cotton varieties as of 2000/2001.

[13] The methods used in this paper build on earlier USAID impact evaluations described in Rogers (2000).

[14] From a conceptual perspective, "*markaz*" in Arabic means the "central place" with one central place "the *markaz* town" and surrounding villages, usually smaller populated places. The *markaz* administrative areas geographically include markets for local services, including government credit, agricultural inputs, and local private business or consumer services. A *markaz* is similar to a county in the southern United States. *Markaz* economies are considered to be driven by independently determined factor endowments and metropolitan and export markets for their tradable products. Technological spillover is more likely to take place within a *markaz* than among *markaz*, so these geographic areas are considered relevant for impact-related questions.

[15]The metropolitan areas of Cairo, Alexandria, Port Said, and Suez include 43 *markaz* that are not considered Agricultural areas. Desert Governorates along the Red Sea, in Sinai, and in the Western Desert were excluded from the analysis because these sparsely settled regions cannot be classified in the same manner and because they account for only a small portion of total agricultural land.

[16] The approach was built upon that of Cook and Mizer (1994).

[17] *Markaz* that were classified into more than one of the agricultural type categories were assigned to the type for which the percentage point difference for cropped area above the cutoff point divided by

the standard deviation was the largest. This was done to enable the classification to represent mutually exclusive groups.

[18] Women's education level in the EDHS data is very highly correlated with the education level of the head of household, who in Egypt is a male 90 percent of the time. Women's education is positively correlated with education and health of children as well. Thus, women's education is considered a proxy that measures these dimensions of human capital for all household members and not only for the women interviewed.

[19] The change over time due to human capital is the coefficient dw/dH multiplied times the change in the education variable for each area.

[20] These differences are calculated by subtracting the coefficients for Pre-1992 Policy and Trends from each other.

[21] For example, GOE efforts to improve farm-level management and technology adoption in the agricultural sector were supported in selected geographic areas by USAID with projects for Agricultural Mechanization 1980-1985, Agricultural Management Development 1980-1985, Small Scale Agricultural Activities 1979-1984, and Agricultural Cooperative Marketing 1979-1983. Other USAID projects included Poultry Improvement 1977-1983, Aquaculture Development 1978-1987, and the Small Farmer Production Project 1979-1987 focusing on farm plot consolidation and credit in Sharqeya, Qalyoubeya, and Assiut Governorates.

5 APRP Impact Assessment Methods

John S. Holtzman and Gary Ender

The Agricultural Policy Reform Program (APRP) was a complex policy reform program characterized by a large number of reforms in many different policy areas. As discussed in chapter 2, APRP began in tranche I with a large number of diffuse policy benchmarks, covering many different policy and regulatory reform domains. Furthermore, tranches I and II were characterized by quite a few studies, which really were not policy benchmarks at all but rather applied research and analysis activities pre-dating formulation of policy reforms. It is also important to note that the final composition of reforms was not known at the beginning of the APRP reform process and, hence, during the initial impact assessment design. In addition, data availability, accessibility, and reliability had not yet been evaluated by the Monitoring, Verification and Evaluation (MVE) Unit.

Principles of Impact Assessment

Given the wide range and variety of policy benchmarks, it was not possible to evaluate every reform. Hence, the MVE Unit had to make choices or predictions about the main thrusts of APRP and the most important types of progress. The Unit was also interested in showing causality (through delineation of causal chains) for attribution of impact to APRP.

An important characteristic of the MVE Unit's approach was that it was integrated and designed to assess the impact of sets of reforms on key segments of the Egyptian agricultural economy. Assessment focused on:

- Impact on the entire farm, not only on one or two elements of production (i.e., specific crops or farm enterprises)
- Impact on entire leading subsectors, not just one industry within each subsector
- Impact on the whole economy through examining the inter-relationships among increases in agricultural production, greater farm incomes, pattern of spending by rural households, and expanded small and micro enterprise (SME) investments and sales.

MVE Unit's Program of Impact Assessment

Impact Assessment Plan. In the fall of 1997, the MVE Unit undertook a comprehensive planning exercise to initiate its program of economic impact assessment. This program was designed to go beyond evaluating whether policy and regulatory reforms were actually implemented to assess in-depth whether the reform program made a difference. Shortly after this exercise, the MVE Unit decided to produce an annual monitoring report that would track changes in a series of progress indicators that included private and public shares in several agro-industries, export revenues for cotton lint and yarn, and water use on irrigated rice. Tracking key indicators was an important input into the Unit's impact assessment, particularly in assessing changes over longer time periods (e.g., from 1986/1987 to 2001/2002). Many policy reform programs funded by the United States Agency for International Development (USAID) would have gone no further than this set of indicators in evaluating impact.

The original impact assessment plan (Zalla et al., 1998) considered a number of different types of analyses, including evaluating changes in agricultural production (and its value) over time, input use (particularly fertilizer), the structure and performance of key commodity subsectors, and changes in agricultural sector resource allocation, as measured through a comprehensive agricultural sector model. The plan called for some form of with-and-without analysis, which would compare the actual impact of the reform program on producers and consumers versus a counterfactual situation. This is superior to a before-after comparison of welfare, which would not account for how the situation was likely to evolve over the APRP period had APRP not been implemented. It was clearly understood, however, that such a complex modeling exercise would depend in large part on follow-up assessments of agricultural sector data quality. An existing agricultural sector model, developed and modified over the course of a decade by the World Bank and the International Food Policy Research Institute (IFPRI), proved not to be as robust as anticipated. The model was examined and tested by an agricultural economist who specializes in mathematical programming and who discovered that the model produced counter-intuitive and hard-to-interpret results (Keith, 1999). The MVE Unit was also well aware that the developing country landscape is littered with well-intentioned but largely failed modeling efforts that proved to be of little use to policymakers. With a strong commitment to data quality, the Unit adhered to the view of modeling in which the quality and usability of model outputs depend heavily on the quality of the data inputs. The MVE Unit, therefore, invested significant resources during the first half of APRP in evaluating data availability, reliability, and accuracy. The Unit's conclusions were not encouraging, and the Unit made the strategic choice to participate in strengthening data collection and analysis.[1]

Impact Assessment Foci and Methods. Economic impact assessment often focuses on how producers and consumers are affected by policy reform programs. In the simpler case, the welfare of producers and consumers is compared before

and after the program was implemented. This presupposes some form of socioeconomic, agricultural production, and food-consumption baseline information, typically gathered shortly after the program has begun.[2] In the case of APRP, IFPRI undertook a nationally representative household sample survey in early 1997, administered in a single visit to 2,700 rural and urban households. IFPRI's survey was especially targeted to households' food expenditures and food consumption practices. It was not designed to provide a baseline on agricultural production, input use, crop and livestock disposal, farm assets, and returns to different crop rotations and crops.

The MVE Unit carried out a producer survey of 180 farm households in April-May 1997 that was designed mainly for verification purposes, but it obtained some basic information about agricultural production and returns (Morsy et al., 1998). Deutsche Gesellschaft für Technische Zusammenarbeit/Cotton Sector Promotion Program (GTZ/CSPP) surveys of returns to summer crops in 1997 and 1998 (Selzer, 1998) and farm income data collected and analyzed by the Ministry of Agriculture and Land Reclamation/Economic Affairs Sector (MALR/EAS) and APRP/Reform Design and Implementation (RDI) Unit (Gleason and Hussein, 1999) also provided valuable baseline data. USAID did not fund IFPRI to carry out a second, nationally representative household survey, as the MVE Unit had hoped. Near the end of APRP in October 2001, however, the MVE Unit conducted a *producer survey* of about 750 farm households in 10 governorates to obtain information about assets, input use, crop production and disposal, and farmers' opinions about the impact of reform. With this information, the Unit hoped to show how farm households fared during the APRP years and how returns to different crop rotations had changed during APRP. On close review, it turned out the two sets of credible baseline data, which were limited in geographic scope, were not consistent with each other. Since there was no way to choose between the two significantly different sets of figures, only limited comparisons of costs and returns could be made. However, the producer endline survey revealed farmers' awareness of reforms, including when they felt that they began and what their impact was, and it provided a useful farm-level cross-check for conclusions emerging from the subsector endline studies (see chapter 15).

Subsector studies of policy reform impact were well-suited to many of the commodity-based policy and regulatory reforms of APRP, which targeted the marketing system. The MVE Unit selected four key subsectors for monitoring and evaluation: cotton, rice, wheat, and fertilizer**.** These three commodities and one key input were predicted as key subsystems at the outset of APRP. Three of the subsectors (cotton, rice, and fertilizer) had been the subject of significant policy reform during the Agricultural Production and Credit Project (APCP) and, hence, merited ongoing monitoring and impact assessment. Monitoring was necessary to determine if the APCP reforms were sustained and if back-sliding would be avoided. Periodic assessment of impact was viewed as essential to the capture lagged effects of APCP reforms.

Although APCP and APRP were separate programs with different emphases,[3] there was a large degree of continuity in the two programs with respect to cotton, rice, and fertilizer. Cotton market liberalization began in earnest during the last years of APCP, particularly in 1994/1995 and 1995/1996. APRP picked up where APCP left off. Cotton was the focus of numerous APCP and APRP policy reform benchmarks (Goldensohn, 1998; and Holtzman, 2000) and, hence, a large cash transfer value can be placed on those benchmarks because policy condition-driven reform tranches began in the late 1980s. Cotton is also the number one agricultural export commodity (as lint), it is the major raw material used in the largest agro-industry in Egypt (the spinning and weaving industry), and it employs many people across vertically linked industries (from seed cotton assembly to manufacture and export of ready-made clothes).

Rice is a second major summer crop that competes for irrigated land and water with cotton (and maize). The rice market was liberalized under APCP from 1990/1991 to 1993/1994, during which compulsory deliveries to public sector mills were phased out and cancelled, paddy and rice prices were freed, and private sector participants were allowed to enter paddy assembly and wholesaling, milling, and trading (including exporting) of milled rice. The private sector responded to these policy changes relatively quickly, although private investment in new rice-related enterprises was lagged, and the impacts of the reforms and private sector responses did not fully work their way through the agricultural economy until APRP started.[4] The fact that privatization of public sector rice milling companies was not attempted during APCP made it important to monitor privatization efforts under APRP. The rice-related policy benchmarks under APRP focused on privatizing public sector rice mills and on conservation of water through planting of short-season varieties and better management of irrigation water supplies. Although repeated attempts to lower the tariff on imported rice failed, APRP succeeded in heightening consciousness of the opportunity cost of growing a high water–consuming crop like rice and in introducing better water supply management controls.

Although the wheat subsector was the subject of far fewer benchmarks than either rice or cotton, subsidized bread remains the staple food of most Egyptian consumers, particularly the poor. Much of IFPRI's work centered around determining who the poorest consumers (i.e., those most deserving of food subsidies) are, as well as policy distortions and constraints that lead to inefficiencies and leakages in the bread subsidy system. Wheat is critical in ensuring Egyptian food security, and the area cultivated to wheat makes it the number one winter-season crop in most years.[5] It is also important to highlight that domestic wheat production covered no more than 60 percent of national requirements during APRP. Egypt remains one of the world's largest wheat importers, and imported wheat is milled into flour (72% or *fino*) that is used in baking products that are purchased by non-poor consumers. In other words, 72 percent flour milling and baking constitutes a distinct wheat market channel that is subject to numerous controls and restrictions (and, therefore, opportunities for

leakages and distortion). As such, the wheat subsector remains overall one of the most highly regulated and least reformed subsectors in Egyptian agriculture.

Liberalizing the fertilizer trade was the subject of many policy benchmarks and an enormous amount of effort under APCP in the first half of the 1990s. Egyptian farmers apply high levels of nitrogen-based fertilizers, and fertilizer is a key purchased production input. In several short years, the fertilizer subsector in Egypt went from being completely dominated by the public sector to one with a thriving private trade and was hailed as a major policy victory. A policy reversal in 1995/1996, when the Government of Egypt returned most fertilizer distribution to the Principal Bank for Development and Agricultural Credit (PBDAC), led the MVE Unit to consider it a high priority to monitor the re-introduction of the private trade under APRP and the relaxation of controls on trade.

Analysis of the impact of reforms in the marketing system called for a different type of analysis than what was used to assess changes in producer incomes and returns to alternative crops. The MVE Unit adapted the *structure, conduct, performance* paradigm to subsector analysis, focusing on how policy reforms led to changes in how commodity subsystems were organized (particularly private sector shares vis-à-vis the shares of public companies and cooperatives), the incentives facing different groups of subsector participants and how they responded to changed incentives, and the performance of the subsector with respect to selected attributes: the degree of private sector participation in the subsector; the distribution of returns relative to investments and risks; innovation in processing, packaging and product marketing; employment; and the flexibility or adaptability of the subsector. See chapter 7 for details on the use of this method and chapters 8, 11, 12, and 13 for the results of the subsector evaluations.

The MVE Unit conducted comprehensive subsector studies in 1998/1999 that established the baseline as 1996/1997 and 1997/1998, the early years of APRP. Regular updates were prepared to assess ongoing progress in the cotton and rice subsectors after 1998/1999. The Unit conducted end-of-project or "endline" studies in the first half of 2002 that took stock of changes in key structural characteristics of the subsectors and changes in conduct and performance. The Unit also attempted to attribute causality for the reforms to APRP and other factors.

The MVE Unit also conceived and carried out several studies of important *cross-cutting issues*. These were designed with hindsight about the focus of APRP, including implementation programs that complemented the policy reform benchmarks. Two studies focused on key topics in institutional change:

- Changes in roles of the public and private sectors
- Impact of APRP on the agricultural information system

The method of inquiry involved structured informal interviews of APRP staff and selected stakeholders and beneficiaries, review of APRP and other reports and data, and stepping back from the myriad process details to view progress in a longer-term perspective. The examination of changing public and private sector roles brought a valuable cross-country comparative perspective to this exercise. The analysis addressed in detail the policy reform process, as well as implementation methods and pitfalls (see chapter 16). The study of APRP's impact on information systems examined progress made by MALR and other ministries in upgrading data collection and analysis of farm production, farm income, and prices at different levels of the marketing system (chapter 14).

The *horticultural subsector* received progressively increasing attention under APRP, as later tranches contained a greater number of policy benchmarks in this area. There were reforms in areas such as the seed subsector, the roles of public/private agricultural research and extension, and contract farming. The horticultural subsector did not benefit from a baseline study early in APRP, although APRP/RDI completed a diagnostic assessment of policy constraints (Pietrus, 1999) prior to developing benchmarks. The MVE Unit decided to assess the preliminary impacts of APRP benchmarks related to horticulture in the final year of APRP, in recognition of the emerging importance of this subsector as an agribusiness investment opportunity, a generator of jobs, and a source of foreign exchange earnings through exports to high-income markets. The approach used to gauge APRP impact on the horticultural subsector was more of a policy-oriented rapid appraisal than a full-blown subsector study. The study examined the international competitiveness of the subsector (see chapter 10). It considered the joint impact of APRP, the Agricultural Technology Utilization and Transfer Project (ATUT) and the Agriculture-Led Export Business (ALEB) on the volume and value of selected horticultural exports, and solicited participant views on the contributions of the individual projects.

Beyond Sectoral Impact. The MVE Unit also undertook studies that were not intended to evaluate directly the impact of APRP. Rather they were intended to shed light on the *potential impact of rapid agricultural growth* and the mechanisms through which it could bring about *increases in employment*, particularly in rural areas. Thus, they addressed the potential impact of any program like APRP that assists the agricultural sector to increase its rate of growth. In rural areas, SMEs play a key role in employment generation because there are very few larger enterprises those areas. SMEs might be a logical stepping stone from employment in agriculture toward work in a larger enterprise, either in an SME that grows or in another enterprise. The possibilities for this mechanism to function and the extent to which agricultural growth could jump-start this process are explored with the results of three surveys (see chapter 18). Mellor provides the conceptual framework at the national level for this work. He developed a simplified, three-sector model for the Egyptian economy that revealed the importance of agricultural growth in generating employment and, thereby, reducing poverty (chapter 17).

Conclusion. The MVE Unit's choice of impact assessment approaches and methods was pragmatic, reflecting data availability, quality, and limitations. The MVE Unit scaled much of the analysis to the scope and objectives of many benchmarks, which targeted improvements in subsectors. It was well supported by the analytical strengths of key MVE Unit staff responsible for major impact assessments.

The MVE Unit's subsector studies assembled and analyzed relevant data from many disparate sources (much of which were unpublished), examined the impact of policy reforms on subsector structure and performance, and identified policy reform gaps and problem areas for future work. The Unit documented in detail how those subsectors were organized and how they were performing early in APRP, covering the baseline years of 1996/1997 and 1997/1998. These studies attributed certain changes to APRP policy and regulatory reform, while concluding that some changes were due to other factors, such as changes in domestic economic conditions, the world market situation, the position of the GOE, policies not tackled by APRP, or other exogenous factors.

The MVE Unit's producer surveys proved to be valuable exercises in sampling, survey design, and survey implementation. They demonstrated that it is possible to conduct high-quality farm surveys in Egypt, using representative but relatively small samples (by IFPRI and MALR standards). The surveys generated useful information on producers' opinions and perceptions of the GOE's agricultural policy reform program. Probably a greater and more lasting contribution of the MVE Unit's impact assessment program was the careful review of agricultural data, leading to recommendations on ways to improve the data collection process. Following up on these recommendations, APRP assisted MALR in strengthening the collection of several types of farm-level data. The Unit's strong encouragement to MALR to generate high-quality data and use this improved data in policy analysis is likely to be one of the most enduring contributions of the APRP.

References

Gleason, Jane and Sayed Hussein. *Study on Cost of Production and Farm Income Data for the 1997/98 Agricultural Season, Volume I.* MALR/RDI Unit - APRP, Report No. 89, December 1999.

Goldensohn, Max. *Review of APCP and APRP Tranches: APCP Tranches 1-7 and APRP Tranches 1-3.* APRP – RDI Unit Report No. 44. Cairo, Egypt. 1998.

Holtzman, John. *Liberalization and Privatization of Key Subsectors in Egypt's Agricultural Economy: Progress & Challenges*. MVE Unit – APRP,

Impact Assessment Report No. 14. Abt Associates Inc. Cairo, Egypt. November 2000.

Keith, John. *Review of the Agricultural Sector Model of Egypt (ASME97): 1999 Version.* APRP—Water Policy Reform Program Report No. 27. International Resources Group, Winrock International and Nile Consultants. Cairo, Egypt. 1999.

Morsy Aly Fawzy, Ahmed Qadery M. Bahloul, Mohamed A. Meselhi, Mohamed Sayed Saeed, and Usama Ahmed El Bahnasawi. *Producer Survey Results, APRP-Tranche I.* MVE Unit – APRP, Verification Report No. 6. Abt Associates Inc. Cairo, Egypt. March 1998.

Pietrus, Joseph. *Horticulture Subsector Policy and Regulatory Constraints*. APRP – RDI Unit Report No. 57. Cairo, Egypt. 1999.

Selzer, Thomas. *Results of the 1997 Farm Survey in Daquahlia and Beni Suef.* GTZ/CSPP Project Report No. 58. 1998.

Zalla, Tom, Stephan Goetz, John Holtzman, Abdel-Hamid Youssef Saad, Morsy Aly Fawzy, Abdel-Rahim Ismail, and Robert Young. *Plan for Assessing the Impact of Egypt's Agricultural Policy Reform Program.* MVE Unit – APRP, Impact Assessment Report No. 1. Abt Associates Inc. Cairo, Egypt. March 1998.

Endnotes

[1] MVE funded several activities, with the MALR/EAS, that have been designed to improve data collection in the New Lands, within-season yield forecasts for some key crops (cotton, wheat), and improved area estimation.

[2] Occasionally, a program or project benefits from a pre-activity baseline, but this is not usually the case.

[3] See chapter 2 for details of the APRP.

[4] Technically, the start date for APRP was the beginning of the 1995/96 fiscal year, which was when the GOE and USAID signed the first Memorandum of Understanding. By this point, the first tranche of APRP policy benchmarks had been designed and agreed. Since the technical assistance teams under APRP did not begin to arrive until November 1996, the de facto beginning point for APRP can be considered the 1996/97 agricultural year. Note that the verification report for tranche I covered the period through 30 June 1997.

[5] The two main winter-season crops are wheat and berseem. Berseem consists of a long-season crop, a short-season crop, and a seed crop. Egyptian analysts consider these three types of berseem separate crops. When the area planted to these three berseems is totaled, it can exceed the area planted to wheat in some years. In winter 2001, total berseem area was 2.62 million feddans, compared to 2.34 million feddans planted to wheat.

6 APRP Progress Indicators

Gary Ender

The Monitoring, Verification and Evaluation (MVE) Unit used progress indicators to measure some of the first effects of agricultural policy reforms implemented under Agricultural Policy Reform Program (APRP). The long-term impact of policy reform was analyzed in the MVE Unit's impact assessment program, so long-term measures of impact are generally not included in the progress indicators.

In December 1999, when the MVE Unit's first monitoring report was published, the data available were useful only for measuring the progress indicators for a period before APRP began. Over time and with the increasing availability of data, the MVE Unit was finally able to report progress indicators for years covering more or less the full duration of APRP (1996–2001), in addition to the baseline period (beginning about 1990).

The first monitoring report included a wide range of progress indicators that had been suggested by the staff of the APRP technical assistance units and their colleagues in the Government of Egypt (GOE) and the U.S. Agency for International Development (USAID). After compiling the required data, analyzing them, and reporting on those indicators, the MVE Unit assessed the usefulness of the indicators as progress indicators for APRP. Those indicators considered best for continued use as progress indicators for APRP were those with a direct relationship to specific reforms under way in APRP. Data were available to measure these indicators, and their interpretation was generally straightforward. At the other end of the spectrum were indicators that were only indirectly or remotely linked to specific reforms (although they may measure ultimate impact) or that were complex in themselves and, therefore, hard to interpret.

The progress indicators that were dropped, based on the assessment in the first monitoring report, included:

- Nominal protection coefficients for urea and rice
- Correlation coefficient between prices of US Pima and Egyptian cotton
- Real value of ready-made garment exports
- Ratio of earnings of non-banking activities to total earnings for Principal Bank for Development and Agricultural Credit (PBDAC)
- Agricultural resource income

The progress indicators that were retained are not perfect combinations of the attributes mentioned above, but the indicator data, when viewed in light of the analysis provided with them, were deemed useful to those interested in the progress of APRP reforms. The progress indicators that were retained included:

- Real value of cotton lint exports
- Real value of cotton and cotton-blend yarn exports
- Private sector share of distribution of nitrogenous fertilizer
- Private sector share of volume of seed cotton trade
- Private sector share of volume of cotton ginning
- Private sector share of volume of cotton spinning
- Private sector share of volume of wheat milling
- Private sector share of employment in cotton ginning
- Private sector share of employment in cotton spinning
- Irrigated area under control of water user associations
- Volume of paddy rice production per unit of water
- Agricultural production per unit of water

Some of the progress indicators are directly linked to the real effects of policy change. A good example is the private sector share of the volume of seed cotton trade, which was zero during the public monopoly period and then zigzagged through various higher and lower non-zero values as the ability of the private sector to acquire and trade seed cotton was regulated in different ways in different marketing years. In some years, seed cotton could effectively be sold by farmers only at government-set prices and only at sales points administered by PBDAC; in other years, there was more flexibility in pricing and/or location, and the private sector took advantage of these opportunities to increase its market share.

The usefulness of a progress indicator may be significantly affected by the method of calculation. The volume of paddy rice production per unit of water is a good example of this effect. There are no direct statistics on the amount of water used to produce rice in Egypt, so this indicator was calculated by combining a scientific estimate of the daily "consumptive use" of water (per area) with the statistics on area for each variety and the number of days that that variety was in the field and being irrigated. There were shorter- and longer-season varieties that were irrigated for different numbers of days. Initially it had to be assumed that the longer irrigation cycle applied to all varieties, since the shorter-season varieties were not grown in blocks, and the irrigation engineers generally had to make water available to all those growing rice in any given area for the entire growing season (even though rice was not supposed to be grown in certain areas). When APRP introduced the idea of growing short-season varieties in blocks and shortening the irrigation cycle in those areas, the method of calculation had to be revised. In particular, for 2001, it was assumed that the consumptive use of water was the amount needed by the actual area of short- and long-season varieties grown (or in other words, that the introduction of block planting of one variety by groups of farmers and the promotion of short-season varieties allowed the

irrigation engineers to shorten the irrigation season for rice on an area equal to the area planted to short-season varieties). As a result, the indicator increased sharply (see Table 6-1).

The progress indicators were summarized in a matrix (see examples in Table 6-1) that provided a brief narrative of the effects that policy reforms during the 1990–2001 period seemed to have had on the level of the indicator. Special emphasis was placed on the 1996–2001 period (i.e., the duration of APRP). Next to each narrative was a graph of the indicator values, so that the reader could assess the trend during the baseline and APRP periods. The right column of the matrix was an assessment of the effect of policies during APRP. The full details of the progress indicators, including data sources, tables, figures, and analyses, were provided in the body of the MVE Unit's monitoring report.

The data for a significant number of the progress indicators were unpublished. There were 12 progress indicators; data for 4 were completely published, data for 4 were entirely unpublished, and for the remaining 4 some of the data were published and some were not. In some cases, the MVE Unit needed to carry out a survey to collect the data directly. In other cases, even the published data were not disseminated widely, or they were available only in highly aggregated form (e.g., spinning industry employment and output) and could not be cross-checked against more disaggregated figures. If the transition to a market-based economy is to proceed smoothly and efficiently, the GOE should remedy this situation by publishing all such essential data in a careful, timely, and open manner.

Some of the ministries with which APRP collaborated have made serious efforts to improve data collection and dissemination. Among those efforts that should be mentioned are MALR's (1) program to publish data on agricultural production by season in a much more timely fashion, (2) publication of the incipient farm income data series and gender-disaggregated data, (3) improvements to the agricultural census (including first-time data for the New Lands), and (4) program to forecast key crop yields during the growing season to benefit both private traders and policymakers. In addition, the Ministry of Foreign Trade began a program to publish trade data on a more timely basis through a web site and monthly bulletins.

The analysis of progress indicators showed that of the 12 separate indicators presented, 7 were generally increasing during APRP, and all but 2 of the 12 seem to have been positively affected by policies during the period. For example, there was apparently a dramatic increase in the production of rice per unit of water. This was the culmination of the coordinated program to change irrigation scheduling in conjunction with the steadily increasing adoption of higher-yielding shorter-season varieties of rice. Yarn exports, after being volatile and mostly decreasing since 1990, stopped declining during the 1999–2001 period.

Table 6-1. EXAMPLES FROM PROGRESS INDICATORS SUMMARY MATRIX (FROM MVE UNIT'S MONITORING REPORT)

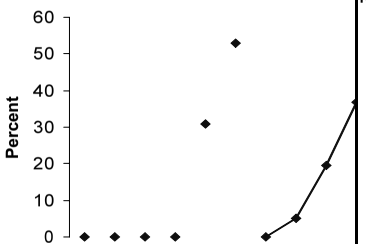
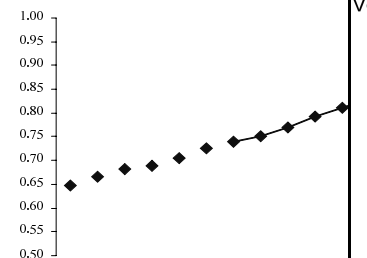
Indicator	Effects of Policy Reforms	Indicator Trend Before APRP APRP 1990 1996 2001	Policy Effect during APRP
3.a) **Private sector share of seed cotton trade (volume)**	This indicator is a direct measure of changes in cotton marketing and pricing policies. The private sector was allowed to enter this area in 1994/95. Since that time the GOE has made annual changes in policies, including minimum export prices and qualities, seed cotton floor prices, allocation of PBDAC-run seed cotton purchasing sites, and deficiency payment schemes. These changes have often hampered the ability, and reduced the willingness, of the private sector to participate in seed cotton marketing, despite a clear desire by many companies and individuals to do so. After reaching 53 percent in 1995/96 before dropping to zero in 1996/97, private sector deliveries of seed cotton to the gins climbed back to 37 percent by 1999/2000, stayed at that level in 2000/01 (36 percent), and fell off slightly to 2001/02 (31 percent).		Mostly positive

Table 6-1. EXAMPLES FROM PROGRESS INDICATORS SUMMARY MATRIX (FROM MVE UNIT'S MONITORING REPORT) (CONT'D)

Indicator	Effects of Policy Reforms	Indicator Trend Before APRP APRP 1990 1996 2001	Policy Effect during APRP
7. **Volume of paddy rice production per unit of water**	Attempts by the GOE to control total rice acreage to conserve water generally did not meet with great success. The indicator nevertheless reveals some apparent efficiency gains in the use of water to produce rice (from .65 kg./m^3 in 1990 to .83 kg./m^3 in 2001). These improvements resulted mostly from the adoption of higher-yielding short-season varieties that were largely bred and distributed before APRP. Recent efforts of MALR and MWRI to capture the water-saving benefits of short-season rice varieties through coordinated planting and irrigation and a shortened irrigation season increased the level of the indicator significantly in 2001. Although precise data on changes in irrigation scheduling are not available, the indicator is likely to have reached almost 1.0 in 2001 (upper point on graph). This is a major policy impact of APRP.		Very positive

Some of the types of progress during APRP that led to these changes in the progress indicators include:

- Privatization of two of the five public cotton ginning companies
- Gradual improvements in various policies affecting cotton export
- Privatization sales, leases, and other policy improvements inducing the private sector to invest in modern cotton spinning
- Consolidation of the return to private marketing of fertilizer through an early policy benchmark, which was, however, apparently reversed in early 2002
- Attainment of substantial water savings from short-season rice cultivation through key changes in policy and irrigation scheduling

Other types of progress are also under way, but it is still too early to see the results. For example, there are many types of improvements in water management, including the matching of irrigation supply and demand through the collection of real-time planting intentions data; the Alexandria Cotton Exporters Association is now operated by a truly private management team that is contemplating important changes in export pricing and grading of cotton; the subcommittees of the Agricultural Commodity Council are taking part in policy formulation; and a cold storage unit was due to open in the customs area of Cairo airport in late 2002.

References

Holtzman, John, Gary Ender, Adel Mostafa, Sherif Fayyad, Samar Maziad, Ezz Eldin Abdel Kader, and Nabil El Santricy. *Intermediate Effects of Policy Reform Under APRP: Progress Indicators, 1990-2001.* MVE Unit – APRP, Monitoring Report No. 4. Abt Associates Inc. Cairo, Egypt. July 2002.

7 Using Subsector Analysis to Assess the Impact of Policy Reform

John S. Holtzman

This paper presents the analytical framework that underlies a large part of the MVE Unit's impact assessment program. A subsector approach, using a structure, conduct, performance paradigm, was used to assess changes in the organization, behavior, and performance of key commodity subsystems in Egyptian agriculture: cotton, rice, wheat, and fertilizer. Many of APRP's policy and regulatory reforms were targeted to specific commodity subsectors and influenced the ways in which agribusiness firms and industries behaved.

Subsector analysis uses an underlying framework from industrial organization theory in economics: structure, conduct, performance. This approach places heavy emphasis on how a commodity subsector is organized (structure), which can influence how participants in the subsector behave (conduct), and ultimately how the subsector performs in the aggregate (and also typically stage by stage, or industry by industry). Behavior or conduct is often inferred from observations about firms operating within industries and subsectors. The broader macroeconomic environment, the basic conditions underlying the subsector, and major policy and regulatory reforms can also influence structure and performance.

Subsector analysis is a dynamic approach that examines how markets and industries respond to change in the form of shifting international supply and demand for a commodity, technological change in the food/fiber system, new knowledge of organizational or management techniques, and policy reform. Subsector analysts pay a lot of attention to agribusiness firms that actively coordinate marketing systems, such as producer/exporters, wholesale traders, processors, and exporters. Key firms in any of these industries can serve as "channel captains" who play a critical role in organizing a subsector, structuring exchange relationships, and using their strategic vantage point (and market power) within the subsector to bring about positive changes that lead to improved system performance.

Most assessments of economic impact focus primarily or exclusively on the welfare of producers and consumers, either before and after policy reforms or under a set of scenarios with and without a policy reform program (or set of investments). Analysts examine producer incomes and assets (investments),

consumer budgets and food choices, and consumer calorie intake and nutrition. Most of the analysis tends to be comparative statics, where researchers identify who wins and who loses from one point in time to another.

Under the Agricultural Policy Reform Program (APRP), many of the policy and regulatory reforms targeted specific commodity subsectors. The Monitoring, Verification and Evaluation (MVE) Unit was, therefore, interested in understanding how these reforms affected the organization of those subsectors, as well as the incentives and behavior of food system participants other than producers and consumers, including traders at different levels of the marketing system (first handlers, wholesale traders), processors, importers, and exporters.

The subsector approach was chosen for four key commodity subsystems (cotton, rice, wheat, fertilizer) for several reasons:

- Many APRP policy benchmarks were subsector-specific. Structural adjustment programs, carried out with World Bank and International Monetary Fund (IMF) assistance in the 1980s and early 1990s, focused on macro variables and policy reforms. Some Agricultural Production and Credit Project (APCP) and APRP benchmarks were agricultural sector wide, but subsequent reform efforts required going beyond sectoral reforms to changing policies, regulations, and practices in specific commodity subsystems.
- Policy and regulatory reform in the agricultural sector (and agribusiness system) and under APRP increasingly focused on real constraints faced by private businesses in key commodity subsystems. An important part of the MVE analytical agenda was to assess how those businesses responded to subsector-specific reforms and the impact of their responses on subsector performance.
- Changes in the organization or structure of commodity subsystems was an important emphasis of APRP. Private sector entry, participation, investment, and market shares ended up being key indicators that were monitored by MVE. The subsector approach, under-girded by industrial organization theory, pays significant attention to subsector structure and how this affects the behavior of (private and public) participants and subsystem performance.

Emphases of Subsector Analysis

Subsector analysis focuses on changes over time in the structure, conduct, and performance (S,C,P) of a subsector, particularly how agribusiness firms respond to policy change and other forces, such as changes in world market conditions, technology, and relative prices. Subsector analysis emphasizes changes in firm, industry, and subsystem behavior over time. Policy reform programs are designed to change the enabling environment and the set of economic incentives facing subsector participants, which in turn leads to changed behavior and enhanced welfare. In many conventional marketing studies, analysts focus largely on prices

and marketing margins. While these are important components of subsector studies, they are a point of departure for studying the competitiveness and distribution of returns across subsector stages.

Subsector analysis grew out of the agricultural marketing field of agricultural economics. Agricultural commodities have particular attributes (e.g., biologically based, perishable) that lead agricultural economists to place heavy emphasis on economic coordination between firms at adjacent stages of subsystems. Good coordination leads to wholesome, tasty, fresh products, while poor coordination leads to spoilage, unpalatable products, and economic losses.

By carefully examining the sets of incentives, risks, constraints, and opportunities facing economic agents at each stage of the value-added chain, a subsector analysis is concerned with the welfare, competitive (or collusive) behavior, and financial performance of those participants. With a positive enabling environment, created by pro-business policies and regulations, subsector participants have incentives to buy and sell commodities, adding value through productive transformation (grading/sorting, processing, packaging, storage, transport), innovating to cut costs and improve products and services, and satisfying customers. Crafting a competitive economic environment minimizes opportunities for traders and processors to offer poor-quality goods or to gouge buyers or sellers on price. Competitive markets discipline cheaters, adulterators, and shirkers. Effective government regulation helps in this regard (to reinforce market discipline), as well as to protect public health and hygiene.

To summarize, subsector analysis has a set of foci that are quite different from the conventional producer/consumer surplus types of analyses:

- Degree of competition in food industries and within subsectors
- Innovation and technological change and their impact on performance
- Economic incentives to invest, innovate, and improve organization and management at the firm level
- How international supply and demand conditions affect domestic production of agricultural commodities and domestic and international market opportunities
- How well-coordinated a subsector is across stages and the result in terms of product cost, quality, timeliness, and packaging

Key Definitions and Concepts of Subsector Analysis

Subsector analysis is a systems approach that takes many factors into consideration in assessing performance. Potentially, systems approaches can appear overwhelming and may seem to have massive data requirements that are not driven by any particular priorities. Choosing what to emphasize should be driven by the impetus for change, which can be the introduction of new technologies, changes in world market conditions, or contemplated or

implemented policy changes. Tracing the impacts of such a change through a complex, vertical commodity subsystem is the essence of using subsector analysis to assess economic impacts.

Table 7-1 is a checklist, in matrix form, of important areas of investigation that might be undertaken in a subsector study. Much of the information listed in the matrix is available in many developing countries, although perhaps from a wide variety of disparate sources. A major challenge in subsector studies is to focus on the minimal and necessary information needs for the purpose of the study, whether it is an initial diagnostic assessment, a focused update, a baseline study for impact assessment, or a rapid appraisal type of project/program evaluation. A potentially important contribution of a thorough subsector baseline study, used in impact assessment, is to pull together available information in a coherent and integrated package. If done well, such a baseline study can serve as a useful reference point for other analysts, policymakers and their assistants, trade association representatives and private industry managers, and evaluators for years to come.

Despite the potential complexity of a comprehensive subsector study, as reflected in Table 7-1, a few points are worth highlighting. First, commodity characteristics and consumption patterns are listed as the first two key areas for good reason. Agricultural products are generally quite perishable and require special post-harvest handling and care. Maintaining the quality and freshness of food products requires significant investments in storage facilities, including cold storage, pre-cooling, sorting, transport (often refrigerated), and handling equipment. The fact that consumption patterns are given special emphasis is consistent with a fundamental tenet of subsector studies and food systems research: demand drives (or pulls commodities through) the subsystem.

Table 7-1, consistent with the S,C,P approach, includes food system participants and organization and subsector operation or conduct as key areas of investigation. The domestic supply situation, commodity price relationships, and international trade considerations also receive attention. The marketing system infrastructure and government institutions and policies are part of the basic conditions of a commodity subsector that can affect costs, incentives, and willingness of private participants to invest. Finally, the timing of a subsector study conditions what an analyst is able to observe because market flows and processing activity may be highly seasonal.

While this discussion of key areas of investigation is perfunctory, the material presented in Table 7-1 does provide a framework around which analysts can organize subsector studies. Some areas and quite a few sub-areas of investigation might have been well covered by previous studies and, hence, might already be well understood (and can be skipped or updated quite easily). Other areas might

Table 7-1. KEY AREAS OF INVESTIGATION IN COMMODITY SUBSECTOR STUDIES

Areas of Investigation	Components	Method of Inquiry	Reasons for Investigating
1. Commodity Characteristics	a) Different grades, end uses. b) Degree of bulkiness, perishability. c) Physical/handling requirements. d) Degree/type of processing. e) Types and magnitude of post-harvest losses. f) Packaging methods and materials for shipment and sale.	1) Review commodity manuals, studies. 2) Develop commodity calendars showing periods of production and transformation. 3) Observation of handling, processing, storage, any sorting or grading, and packaging. 4) Assess nature and degree of post-harvest losses in a rough way.	a) Commodity characteristics can influence operation of the subsystem, which functions are performed, how they are performed, and the relative cost at which they are performed. b) The nature of the production process influences the timing and magnitude of producer sales and marketed flows. c) Post-harvest losses are high in many countries. Identification of causes and means of reducing losses can expand food availability.
2. Consumption Patterns	a) Seasonal and secular trends in domestic and export markets. b) Disaggregated consumption patterns by socioeconomic and ethnic group. c) Future market prospects.	1) Review consumption studies, food balance sheets, and demand projections. 2) Construct food balance sheets if data are available. 3) Interview nutrition/consumption researchers, selected commodity importers, exporters, institutional buyers, and rural and urban consumers.	a) Demand drives (or pulls commodities through) subsystems. b) The strength and seasonality of demand affect production and storage incentives, as well as the direction and magnitude of marketed flows. Longer run trends and opportunities affect investment decisions of participants in the subsystem.
3. Supply Situation	a) Production by year and by region for recent years, noting trends and variability. b) Stocks for transformation and consumption by season and region. c) Flows from major supply areas to major markets, including imports and exports.	1) Review commodity studies. 2) Interview large wholesalers, parastatal managers, crop production researchers, importers, exporters, processors, cooperative and trade association officials. 3) Use map to show flows and apparent surplus and deficit areas. 4) Describe seasonal variation in stocks and flows.	a) Supply and demand are basic elements of economic analysis. b) Production levels and variability affect prices (depending on elasticities), returns via the price mechanism, and risk perceptions of producers. c) The level of stocks during different periods affects seasonal variation in prices and commodity availability. d) Shifts in supply over time may indicate response to policies, technological change, the institutional environment, and alternative institutional arrangements.

Table 7-1. KEY AREAS OF INVESTIGATION IN COMMODITY SUBSECTOR STUDIES (CONT'D)

Areas of Investigation	Components	Method of Inquiry	Reasons for Investigating
4. Price Relationships and Seasonality	a) Secular trends in real prices at the farmgate, wholesale and retail levels. b) Seasonal and cyclical trends in prices. c) Changes over time in relative price relationships. d) Changes over time in input/output price and (product) value/(input) cost relationships.	1) Gather secondary price data for the commodity and close substitutes/complements for a ten or more year period. 2) Deflate prices or express prices in constant price terms. 3) Analyze secular, cyclical and seasonal price trends, and changes in relative price relationships over time. 4) Estimate supply and demand relationships if data permit. 5) Calculate input-product price ratios, and/or value-cost ratios over several years.	a) Relative prices are a measure of the structure of incentives facing food system participants. b) Changing relative price relationships may indicate shifts in production and marketing incentives, especially if coupled with accurate production and marketing cost data. c) The domestic pricing structure relative to international prices provides insight into regional and national comparative advantage. d) Input-product price and value-cost ratios are proxies for the profitability of agricultural production.
5. Food System Participants and Organization	a) Marketing channels and commodity subsector stages. b) Important assembly, redistribution and terminal markets. c) Types, numbers, and geographical distribution of firms at key subsector stages. d) Prevalence and importance of alternative institutional arrangements, such as contracts, vertical integration, direct marketing, cooperatives, and spot markets.	1) Review previous commodity studies. 2) Check if existing enumerations or sample frames in government agencies (e.g., licensing offices). 3) Interview knowledgeable observers of subsectors and selected participants. 4) Draw a subsector map (flow chart) showing principal stages and marketing channels. 5) Use a geographic map to show important marketplaces. 6) Identify firms using alternative coordination mechanisms and do case studies.	a) Food system organization (or structure) influences the conduct of participants, which in turn affects performance. b) High levels of concentration of firms at particular stages of the food system may lead to higher production/marketing costs than under conditions of lower concentration. c) Prevalence of myriad small firms who fail to specialize at one or more levels of the food system may lead to scale diseconomies and high costs. d) Analysts need to examine the benefits and costs of alternative institutional arrangements as the food system evolves.

Table 7-1. KEY AREAS OF INVESTIGATION IN COMMODITY SUBSECTOR STUDIES(CONT'D)

Areas of Investigation	Components	Method of Inquiry	Reasons for Investigating
6. Subsector and Food System Operation or Behavior	a)Practices and strategies of subsystem participants (individuals, firms, organizations for procuring inputs, processing, storage and marketing of outputs). b)Vertical coordination mechanisms: exchange arrangements, risk-reduction/sharing, information dissemination. c)Sources, uses and distribution (equity) of production and marketing information. d)Adaptability and responsiveness of subsystem to shifting supply/demand, exogenous shocks, policy changes and uncertainty. e)Evidence of market power.	1)Identify key stages and participants. 2)Develop informal interview guidelines. 3)Sample purposively based upon knowledge of the population of potential respondents from previous records or studies, or from the above characterization of subsystem (#5). 4)Conduct selected in-depth informal interviews. 5)Crosscheck findings with other subsystem participants and knowledgeable observers.	a)Operation and behavior in the aggregate affect food system performance. b)Information is costly to gather and process, and access is unequal. This affects the ability of different size firms to respond to changing market conditions. c)The adaptability and responsiveness of commodity subsystems to changing conditions and uncertainty affect levels of output and performance, as well as the continued viability of the subsystem in a particular country. d)Better vertical coordination can improve the matching of supply and demand at successive stages of the food system and reduce risk. It is important to determine if this is associated with limited entry, unequal access to information, and unequal sharing of risks and rewards.
7. Marketing System Infrastructure	a)Physical infrastructure (transport, including roads, ports, airports and waterways; market-places; storage and processing facilities; communications; electricity; water supply). b)Infrastructure adequacy and bottlenecks. Evidence of excess or unutilized capacity.	1)Review studies of transportation and communication infrastructure, storage/processing capacity and utilization, and marketplaces. 2)Inspect and assess the adequacy of a sample of the above. 3)Use a map to show key infrastructure. 4) Identify bottlenecks and constraints, uneconomic excess capacity (or inappropriate scale).	a)In some developing countries infrastuctural constraints constitute severe bottlenecks that slow food system development and penalize isolated areas and regions. b)Excess, underutilized capacity suggests uneconomic investments and resource misallocation.

Table 7-1. KEY AREAS OF INVESTIGATION IN COMMODITY SUBSECTOR STUDIES (CONT'D)

Areas of Investigation	Components	Method of Inquiry	Reasons for Investigating
8. Government Marketing Institutions and Polices	a) Regulatory environment: rules; input and product regulations; laws affecting marketing and trading activities; property rights. b) Public marketing institutions (parastatals, cooperatives, joint ventures); the extent and nature of their participation in marketing; effect on the behavior and performance of private participants in the food system. c) Macroeconomic policies: price policies; exchange, interest, wage rate policies; fiscal and monetary policies. d) Banking and credit policies.	1) Regulations: use informal interviews with subsector participants to identify vexing or constraining regulations. Do follow-up interviews with selected policy-makers. 2) Institutions: interview managers, determine the organizational mandate, outline its functions, estimate its market share, examine its pricing policies, assess the effectiveness of distribution and marketing services, and assess the impact of its participation on system performance. 3) Policies: review macroeconomic assessments of the World Bank, IMF or others. Assess the impact of policies on the organization and operation of the food system & the incentives of different system participants. 4) Interview bank and credit agency officers. Determine whether credit is subsidized, how it is rationed, who gains access, and the sectoral distribution of credit.	a) The regulatory environment generally and specific regulations in particular affect the behavior and incentives of food system participants. b) Public marketing institutions dominate food systems in some countries, influence the organization, operation and performance of food systems in many countries, and generally affect the behavior of system participants. c) Macroeconomic policies condition and shape the environment in which system participants make decisions about investments and operations. d) All of the above contribute to food system stability and/or uncertainty, which greatly influence behavior. e) Banking and credit policies determine who gains access to formal credit, which is often subsidized.
9. International Trade and Commodity Competitiveness	a) Commodity exports and world market situation. b) Imports of the commodity or substitutes and their impact on domestic production, markets and prices.	1) Analyze trade quantity and price data available in statistical abstracts or outside assessments. 2) Review international commodity production, price and trade forecasts. 3) Compare prices of domestically produced commodities with international	a) Few, if any developing country food systems are autarkic. International trade in agricultural commodities affects production and marketing incentives, consumption patterns and preferences, and the behavior and opportunities of system participants.

Table 7-1. KEY AREAS OF INVESTIGATION IN COMMODITY SUBSECTOR STUDIES (CONT'D)

Areas of Investigation	Components	Method of Inquiry	Reasons for Investigating
		prices.	
	c)Trends in exports and imports. d)Likely changes in exports and imports, and emerging market opportunities or dependencies. e)The competitiveness of exports in particular foreign markets.	4)Analyze the competitive position of a specific export commodity in key markets. Examine trends in export levels, market shares and prices, and ascertain reasons for changes. 5)Interview exporters and importers and major domestic buyers in the foreign markets. 6)Visit export-staging and import-receiving facilities. Inspect exported produce in terminal markets and compare with that of competing suppliers.	b)International market conditions influence developing countries' comparative advantage in production and export (import) of agricultural commodities. c)In assessing export competitiveness, site visits to markets and buyers' premises and in-depth interviews with importers and end users in foreign markets provide a good picture of how a country's exports compare with those of other suppliers. Such visits to foreign markets often yield concrete input and insights into what needs to be done to meet international grades and standards generally and the requirements of particular buyers and end users.
10. Representativeness of the Period Under Study	a)Timing of the study relative to the annual commodity production and marketing cycle. b)Agricultural and economic characteristics of the year of the study relative to earlier years or climatic cycles.	1)Compare rainfall data and production estimates with earlier years. 2)Compare economic data: GDP, balance of payments, inflation rates, trade patterns, exchange rates. 3)Assess political factors: any change of government, policy changes, movements towards (or away from) democracy.	a)The period of observation may be unusual with respect to climate, agricultural production, economic and political conditions, and the effects of recent changes. b)Food system development is an ongoing process. Historical perspective of long-run patterns of change in basic economic, institutional, political and environmental conditions is valuable in understanding food system development.

be poorly understood and, hence, require significant investment and, in some cases, original survey research. Under APRP, the MVE Unit decided to conduct a formal survey of 59 commercial rice mills in late 1998, as this milling industry segment had expanded rapidly from a low base in the early 1990s, and its size and scope were not well understood. This survey generated a lot of usable empirically based output that was used selectively to prepare the *Rice Subsector Baseline Study*. For example, it came as a surprise to many that commercial rice mills represented an estimated 37.5% of national rice milling capacity by 1997/98, larger than the public mills' share of 22.3% and the small village mills' share of 36.8%. Even more significant was that the commercial rice mills were milling an estimated 44.5% of the milled paddy crop in 1997/98, while the public sector mills were milling only an estimated 11.9%. Clearly, the commercial rice mills had come to dominate the milling of rice that was exported and sold in urban areas of Egypt (see Holtzman et al., 1999).

Food System. A food system has both horizontal and vertical dimensions. The horizontal dimension refers to firms within a particular industry or to a particular stage of the food system where a similar set of functions is performed. The vertical dimension refers to subsystems or subsectors of single commodities or relatively homogeneous groups of commodities. This dimension is vertical because it cuts across stages of a subsystem, where different production, assembly, processing, and distribution functions are performed. As conceptualized by Shaffer (1973), a subsector incorporates productive transformation and value-adding at each stage of a subsystem.

The vertical emphasis of subsectors is best captured in a subsector map, which is a useful way to depict subsector stages, the groups of participants at those stages, and different market channels. Subsector maps can be used to show the volume of physical input and product flows, financial flows, information flows, and the value of output at each stage (from each participant group) and sales/transfers between stages. Figure 1 is a map of the Egyptian rice subsector for 1999/2000. It shows physical input and output flows, as well as quantities processed at the milling stage. Other subsector maps were developed early in APRP for the cotton, rice, wheat, and horticultural subsectors.

Subsector Approach: Economic Organization Affects Performance. The subsector approach focuses on the performance consequences of alternative forms of industrial and economic organization. Figure 2 provides a schematic overview of the S,C,P approach (of industrial organization theory) as applied to subsector analysis. Basic production, consumption, policy/regulatory, and macroeconomic conditions shape the opportunities and limits that face individual firms operating in a commodity subsystem. The structure or organization of the subsystem affects how firms behave (coordinate or attempt control other firms) within and across stages of the system, which in turn leads to performance consequences. Basic conditions and a particular subsector structure do not completely determine

performance outcomes, but they can strongly affect how well and efficiently a food system performs. Key performance attributes are as follows:

- Allocative accuracy
- Stability of output, prices, and profits
- Technical and operational efficiency (within and across stages)
- Equity with regard to the distribution of returns, rights, and control versus investments and risks
- Subsector adaptability
- Level and type of employment
- Accuracy, adequacy, and equity of information distribution

Demand Drives the Food System. Many developing country governments and donor agencies have historically shown a production or supply-side bias in their policies, interventions, or projects. That is, they have emphasized increasing production and paid far less attention to commodity marketing, processing, market development, and export promotion. Taking a food system perspective and using a subsector approach, an analyst views demand as the force that pulls commodities through subsystems, strongly affecting the forms in which commodities are marketed, processed, packaged, and sold. Consumers are considered subsector participants because their expenditure patterns affect agricultural production and marketing decisions of upstream participants. Shifts in demand induced by changes in relative prices, in the purchasing power of consumers (effective demand), and in tastes and preferences affect in a significant way the set of incentives facing participants throughout the subsector to supply products to consumers or end users in the forms, at the times, and at the places that they desire.

Coordinating Agents, Institutions, and Mechanisms. Coordination of food systems is an active process undertaken at different levels. Firms at particular key stages of a commodity subsystem are coordinating agents. Wholesale traders or processors are located at key stages and handle or process large volumes of a commodity, coordinating assembly, transformation, and distribution. Government agencies that provide needed services, commodity or agribusiness trade associations, and formal groups of producers, traders, and processors act as coordinating institutions. Various types of contractual arrangements, alternative forms of markets (e.g., spot, futures, and auction markets), electronic information exchanges, and vertical integration are coordinating mechanisms. Uncertainty in agricultural production, the perishable nature of agricultural commodities (limited storage and shelf lives), and increasingly stringent quality and phytosanitary requirements are strong incentives for subsector participants to devise effective coordinating institutions and arrangements.

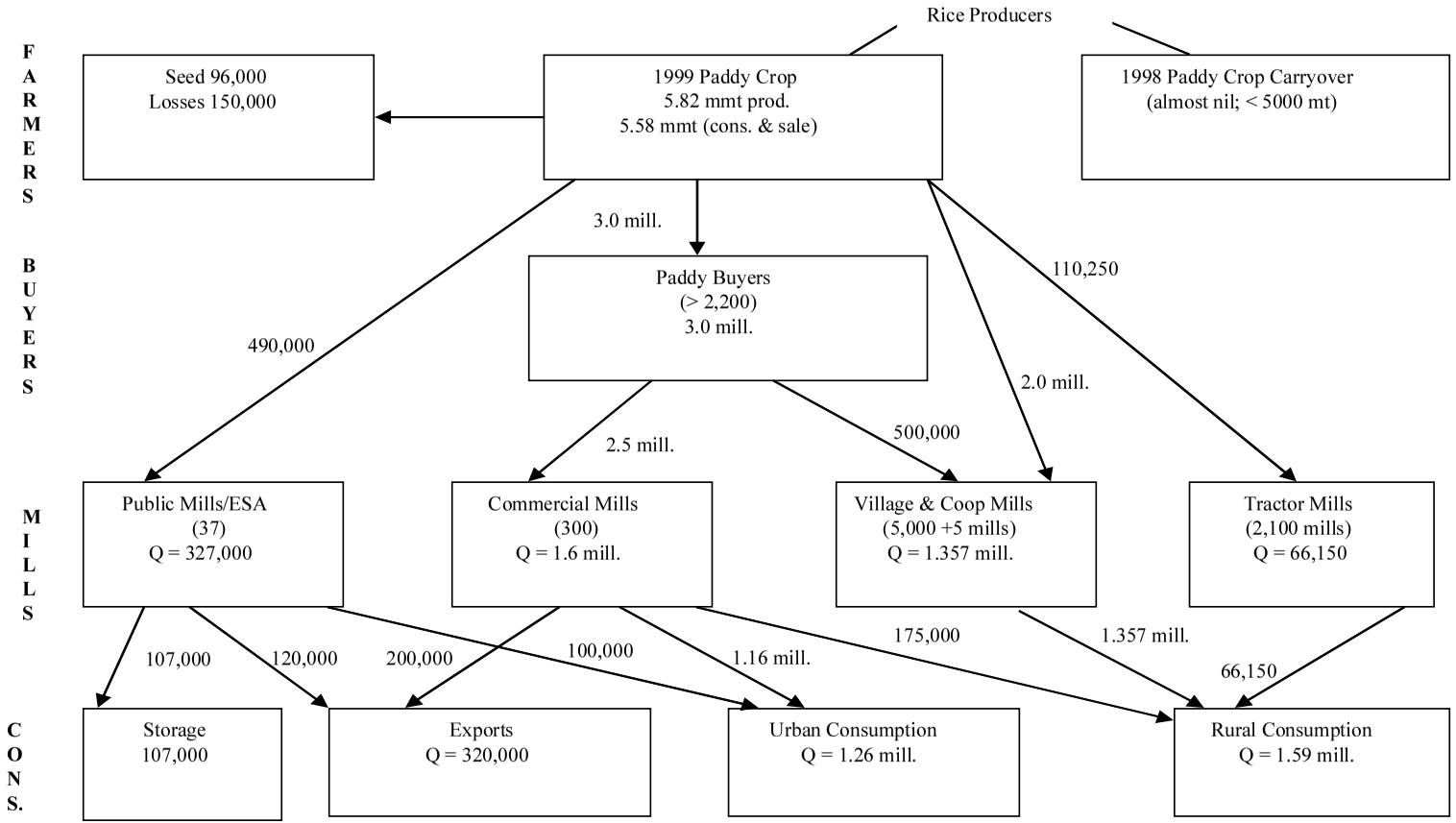
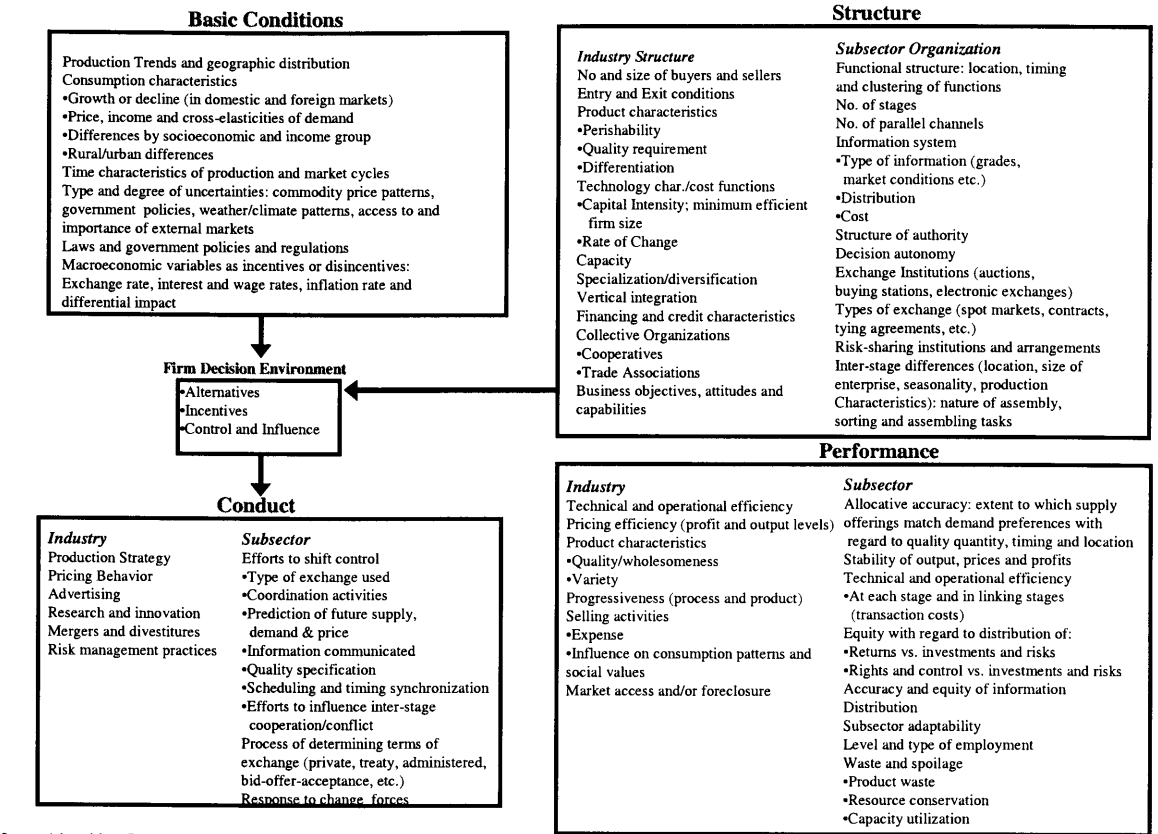


Figure 7-1. RICE SUBSECTOR MAP, 1999/2000



Source: Adapted from Bruce W. Marion and NC 117 Committee, The Organization and Performance of the U.S. Food System, D.C. Health and Company, Lexington Massachusetts, 1986

Figure 7-2. STRUCTURE, CONDUCT, PERFORMANCE PARADIGMS APPLIED TO THE COMMODITY SUBSECTOR APPROACH

Contrasting Subsector and Industry Analysis

In carrying out baseline and endline impact assessment studies for APRP, the MVE Unit applied the S,C,P framework of analysis both to commodity subsectors and to key industries within those subsectors. This section shows how the emphases and focal points change, depending on how you apply S,C,P—vertically (in subsector analysis) or horizontally (in industry analysis). For example, the MVE Unit examined in depth the S,C,P of the seed cotton trading and ginning industries in the cotton subsector. The Unit also determined where public and private participants exercised the most control and market power. Similarly, in the rice subsector work the Unit paid significant attention to the rice milling industry, a key subsector stage in a period of rapid transition, and the rice exporting industry. One reason for focusing on these industries was that large commercial rice millers and exporters (often one and the same) play an important organizing and coordinating role in the marketing system.

In some subsector studies, a particular industry becomes the focus of attention because it is believed to be important but it is not well understood, factual information is outdated or thought to be inaccurate, and conventional wisdom about that industry is judged (ex ante) to be wrong or misleading, which may influence policymakers in undesirable ways. Policymakers might ignore a key industry in a subsector, penalize it through ill-considered policies or regulations, or have exaggerated notions of industry profitability (and, therefore, seek to tax it heavily or restrict its expansion).

The discussion below draws heavily on the information in Figure 2. The three boxes in Figure 2 showing S,C,P attributes differentiate between *industry*-specific and *subsector*-specific characteristics. When performing subsector analysis, it is important to remember that the primary focus is on the vertical dimension; that is, we are interested in how productive, efficient, and effective commodity subsystems are in the assembly, transformation (processing), and distribution of agricultural products. The product's perishable nature places special demands on subsector participants to handle, move, and process those products in a careful and timely way. Hence, coordination of physical product, information, and financial flows within the subsector is a critical consideration.

Structure. At the subsector level, structure concerns the number and market power of different stages, as well as different marketing channels. The key focal point is to identify where market power resides in the subsystem. Certain participants, such as large wholesale traders, processors, and exporters, typically exercise considerable market control. A large proportion of a commodity may pass through only a handful of firms at a particular stage of the subsystem. In Egypt, the extent to which public or private companies dominate a subsector is an important consideration. In the early days of APRP, public sector cotton trading companies dominated the cotton marketing system, exercising leverage over

smaller cotton traders (who supplied public traders on contract), private exporters (who often depended on public traders for lint to honor export contracts), and ginning companies. Other key structural characteristics of subsectors are exchange and risk-sharing arrangements.

Structural characteristics of industries, on the other hand, include the number and size of buyers and sellers, industry entry and exit conditions and barriers, product characteristics (at a particular level of transformation), the role of collective or advocacy organizations, technology characteristics of a particular industry, and the degree to which larger firms in an industry attempt to better control their access to inputs and their control over output distribution and sales through vertical integration, contracts, or other means.

Conduct. In applying the S,C,P paradigm to subsector analysis, analysts examine the efforts of participants to shift control, rewards, and risks. The specific coordinating activities or efforts of subsector participants, the extent to which there is cooperation or conflict between stages, and the flow and distribution of information across stages are key focal points. In many developing countries, information is asymmetrically distributed across stages of a subsector, with the larger, well-placed participants at key nodes often having far superior information to dispersed producers and first handlers, as well as consumers. A last key conduct consideration is how the subsector as a whole responds to changes (exogenous shifts), such as sudden price movements, supply shifts (or new information about supply changes), changed world market conditions, or emerging competitors or competitive threats. Policy and regulatory changes are other key variables that can affect the incentives facing different subsector participants, which might induce particular groups of participants to change their behavior.

Analysis of conduct at the industry level focuses on a different set of issues:

- Product positioning or placement
- Pricing strategy, including any collusive or predatory pricing practices
- Product promotion, including advertising approaches/campaigns
- Risk management techniques

It is also important to note that conduct is often difficult to observe in commodity subsectors because firms are reluctant to talk about conduct and what motivates their behavior, so analysts sometimes must infer conduct from performance outcomes.

Performance. In analyzing performance at the subsector level, agricultural economists focus on the following considerations:

- Matching of supply and demand between stages
- Stability of output, prices, and profits

- Technical and operational efficiency at each stage, and linking stages
- Equity of returns relative to risks and investments
- Accuracy, adequacy, and equity of information
- Level and types of employment
- Subsector adaptability and responsiveness

In analyzing industry performance, the focus changes to a different set of attributes:

- Technical and operational efficiency
- Pricing efficiency
- Product characteristics
- Progressiveness (process and product)
- International competitiveness
- Quality, wholesomeness of agricultural products (fresh, processed)

Relationships among Structure, Conduct, and Performance. Much of the work under APRP, particularly in monitoring public-private market shares, was structural in nature. The assumption was that structure affects performance and that a larger private market share would lead to increased competition, more innovation in handling and processing, and lower cost performance of marketing services. Overall, a greater number of market system participants are assumed to lead to a more efficient marketing system, where there is better coordination between supply and demand between subsector stages.

Some industries, however, have significant capital requirements, which constitute a barrier to entry. For example, ginning and spinning require much larger investments, and typically operate on much thinner margins, than seed cotton trading or exporting, where overhead costs are low. There are few investors in Egypt willing to invest large sums of capital in new ginning or spinning enterprises (start-ups) or in taking public companies private when there is excess capacity in both industries. The high capital requirements of some agro-industries necessarily limit the number of participants, which is not necessarily bad.

The key is to achieve workable competition, where there are enough participants to ensure competition and prevent collusion, and where competitors strive to innovate technologically, organizationally, and managerially. Excessive investment and hyper-competition, as in the private rice milling industry, can lead to excess, underutilized industry capacity, closures of some mills, and misallocated resources (i.e., too much “get-on-the-band wagon” types of investment).

Conduct is the hardest part of the S,C,P paradigm to observe. Anything other than competitive behavior or conduct among firms can lead to undesirable performance

outcomes. Industrial organization economists typically pay a lot of attention to any evidence of collusive behavior among firms, anti-competitive pricing (oligopoly pricing or below-cost pricing designed to eliminate weaker competitors), and any administrative allocation of market shares.[1] Firms that collude tend not to invest in improved technology, physical plant and materials, better organization, and strengthened management. Competitive conduct or behavior, on the other hand, is characterized by active search for the lowest-cost, best-quality sources of supply; use of improved handling, processing, storage, and transport techniques; access to good market information and an ability to use this information quickly, decisively, and to good economic advantage; and a search for ways to distinguish or differentiate product through better placement, packaging, presentation, and, in some cases, advertising.

Attributes against which performance is measured typically include the following:

- Allocative, operational, and technical efficiency
- Stability of output, prices, and profits
- Accuracy and adequacy of information, and the extent to which it is distributed widely and in a timely manner
- Level and types of employment
- Evidence of waste or spoilage (e.g., post-harvest losses)
- Subsector adaptability and ability to cope with change and (exogenous) shocks

One important emphasis of subsector studies is on how well-coordinated particular commodity markets are. Better market coordination leads to better matching of supply and demand between subsector stages, resulting in efficient, low-cost exchange, maintenance of product quality (minimal spoilage, losses), productive transformation (processing, packaging) that adds value, convenience, quality, and other attributes, and overall good information on supplies and prices (at different levels of the marketing system). A second important emphasis of subsector analysis is subsector adaptability to policy reform, economic shocks, rapidly changing world market conditions, and other exogenous changes.

Emphases of Conventional Impact Assessment and Subsector Analysis

By following conventional impact assessment, one sees that reducing the tariff on rice will lead to certain effects on rice production and consumption (Figure 3). Reducing the tariff will lower the cost of imported rice and should expand rice imports, unless domestic production is exceptionally high and has led to depressed domestic price levels (the abnormal case). Consumers, particularly lower-income consumers, will buy more imported rice because it is cheaper; their welfare will increase; the added supply of (imported) rice on the domestic market will tend to depress domestic rice and paddy prices; farmers will plant less area to paddy and produce less rice; their gross and net revenue from rice production will decline,

and their overall income and welfare will decrease to the extent they shift production, at the margin, to the next-best cropping alternative. By changing the cropping pattern, water may be saved (depending on the water requirements of the alternative crops).

Subsector analysis looks also at the incentives facing traders, millers, importers, and exporters. Lower overall rice production could negatively affect rice exporters, who will find less local rice available for export. But it could have less negative impact than anticipated if the demand for rice in foreign markets is sufficiently segmented or differentiated from domestic demand. Millers will have less paddy to process, with lower domestic production, and hence a contraction in the domestic milling industry is likely.[2] The least-efficient mills, probably the least-competitive commercial mills, will exit the industry.[3] Other, more efficient mills could also operate at a lower rate of capacity, leading to lower gross and net incomes, layoffs of workers, a halt to investment, and perhaps, at the margin, a shift of some resources to other types of milling or agribusiness processing. First assemblers of paddy and wholesale traders would buy less paddy, as a lower proportion of the crop would be commercialized, and their incomes would decline unless they could use their financial and physical resources to buy and sell other crops. Overall employment in the domestic rice trade would clearly decrease.

Subsector analysis does not ignore the possibility that resources can be transferred out of the rice subsector (or into it). Cross-subsectoral impacts must be traced, although subsector analysis does not offer any special tools for quantifying those impacts. Subsector analysis can document changes over time in production, processed throughput, domestic sales and prices, export volume and prices, and employment/investment at different stages of the subsector. Surveys can be designed to capture information on what, for example, rice millers considered the next-best alternative investments at the time they invested in rice milling, or to what other uses the land and buildings of a closed-down rice mill were put.

Applications of Subsector Analysis to Economic Impact Assessment

Subsector analysis has typically been used for diagnostic assessments of problems and opportunities facing particular commodity subsystems at the beginning of an applied research program or prior to a project or market reform program. Subsector analysis is not usually thought of as an impact assessment method, but it can be adapted for this purpose, especially if the intervention, whether policy, technical, managerial, or organizational, is targeted to a particular subsector. This can be best illustrated by an example—phasing out of administered distribution and pricing systems in the cotton/textile subsector.

Phasing out of quota allocations and administered pricing at different stages of the cotton/textile subsector is another important set of policy reforms that have the

potential to change *subsector* structure, conduct, and performance in some of the following ways.

Subsector organization or structure. Quotas on lint deliveries to public spinning companies have ensured that public spinners obtain significant quantities of lint to meet production targets. With the removal of these quotas, private spinners would have easier access to lint sold by public sector trading companies, which buy at least two-thirds of the seed cotton crop. New entry of private firms into the spinning industry would also be encouraged. Currently, private sector spinning investments are limited to selected niches (some high-count yarn spinning, some spinning of waste, and the cheapest long-staple lint) that are profitable and for which private spinners can obtain raw material. As long as public trading companies concentrate on supplying public spinning companies, both sets of public companies will dominate their respective industries. Hence, the quota system perpetuates public sector predominance in the cotton/textile subsector.

Using a subsector approach, an analyst is encouraged to think through likely scenarios that would follow a significant policy reform. With removal of the quota system, the private sector market channel would likely be strengthened, as private traders could sell to all types of spinners—public, private (including privatized), and joint investment companies. The types of exchange arrangements across stages would become more diversified, as buyers and sellers might adopt forward deliverable contracts, auctions, or perhaps even electronic exchanges in addition to spot markets. With a stronger private sector trade in lint, private spinners would undoubtedly have easier access to lint. Public trading companies would have an incentive to sell to private spinners, given their typical ability to pay, as opposed to money-losing public spinning enterprises that typically must take lint on credit, providing payment only when their goods are produced and sold.

Subsector conduct or behavior. Instead of waiting for the Holding Company (HC) or GOE committees to make decisions about seed/lint cotton allocation, public and private firms would compete more vigorously for market share. Grades would likely become better defined, with inter-grade price differentials varying, depending on supply and demand for the different grades, rather than the current fixed-price differentials between grades. The abandonment of HC or committee decisions would also probably encourage lint imports, as public spinners would be forced to seek out the cheapest source of raw material in order to be competitive.

Subsector performance. Dropping administrative allocation of credit, raw material, and market shares would most likely lead to reduced public sector participation in seed cotton trading, lint export, and spinning. Capacity would shrink in several cotton/textile subsector industries, as private, privatized, joint investment, and the few profitable public companies would become stronger and be able to operate more profitably. They would have better access to credit (less crowding out), and could obtain raw material more easily, particularly in years of

scarce domestic supply. Coupled with a change in the administrative allocation of varieties in planting (the variety map), doing away with all quotas and administered market shares would probably lead to a shift in varieties grown to lower-quality long-staple (LS) varieties (Gizas 80/83), and perhaps some medium-staple varieties, which would meet the needs of the domestic spinning industry.

Conclusion

Subsector analysis was well-suited to analyzing changes in the S,C,P of key commodity subsystems in Egyptian agriculture during the APRP policy reform period. Many policy benchmarks were targeted to changing the policy and regulatory environment facing and constraining the participants, particularly private sector firms, in key subsystems. Much of the emphasis of APRP, as opposed to APCP, was in removing impediments in downstream marketing, processing, and export stages of key commodity subsectors. APCP concentrated more on constraints facing farmers in input and product markets, whereas APRP moved beyond the farm to work with different groups of participants in the agribusiness system.

Both the baseline subsector studies and the endline studies used subsector analysis and an implicit, underlying S,C,P approach. The endline studies examine, among other things, the structural changes, different behavior of firms and industries, and the performance consequences of structural and behavioral changes on four commodity subsystems. Analysis also focused on how agribusiness firms play an important role in coordinating the market, linking producers and consumers (the usual focal points of economic impact assessment). Through elucidating causal chains, MVE Unit analysts also attempted to attribute changes and outcomes to APRP, as opposed to general economic developments, non-APRP related actions of the GOE, and other exogenous factors.

A major focal point of the MVE Unit's subsector studies was to track changes in public/private market shares in key industries within those subsectors. As long as public sector companies had preferential access to raw materials (including imports), credit, and well-established buyers (guaranteed purchasers at fixed prices), and as long as those companies faced administered prices and margins that ensured profitable operations, they would dominate the subsector and would manifest performance characterized by:

- Limited change in management, organization, marketing methods, and technology use
- High levels of public sector employment relative to real needs
- Limited private sector investment and participation
- Slowness of public companies to adapt to changing world market conditions

- Administered prices and margins, set by holding companies or committees of public companies and designed to allow the most inefficient of public companies to operate at break-even levels or marginal profitability
- A large public market share, which is often divided (in near equal percentages) in quota-like arrangements among public companies
- Absence of incentives to consider innovations designed to cut production and marketing costs and to increase public companies' productivity

While the structure of a subsector does not determine its performance, it can shape performance outcomes. Static, public sector–controlled subsectors do not typically foster the emergence of lean, competitive companies that can adapt quickly to changes in world market conditions, technology, consumer tastes and preferences, and other exogenous shifts. A broad challenge of APRP was to allow enough private sector participation in key subsectors to lead to competition, innovation, and positive change. A second, related challenge was to ensure as level a playing field and as broad a private sector participation as possible in order to avoid emerging monopolies or oligopolies.

An important achievement of APCP that was reinforced by APRP, particularly in the rice and fertilizer subsectors, was to open up public sector–dominated, protected markets to increased competition. Using a subsector approach, the MVE Unit concentrated on monitoring and assessing the impact of private sector entrants' competitive behavior on marketing costs and margins, public/private market shares, and the pattern of investment and technological innovation. Under APRP, increased private participation and competition generally led to improved performance. The MVE Unit did need to pay close attention to the degree of concentration in selected industries such as lint exporting, where the two leading private exporters had captured a disproportionately high market share in 2000/2001. There is always a risk that static, administered public marketing systems will be replaced by oligopolistic and collusive private sector–dominated systems, particularly in slowly reforming subsectors where different private sector participants have different amounts of access to information about investment and market opportunities, finance, and technical expertise. Subsector analysis compels analysts to consider issues of control and market power relative to levels of investments, risks, and returns. The subsector analyst does not regard the fact that more than one-half of the volume or sales of an industry in a subsector has been attained by private firms as the completion of the market reform process (through privatization and/or private investment). This argues for continued monitoring of the competitive (or anti-competitive) behavior of private sector firms.

A final emphasis of the subsector approach is on how responsive a subsector is to changing forces of domestic and international demand. To the extent that the Egyptian economy was insulated from world markets (as it was in the 1970s through the early 1990s) Egyptian producers and agribusinesses could produce low-quality, undifferentiated products for Egyptian consumers (whose purchasing power was generally quite low) and for undemanding captive markets like the

Soviet Union. By the mid to late 1990s, the Egyptian economy was becoming more open to international market forces, with predictable consequences. Industries that produced low-quality output, such as lower counts of yarn spun by the public sector–dominated spinning industry, had trouble selling their products in world markets. This led to inventory build-ups and weakened the public sector spinners financially. Public sector companies that could be privatized were sold or leased, while the weaker companies became unattractive from a financial standpoint and more difficult to privatize or rehabilitate. While the public spinners were having trouble adapting to world markets, a handful of privatized spinning companies and new high-count spinners were producing higher counts of yarn (of consistently higher quality) that could be sold profitably into selected market niches.

As a signatory to GATT in 1995, Egypt agreed to accept progressive tariff reductions in goods that had been kept out of Egypt due to high tariff walls during much of the 1990s. These goods would begin entering the Egyptian market by 2005 with minimal protection. Hence, while the domestic market was the place where lower-quality, domestically produced goods could be sold in the past, this would become a less viable option under a more liberal trading regime.

As applied to impact assessment under APRP, subsector analysis was dynamic. Ongoing work on the cotton and rice subsectors, leading to nine impact assessment reports or special studies on cotton and four on rice, documented in meticulous fashion changes over time in the structure, conduct, and performance of those subsectors due to APRP-led or -induced policy reform, other GOE actions, changes in world market conditions (and Egypt's tariff regime), privatization, and introduction of innovations in management, organization, and technology. In this sense, the subsector approach was dynamic, tracing the implementation of cotton and rice policy reforms and the year-to-year response of firms and industries to those reforms. It was also innovative in that most S,C,P studies are typically initial diagnostic assessments or in-depth reviews of how competitive a particular subsystem is (see Marion, 1986). The MVE Unit's monitoring and impact assessment work for the cotton and rice subsectors tracked changes from marketing season to marketing season, with particular attention to the organization of industries in those subsectors, the competitive and anti-competitive behavior of firms, and the resulting performance consequences. MVE Unit work on the wheat and fertilizer subsectors was characterized by a comparative statics approach, whereas it conducted ongoing analysis of the cotton and rice subsectors. Only baseline and endline studies were completed for the wheat and fertilizer subsectors, providing before and after snapshots of how those subsectors changed during APRP.

To conclude, subsector analysis can provide rich insights into the organization, operation, and performance of key agricultural commodity and input subsystems. Understanding how subsector organization or structure changes with policy reform is critical to anticipating and documenting reform outcomes. Subsector structure,

coupled with the enabling environment, strongly affects the set of incentives facing firms and industries. Firms' responses to these incentives affect their behavior or conduct, enhancing or impeding competition. The degree of workable competition, supported by a workably competitive subsector structure, strongly affects performance. Analyzing the interplay of the enabling environment, subsector structure, and firm and industry conduct enables the analyst to assemble plausible causal chains linking policy reforms to improved performance. This is the essence of using subsector analysis in economic impact assessment.

References

Holtzman, John S. "Rapid Appraisal of Commodity Subsectors," chapter 8 in *Guide to Developing Agricultural Markets and Agro-enterprises,* ed. Daniele P. Giovannucci. The Agribusiness & Markets Thematic Group. World Bank. Also available at the following website: http://wbln0018.worldbank.org/essd/essd.nsf/Agroenterprise/agro_guide. (Paper can be accessed by clicking on A. Agricultural Markets and Agribusiness Assessments). 2000.

Holtzman, John S. with the collaboration of Abdel-Rahim Ismail and Charles Stathacos. *Rice Subsector Baseline Study.* APRP/MVE Impact Assessment Report No.3. Cairo, Egypt. 1999.

Holtzman, John S., Jerry Martin, and Richard D. Abbott. *Operational Guidelines for Rapid Appraisal of Agricultural Marketing Systems.* Agricultural Marketing Improvement Strategies Project. Abt Associates Inc., Bethesda, Maryland. 1993.

Holtzman, John S. *Rapid Reconnaissance Guidelines for Agricultural Marketing and Food System Research in Developing Countries.* MSU International Development Papers, Working Paper No. 30. Michigan State University, East Lansing, Michigan. 1986.

Marion, Bruce and the NC 117 Committee. *The Organization and Performance of the U.S. Food System.* D.C. Heath and Company, Lexington, Massachusetts. 1986.

Marion, Bruce. *Application of the Structure, Conduct, Performance Paradigm to Subsector Analysis*, N.C. Project 117. Working Paper No. 7. Madison, Wisconsin. 1976.

Shaffer, James D. "Food System Organization and Performance: Toward a Conceptual Framework." *American Journal of Agricultural Economics,* vol. 62, no. 2. 1980.

Shaffer, James D. "On the Concept of Subsector Studies." *American Journal of Agricultural Economics*, vol. 55: 333-335. 1973.

Endnotes

[1] Administrative allocation does not refer to governmental allocation of market shares here. Rather, it means that market shares are not determined through the competitive behavior of firms, but rather through collusive market-sharing agreements of firms that decide not to compete.

[2] There is already excess capacity in the domestic rice milling industry, so decreased paddy production would certainly lead to closures.

[3] This assumes that the GOE does not try to keep these private mills in business, using subsidies or providing credit, as it has done to the ESA rice milling companies (former public sector rice mills).

III The Impact of APRP in Key Subsectors

Overview

This section examines the short- to medium-term impacts of policy reform in four commodity subsectors and for two key inputs to agricultural production, fertilizer and water. All of the chapters, except for chapter 9, use the structure, conduct, performance paradigm, which is explained in chapter 7.

Chapters 8, 11, 12, and 13, which discuss the fertilizer, wheat, rice, and cotton subsectors, respectively, are based on in-depth impact assessment studies that established a baseline in 1996/97 and 1997/98 and then reviewed changes in structure, conduct, performance between the baseline and endline periods. In all four cases, policy and regulatory reforms began during APCP and continued into APRP, so there are lagged impacts from APCP. In the fertilizer and cotton subsectors, APRP reversed the effects of backsliding that occurred during the period between APCP and APRP. The cotton subsector received the most attention on APRP's policy and regulatory agenda; policy benchmarks addressed privatization, liberalization, pesticides, export promotion, and other issues. Rice was the subject of fewer benchmarks, which were designed to liberalize marketing and international trade. Improved water management was coordinated with the GOE's expansion of short-season rice varieties in key irrigation command areas.

Chapter 9 addresses water policy reform, discussing APRP's activities and their effects on irrigation policy assessment and planning, irrigation system management, and private sector participation in policy change. With access to only limited baseline data, it focuses on the degree to which reform benchmarks were accomplished and implementation activities were successful. Chapter 10 deals with the horticultural subsector. The reforms it examines were clustered in the final three tranches of APRP and concentrated on improving the enabling environment for horticultural exports. Reform efforts also benefited from technical input from two other USAID projects, ATUT and ALEB, which implemented improvements in technology, management, market information, and the mechanics of exporting to high-income markets.

8 Changes in the Fertilizer Subsector during APRP[1]

Abdel-Hamid Y. Saad

The participation of the private sector in distribution was the major policy issue in the nitrogenous chemical fertilizer subsector under both APCP and APRP. The private sector was first allowed to distribute fertilizer in the early 1990s. It succeeded in taking over most distribution and in satisfying the needs of the farmers. In 1995 there was a "crisis" due to several factors, mostly under the GOE's control, such as scheduled maintenance at fertilizer factories and the duty on imports. The GOE response to the crisis included returning control of fertilizer distribution to PBDAC. Subsequent reforms gradually restored distribution to the private sector during APRP. However, at the end of APRP there was an effort by the chairman of PBDAC to regain 50 percent of the production for distribution by PBDAC.

Other subsector issues include quality, pricing, and competition. In the early years of APRP, there were some differences in the quality of fertilizer, but all the factories now use conditioning materials to make fertilizer more storable, and the quality of the fertilizer produced at the different factories is comparable. Ex-factory prices of nitrogenous fertilizer are approved by the Government. Price increases are requested by the price leading and largest producing company (Abu Qir) and are generally approved. During APRP ex-factory prices of nitrogenous fertilizer showed very little change. There are no collusive actions among the producing companies, neither in the volume of production nor in pricing. In distribution, the large number of private traders, in addition to the cooperatives and PBDAC, generally results in competition among them. Changes in fertilizer policy were not a major thrust of APRP, but the project did help reduce the role of the public sector and subsidized companies and increase the role of private traders to levels achieved at the end of APCP. These steps included the design and implementation of policy benchmarks aimed at increasing the role of the private sector in production and marketing, and the organization of several meetings with producers, distributors, and leading members of the Egyptian Association of Fertilizer Distributors and Traders to discuss problems and issues. The proposals and the outcomes of these meetings were conveyed to policymakers.

Since the Egyptian revolution in 1952, the Government of Egypt (GOE) used the so-called agricultural cooperatives (actually they were, and still are, government entities)

as the single channel for distributing new forms of farm inputs (mainly chemical fertilizer, improved seed of strategic crops, and insecticides), in addition to the assembly of the forced deliveries of agricultural commodities. By the mid 1970s, for unknown reasons, these so-called agricultural cooperatives had been liquidated, and some of the facilities (especially storage) were transferred to the newly established Principal Bank for Development and Agricultural Credit (PBDAC), with branches in nearly all the villages in Egypt. PBDAC took over the monopolistic role played previously by the agricultural cooperatives.

Based on the Economic Reform and Structural Adjustment Program (ERSAP) that started in 1990/91, government policy was directed toward the transformation of the different public sector enterprises, including PBDAC, along commercial lines and to more of a free-market structure. The increased participation of the private sector in the production and distribution of new farm inputs were expected to increase competition and the efficiency of the market system. PBDAC was required to operate like a commercial bank in the business of savings and credit bank. During the period from 1990 to 1994, the role of PBDAC in the distribution of chemical fertilizer declined gradually from complete monopolization to handling only 10 percent of domestic production of nitrogenous fertilizer. The role of the private sector increased that to where it distributed about 70 percent of domestic production in 1994.

1995 Fertilizer "Crisis"

In the period of the peak demand for nitrogenous fertilizer for the summer growing season, a significant shortage was accompanied by a great increase in the prices of these fertilizers. The main reasons for this crisis were:

- Breakdowns in the production units of the Talkha factory
- Repairs and maintenance for units of the Abu Qir factory
- Increased exports of fertilizer as a result of high world prices

The two companies mentioned above (Talkha and Abu Qir) produce over 90 percent of nitrogenous fertilizer in Egypt, which exacerbated the problem. The private sector was blamed for the creation of the crisis, and the GOE took the following actions to alleviate the problem:

- PBDAC was instructed to handle all domestic production of nitrogenous fertilizer.
- The private sector was asked to import 1.25 million tons (15.5 % N. equivalent) duty-free.
- The 30 percent duty on the importation of nitrogenous fertilizer was temporarily canceled.

By the time the repairs and maintenance were completed at the two big companies and the private sector imported the assigned amount, the peak demand for the nitrogenous fertilizer was over. The fertilizer started to pile up in the poor storage

facilities of PBDAC, which asked the Government to reduce PBDAC's share of domestic distribution. Since early 1997, the share of PBDAC has decreased, and the share of the private sector has increased again.

Looking broadly at the production of all chemical fertilizer, there has been some privatization of the public sector companies since the mid 1990s. Before 1996, all factories producing fertilizer were under public sector management. Currently, the production of phosphorus chemical fertilizer is wholly under the management of the private sector. About 75 percent of nitrogen fertilizer production is now in companies organized under the private sector law.[2] Although there are no barriers to limit the private sector in the production of chemical fertilizer, private investors find it easier to buy public sector companies than to establish new ones. Therefore, the number of producing factories changed very little during APRP.

Role of APRP

APRP began after the 1995 crisis, when the fertilizer market was highly disturbed and PBDAC was controlling the major part of domestic distribution of fertilizer. Private traders were suffering from the instability of the market caused by the unclear policy of the GOE with regard to participation in the fertilizer market. Consequently, APRP designed a number of benchmarks to improve the operation and performance of the fertilizer market:

Tranche I:

I.B.1. Reduce the tariff on nitrogen fertilizer (ammonium nitrate and urea) from 30% to 10%.

I.B.2. Review ex-factory prices and set them in light of border prices, adjusting the prices at least once per season.

I.B.3. Eliminate government quota allocations of fertilizer, except in the case of market failure.

I.B.4. Based on the study of fertilizer production to be completed by February 1996, the GOE will adopt a time-phased liberalization and privatization of fertilizer production, marketing, and international trade.

I.B.5. Privatize one fertilizer plant by September 1996.

Tranche II:

A3. The GOE will issue instructions to fertilizer factories to sell fertilizer without quotas for any group under commercial conditions and will develop an overall fertilizer policy framework emphasizing fertilizer production, pricing trade, and private sector participation.

Structure

Production. In 1996, there were four companies producing nitrogenous fertilizer, by 1998, there were five companies. This was due to the division of Talkha company (El-Nasr Company for Fertilizer and Chemical Industries) into two units: one under the same name, for the production of ammonium sulfate and nitrolin, and the other unit renamed El-Delta Company for Fertilizer and Chemical Industries, to specialize in the production of urea and ammonium nitrate. During the same period, Abu Qir Company expanded its operation by establishing Abu Qir III, which began production in 1998. The company plans another expansion in Abu Qir IV, as indicated in Table 8-1.

Nitrogen fertilizer production during APRP increased from 7.1 million tons (15.5% N. equivalent) of the different nitrogen fertilizers in 1995/1996 to 8.8 million tons in 2000/2001, as presented in Table 8-2.

The increase in the production of nitrogenous fertilizer during the period from 1995/96 to 2000/2001 is due to the additional production of Abu Qir III, which has a productive capacity of 600,000 tons/year of urea. Abu Qir IV is planned to start production in 2005 as a free zone unit, with a productive capacity of 600,000 tons/year of ammonium nitrate. If Abu Qir IV is completed, the total nitrogenous fertilizer produced by the Abu Qir Complex will reach 7.0 million tons (15.5 % N equivalent). The Egyptian Factory for Chemical Fertilizer is under establishment at Ain Sukhna in Suez governorate, as a private (free zone) unit by Samad Misr Company, which will further increase Egypt's productive capacity of nitrogenous fertilizer.

Prices. Ex-factory prices for the different chemical fertilizers are shown in Table 8-3. There were few changes in these prices during the period under investigation, amounting to 11.1 percent in the case of Abu Qir urea and only 6.7 percent in the case of Abu Qir ammonium nitrate. Comparing these changes with the changes in the international price of urea on the Black Sea market during the same period indicates that the international price fluctuated between $170.93/ton in January 1996 and $65.60/ton in January 1999, a decrease of 61.6 percent. Seasonal fertilizer production is relatively stable as compared with seasonality of demand. Monthly fluctuations in production are mainly due to scheduled repairs and maintenance of the different factories.

Due to the large seasonal swings in demand for nitrogen fertilizer and the relative seasonal stability of production, Zalla and Saad (1998) in the fertilizer baseline study proposed that discounts be offered by the producing factories to the distributors. They proposed that these discounts be sufficiently large to cover storage costs in order to stabilize the distributors' withdrawal of the fertilizer stocks from the factories. However, the factories have no problem with their stocks, and no price discounts have been made. It seems that the factories offer their output to the local distributors

Table 8-1. EVOLUTION OF ABU QIR'S PRODUCTIVE CAPACITY

Productive Units	Capacity (tons/day)	Products	Beginning of Operation
Abu Qir I			
Ammonia Unit	1,100	Ammonia	
Urea Unit	1,550	Urea	September 1979
Marine Line	100,000 tons/year	Excess Ammonia	December 1990
Abu Qir II		Ammonia	
Ammonia Unit	1,000	Nitric acid	
Acid Unit	1,800	Ammonium	
Nitrate Unit	2,400	nitrate	August 1991
Abu Qir III			
Ammonia Unit	1,200	Ammonia	
Special Urea Unit	2,000	Urea	October1998
Abu Qir IV			
Ammonia Unit	1,200	Ammonia	Expected
Nitric Acid Unit	1,800	Nitric acid	second half of
Ammonium Nitrate Unit*	2,400	Ammonium	2004
Calcium Nitrate		nitrate	

Source: Abu Qir Company for Fertilizer and Chemical Industry, Annual Report 2000/01, 25th Anniversary.

*Ammonium nitrate unit will be composed of two lines, each with a capacity of 1,200 tons/day. One of these lines will be equipped to produce calcium ammonium nitrate according to demand, in addition to ammonium nitrate.

during the domestic peak demand, and then during the off-season period, the factories find it more profitable to export their output instead of offering discounts to domestic distributors. By 1998, with the operation of Abu Qir III, domestic production became large enough to meet domestic production during the peak season. Lower off-season prices have never been offered.

Distribution. PBDAC, the agricultural cooperatives, and the private sector participated in the distribution of fertilizer during the last 15 years. Their relative shares are indicated in Table 8-4 and Figures 1 and 2.

Private traders entered fertilizer distribution early in the 1990s. Their number is now estimated at 6,000, nearly half of them licensed, while the other half are mainly retailers in villages who deal in small quantities. According to the size of their activities, they can be classified into three groups:

- Distributors, who deal directly with the factories
- Wholesalers, who receive the fertilizer from distributors and deliver it to retailers
- Retailers, who receive fertilizer from wholesalers and sell it to farmers

Table 8-2. DOMESTIC PRODUCTION OF NITROGENOUS FERTILIZER, 1995/96 B 2000/2001 (000 tons, 15.5 % N.)

Company & Fertilizer	1995/96	1996/97	1997/98	1998/99	1999/20	2000/2001
Abu Qir						
Urea 46.5%	1,750.2	1,566	1653	2,643.3	3,633	3,635
Ammonium Nitrate 33.5%	1,736.4	1,793	1,670.7	1,772.0	1,707.9	1,831
Subtotal	3,486.6	3,359	3,323.7	4,415.3	5,340.9	5,466
Talkha						
Urea46.5%	1,539	1,558.2	1,268.4	0	0	0
Ammonium Nitrate 33.5%	934.3	930.0	800.1	0	0	0
Ammonium Sulfate20.6%	81.5	105.1	65.1	68.2	100.5	84.5
Nitrolin 33.5%	0	0	0	291.1	385.1	344.1
Subtotal	2,554.8	2,593.3	2,133.6	359.3	485.6	428.6
El-Delta						
Urea 46.5%	0	0	0	1,221	1,317	1,501.8
Ammonium Nitrate 33.5%		0	0	509.2	524.1	527.1
Subtotal	0	0	0	1,730.2	1,841.113	2,028.9
El-Cook						
Ammonium Nitrate 33.5%	88.4	88.0	73.9	39.6	15.1	0
Ammonium Sulfate20.6%	21.7	21.4	21.1	16.7	13.2	15.9
Subtotal	110.1	109.4	95.0	56.3	28.3	15.9
Suez						
Ammonium Nitrate 33.5%	308.0	324.0	283.1	291.1	385.1	344.1
Ammonium Sulfate20.6%	81.3	105.0	65.1	68.2	100.7	84.5
Subtotal	389.3	429.0	348.3	359.3	485.9	428.6
Qima						
Ammonium Nitrate 33.5%	595.9	608.8	580.3	560.2	463.6	441.3
Subtotal	595.9	608.8	580.3	560.2	463.6	441.3
Total	7,136.7	7,099.8	6,480.9	7,480.6	8,645.4	8,808.94

Source: Ministry of Public Enterprises, Supreme Council of Chemical Fertilizer, unpublished data.

Table 8-3. EX-FACTORY PRICES FOR NITROGENOUS FERTILIZER (LE/ton)

Company and Fertilizer	1995/96	1996/97	1997/98	1998/99	1999/20	2000/2001
Abu Qir Co.						
Urea 46.5%	450	495	495	495	495	450
Ammonium Nitrate 3.5%	375	399	399	399	399	399
Talkha Co.						
Urea 46.5%	450	450	495	495	410	420
Ammonium Nitrate33.5%	350	380	380	380	365	365
Ammonium Sulfate 20.6%	360	360	360	360	295	340
Nitrolin 33.5%	380	399	399	399	375	380

Source: Ministry of Public Enterprises, Supreme Council of Chemical Fertilizer, unpublished data.

Table 8-4. SHARES OF DIFFERENT MARKETING CHANNELS OF NITROGEN FERTILIZER (percent)

Year	Domestic Sales	PBDAC	Cooperatives	Private Sector
1995/96	6,529	89	2	6
1996/97	6,484	59	19	21
1997/98	5,428	20	21	54
1998/99	5,975	9	15	75
1999/20	6,386	9	13	77
2000/2001	6,980	11	19	69
February 2002	N.A.	30	20	50
March 2002	N.A.	50	20	30

Sources: 2002: MALR, Ministerial Decrees No. 303 and 413 for the year 2002. 1995/96-2000/01: Ministry of Public Enterprises, Supreme Council of Chemical Fertilizer, unpublished data.

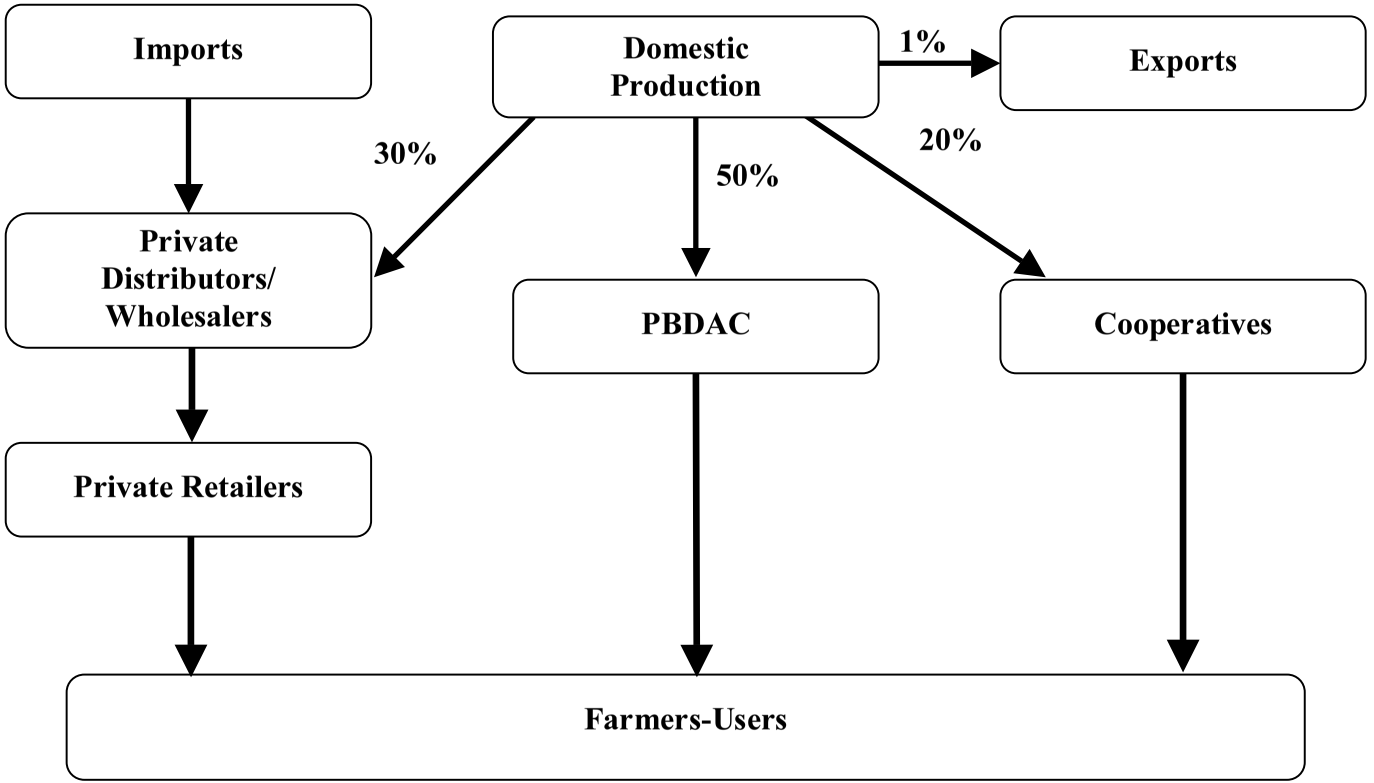


Figure 8-1. DISTRIBUTION OF NITROGEN CHEMICAL FERTILIZER, 1999-2000

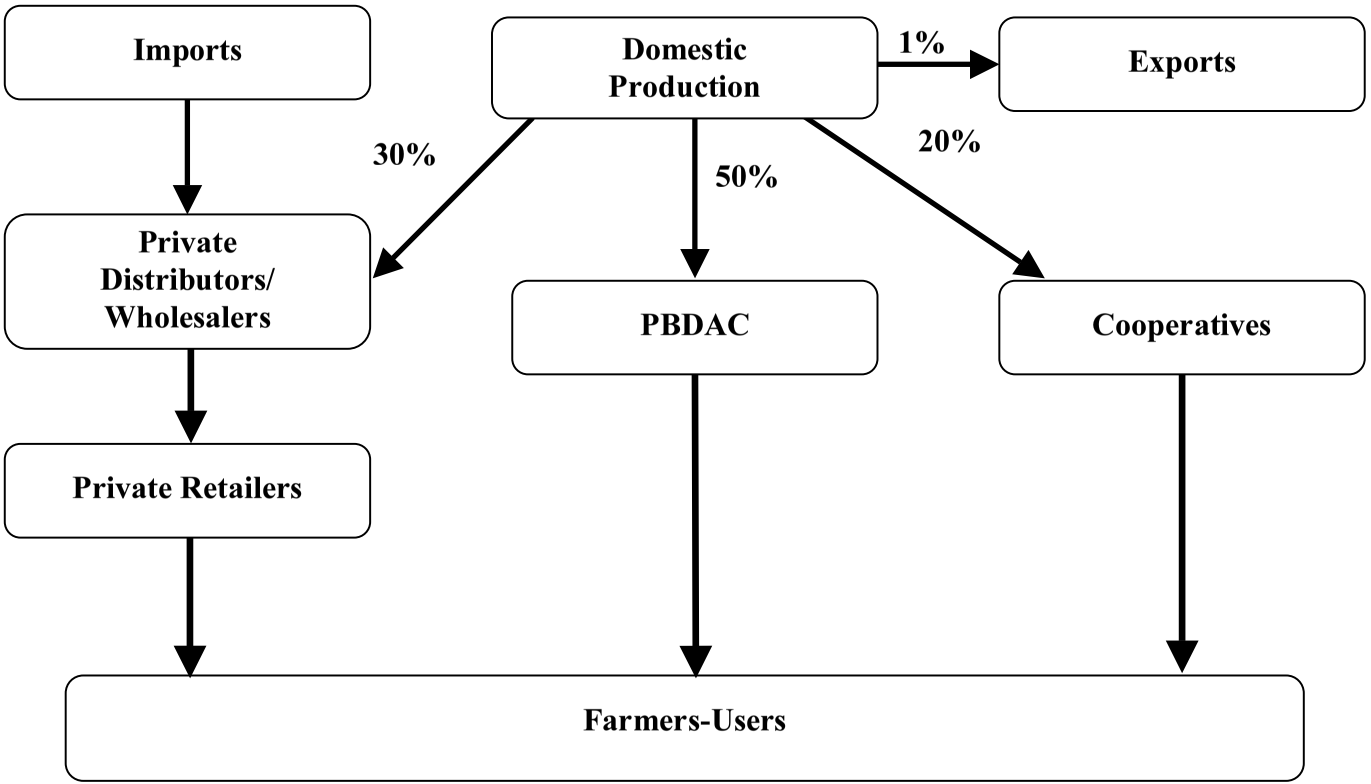


Figure 8-2. DISTRIBUTION OF NITROGEN CHEMICAL FERTILIZER, MARCH 2002

Distributors and wholesalers are located mainly in the big cities or big towns; retailers are located mainly in villages close to farmers.

One of the benchmarks of APRP required that "The GOE will issue instructions to fertilizer factories to sell fertilizer without quotas for any group under commercial conditions and will develop an overall fertilizer policy framework emphasizing fertilizer production, pricing trade and private sector participation." In theory, it is expected that as the number of traders dealing with the producing factories increases, competition among them will increase to the benefit of the final user of fertilizer. In practice, this did not happen. However, from the practical and operational accounting point of view, the producing factories prefer to deal with a relatively small number of traders who handle large quantities of their products. The Abu Qir factory has only 27 private distributors in addition to PBDAC and about 3 general agricultural cooperatives who handle all of its products. Abu Qir selects its private traders based on previous history of transactions with these traders. A distributor will be dropped from the list if he "misbehaves" in the market. This type of supervision of the factory over its clients of distributors is expected to lead to competition among themselves to show "good behavior" in the market.

From 1995/96 to 1999/2000, PBDAC's share of domestic sales of chemical fertilizer declined gradually from 89 percent to only 9 percent, while the share of the private sector increased from 6 percent to 77 percent and the share of the agricultural cooperatives fluctuated by nearly 20 percent. However, in February 2002, the GOE issued instructions to the producing factories to increase the share of PBDAC to 30 percent by reducing the share of the private sector to 50 percent. Within the following month, new instructions were issued to increase the share of PBDAC to 50 percent, while decreasing the share of the private sector to only 30 percent. Investigations as to the reason for this quick change in GOE policy led to the following:

- Increased exports by the private sector due to increased world prices
- Increased prices paid by farmers

In February 2002, the GOE anticipated another fertilizer crisis similar to that of 1995, which led to this quick change in the policy. However, quick field investigations of the prices paid by farmers for fertilizer in different locations were made during the third week of May 2002, the peak month for demand for nitrogenous fertilizer. The results of these investigations are presented in Table 8-5.

The data in Table 8-5 shows that the maximum retail price for urea is LE 580/ton in Menoufeya governorate. If the ex-factory price of LE 450/ton is taken into consideration, then the three groups of traders that are involved in the distribution of chemical fertilizer (distributors, wholesalers, and retailers) obtain a maximum of

Table 8-5. PRICES PAID BY FARMERS FOR N. FERTILIZER, MAY 2002 (LE/ton)

Location	Source	Urea 46.5 %	A. Nitrate 33.5 %
Menoufeya	Cooperative	525	(A.Q) 458
Menoufeya	Cooperative	480	(Talkha) 510
Menoufeya (1)	Private	(A.Q.) 580	(A.Q.) 500
		(Talkha) 560	(Talkha) 500
Menoufeya (2)	Private	550	500
Menoufeya (3)	Private	(Talkha) 560	(A.Q.) 505
Menoufeya (4)	PBDAC	467	Suez 467
Menoufeya (5)	PBDAC	(A.Q.) 516	
Daqahleya (6)	PBDAC	(A.Q.) 532	(A.Q.) 465
Daqahleya (6)	PBDAC	(Talkha) 503	
Daqahleya	Cooperative	(A.Q.) 532	(A.Q.) 470
Tahrir	Private	550	510

Source: Data collected by the author.
Specific locations: (1) Village Begiram, Quesna District; (2) Menouf District; (3) Quesna District; (4) Quesna District; (5) City of Shebin El-Kom; (6) City of Mansoura

LE 130/ton as marketing margin, which represents 28.9 percent. Assuming that the margin is divided equally among the three groups of intermediaries, the marketing margin in total (29%) and per group (9.7%) is modest by international standards and is not large enough to warrant such precautions and quick changes in GOE policy. It is clear that the action taken by the GOE was not based on objective data and sound analysis of the fertilizer market.

This quick change in the policy of the GOE will have adverse effects on the market for fertilizer in the following ways:

- Great disturbance to the relative stability of the market that has existed during the last few years. This will limit the ability of private traders to respond to market signals, which may or may not be what policymakers intended.

- Great losses for private traders, who have high fixed and operations costs to handle over 70 percent of fertilizer.

- Unfair competition: because PBDAC and the cooperatives are partially subsidized by the Government, they can realize lower margins than those that would prevail under full-cost pricing.

- Some traders will have to reduce at least some of their operations costs, thus increasing unemployment, social disturbance, and political instability.

Therefore, this changing and unclear policy will have a negative impact on producers and distributors and will affect investments in these activities. On the other hand, the end users of chemical fertilizer (farmers) still prefer to buy their fertilizer from private traders and agricultural cooperatives for the different field crops, as indicated in Table 8-6.

Table 8-6. FARMERS' OPINIONS ABOUT BEST SOURCE FOR CHEMICAL FERTILIZER, BY CROP GROWN (percent)

Supplier	Cotton	Wheat	Maize	Rice
PBDAC	1.2	1.1	1.7	1.4
Cooperatives	52.2	42.8	33.6	37.5
Private Traders	33.4	44.3	41.6	51.9
Others	13.2	11.8	24.1	9.2
Total	100.0	100.0	100.0	100.0

Source: Morsy Ali Fawzy et al. (2002).

The data in Table 8-6 show that the best sources for fertilizer for the different field crops are the private traders and agricultural cooperatives. Very few farmers consider PBDAC a best source for fertilizer. Table 8-7 indicates that during the APRP period, the preference of farmers to buy fertilizer from PBDAC has declined tremendously, so that there is practically no preference for dealing with PBDAC in the purchase of chemical fertilizer. This is an indication that the GOE's change in policy runs counter to the preferences of farmers, who are currently free to buy their fertilizer from any supplier (see Table 8-8.).

Table 8-7. CHANGES IN FARMERS' PREFERENCES ABOUT BEST SOURCE OF CHEMICAL FERTILIZER, 1997–2001 (percent)

Suppliers	1997	2001	Difference
PBDAC	29	1	28
Cooperatives	46	42	4
Private Traders	16	43	27
Others	9	14	5
Total	100	100	100

Source: Morsy Ali Fawzy et al. (2002).

Table 8-8. FARMERS' FREEDOM TO CHOOSE THEIR SOURCE OF FERTILIZER (percent)

Crop	Free	Not Free
Cotton	98	2
Wheat	100	0
Maize	100	0
Rice	100	0

Source: Morsy Ali Fawzy et al. (2002).

Conduct

Market conduct means the behavior of all the participants in the market, particularly those aspects of behavior that suggest restraint of trade or competition or that fail to provide final users with the quality and kind of material desired, especially with respect to the production and pricing policies. Rapid and unpredictable changes in government policy is the factor most limiting to the rapid evolution of private sector participation in the fertilizer market in Egypt. The best example of the serious interference in the fertilizer market by the Government was the sudden change in the PBDAC quota twice in 2 months (February and March, 2002).

Production. In the production of chemical fertilizer, there is no collusive action among the producing companies. Collusion is when private producers and traders

conspire to restrain trade in a way that increases their own sales and/or profits. The production of this group of commodities is based on well-known chemical formulas whose production technology is well known to all manufacturers. In addition, domestic and international markets are capable of absorbing the quantities produced. As a result each company is producing the maximum possible quantity determined by its productive capacity. Therefore, there is no competition with regard to the volume of production of each company.

On the other hand, there seems to be some competition with respect to quality. Prices for the same type of fertilizer vary depending on the producing company. The products of Abu Qir factory have a reputation for being of the highest quality, which is why they are priced and sold to farmers at prices higher than similar products produced by Talkha or other companies (see Table 8-3). In 1997, the products produced by Talkha factory were of very poor quality. Even PBDAC refused to receive its quota from the factory, and large quantities accumulated in the limited storage facilities of the factory. This created problems for the company and led to the split of the company into two units, as mentioned before. New management and new technical staff were appointed for the separate unit, called El-Delta Company. The quality of the products produced by the new company has improved, and it is nearing the point where it will be able to compete with the Abu Qir products.

The pricing of chemical fertilizer is not an issue for competition among producing companies. Actually, the Abu Qir company can be considered a price leader. It requests price increases when it has higher production costs, especially for the main raw material, natural gas. This request is reviewed and discussed within the government offices, especially in the Ministry of Public Enterprises (MPE) and the Ministry of Agriculture and Land Reformation (MALR). In most cases, the requested price increase is approved. Price increases apply to all companies producing chemical fertilizer. Zalla and Saad (1998) proposed that producing companies should have greater control over ex-factory prices so that they could give discounts sufficiently large to cover storage costs. However, so far nothing has changed, and ex-factory prices are relatively stable all year. The ability of the international market to absorb the surplus fertilizer during the off-peak season eliminates the need for these companies to offer discounts.

Distribution. The large number of traders involved in the marketing of chemical fertilizer would, in theory, induce competition among them. However, the quality of the product is determined mainly by the producing factory. There is little a trader can do to improve quality; the trader can only store the fertilizer in a good place to preserve the quality. In addition, the prices of chemical fertilizer are nearly determined as the ex-factory prices plus transportation costs to each specific location. Producing companies make contracts with cooperatives of truck transport. For purposes of transportation, Egypt is classified into three zones: Lower Egypt, Middle Egypt, and Upper Egypt. The cost of transportation per ton is determined as an average for each of the three zones and is added to the ex-factory price. Therefore, the prices paid by fertilizer distributors are the same in each zone. Marketing margins

might differ among traders. To stabilize the operation of the fertilizer market at the top level and to prevent "misbehavior" by traders, the Egyptian Association of Fertilizer Distributors and Traders (EAFDT) was established just before 1996, and became effective in 2000. The members of EAFDT are the main distributors (about 27) who receive quotas from the local fertilizer manufacturers, in addition to exporting or importing fertilizer. In 2000, the EAFDT members set "rules and regulations of the game" for the operation of their firms in fertilizer trading. The system now operates like a centralized cartel. The main approved rules for the operation are as follows:

- In coordination with the fertilizer factories, and based on the total quota of domestic production assigned to the private sector, each firm is assigned a specific quota from each factory and for each type of fertilizer. These quotas have been agreed upon by each member of the association.

- Transportation cost from the factory to the distributors' yards is fixed and is determined as mentioned before.

- A 3 percent margin has been agreed upon by the members of the association. As long as these firms receive fertilizer at the same ex-factory price, and as long as they charge the same margin, the selling price is the same for the same product among all sellers in the same zone.

- Each factory submits to the association a monthly list of the different quantities delivered to each member.

- If any firm receives more than its quota in any month, the margin for the excess amount is paid to the firm whose quota has been affected, in addition to a specific fine/ton to be paid to the association.

- Daily contacts and weekly meetings of the members of the association harmonize the operation of the association.

This system presents no room for competition among the distributors of chemical fertilizer. While there is no geographic allocation of the market among the distributors, there is also no profitable way for them to increase their sales. In any governorate or district, there can be branches of a number of distributing companies. Competition exists, however, between wholesalers and retailers in the following forms:

- Providing the required combinations of the different fertilizer at the appropriate times

- Providing some services to the buyers, such as selling on credit

- Special discounts for cash payments or on the basis of the good reputation of the buyer or volume of purchases

Farmers' Preferences for Market Channels. The preferences of farmers for the purchase of fertilizer are based on several factors, as indicated in Tables A-1 through A-4 in the appendix. The tables indicate that the main reasons for buying from a specific supplier are:

- Availability of fertilizer at all times
- Lower price
- Better facilities
- Contract with the company
- Combination of these factors

The information presented in Tables A-1 through A-4 also indicates that in the case of cotton growers' preferences, the cooperatives rank first, followed by private traders, while PBDAC ranks last. In the case of wheat, maize, and rice, private traders rank

first, followed by the cooperatives, and PBDAC ranks last. Apparently PBDAC does not offer any particular advantage that would entice farmers to buy fertilizer from PBDAC. With the exception of cotton, the private traders are preferred to other sources. The rapid and unpredictable changes in the GOE's policy related to the determination of specific quotas for the different fertilizer marketing channels (that is against the will and the preference of the end users of the fertilizer) is the most significant impediment to a more rapid evolution of competitive private sector participation in the fertilizer market in Egypt.

In the Monitoring, Verification and Evaluation (MVE) Unit's fertilizer baseline report, Zalla and Saad (1998) proposed free ex-factory sales to any trader without determination of special allocations to political favorites. An example of such favoritism is the increase in the quota allocated to PBDAC in February and March 2002. In addition, PBDAC refused to pay the same ex-factory price for fertilizer as the private traders. In January 2002, Abu Qir Company raised the price of urea by LE 5 per ton and the price of ammonium nitrate by LE 10 per ton. This increase was applied to all the clients of Abu Qir, with the exception of PBDAC, which insisted on paying the old price for its purchases. This decision is not made by the companies, but by government policy. This favoritism was expected to be obsolete after the 1998 production season with increased domestic production.

Zalla and Saad (1998) also indicated that the 30-percent import duty creates a gap between import and export parity equal to the duty plus international transportation costs, and in response proposed reducing that duty to 0–10 percent and establishing an

anti-dumping levy of the difference between 20 percent or 30 percent and the new duty. In May 2002 the import duty on nitrogen fertilizer was still 30 percent.

To strengthen the agricultural cooperatives, Zalla and Saad (1998) proposed that the GOE require PBDAC to return to the cooperatives the storage facilities that were transferred to PBDAC from the cooperatives in 1976. However, the storage facilities are still under the management of PBDAC.

A fertilizer information system was proposed in the baseline study to assist companies and the Government in anticipating and responding to market signals. Such a system would collect and analyze quantitative data on fertilizer production, domestic deliveries, imports, exports, inventories, prices, consumption, and international prices. The Egyptian Fertilizer Development Center would provide an appropriate structure if it were completely independent of Talkha company. However, the situation is still as it was at the time of the baseline report, with no development of an accurate information system. The best indication of that is the explanation given by those in authority explaining the reason behind the increase in the PBDAC quota (and accompanying discussion of high prices of private sales), which was proved to be invalid (see Table 8-5).

Market Performance

Prices. During APRP, the market for chemical fertilizer was relatively stable, with prices showing little change, as indicated in Table 8-9.

Table 8-9. PRICES OF UREA BY SUPPLIER, 1997 AND 2001 (LE per 50 kg)

Supplier	1997	2001	Difference (%)
PBDAC	27.0	27.3	1.1
Cooperatives	29.9	27.2	-2.5
Private Traders	29.0	28.6	-1.4

Source: Morsy Ali Fawzy et al. (2002).

The price of urea supplied by PBDAC showed little increase, while the price of urea supplied by cooperatives and private traders showed some decline, indicating more efficient operation of the latter two types of suppliers in the marketing of chemical fertilizer.

The Nominal Protection Coefficient (NPC) shows the extent of protection of local production. Table 8-10 shows the domestic price of Abu Qir urea and the world price of urea in the Black Sea market (c.i.f. Alexandria). The NPC is defined as the ratio of domestic f.o.b. price to the border or c.i.f. price for a domestically produced commodity. It is clear from Table 8-10 that the change in the domestic price during the period under study did not exceed 11.1 percent, while the world price decreased by 59.4 percent from 1995 to 1999, but increased by 238.5 percent from 1999 to

2001. This relative stability of domestic prices and the highly fluctuating world prices led to wide swings in the value of the NPC. The domestic price was higher than import parity for the years 1997, 1998, and 1999, but was much lower during the remaining years under study. Therefore, there was implicit taxation in some years and implicit subsidy in other years. Again, this indicates the necessity of reviewing the policy of the GOE in keeping the ex-factory prices for chemical fertilizer relatively stable. The prices of the majority of farm outputs (with the exception of sugarcane) have been left to market forces for determination, and they have been free to move upward with world prices. Allowing chemical fertilizer prices to fluctuate with crop prices would stabilize aggregate farm income in most cases better than holding one of the two prices relatively fixed while freeing the other to move in response to market forces.

APRP Contributions. Even though changes in policy regarding chemical fertilizer were not a major thrust of APRP, the program did play a role in reducing the role of the public sector and subsidized companies and in increasing the role of private traders. These steps included:

- Design and implementation of policy benchmarks aimed at increasing the role of the private sector in production and in marketing, in order to increase competition and improve performance.

- Organization of several meetings with producers, distributors, and leading members of the EAFDT to discuss the problems and issues that they face in the production, pricing, and distribution of fertilizer. The proposals and the outcomes of these meetings were conveyed to policymakers.

The fertilizer benchmarks aimed to increase the role of the private sector in the fertilizer subsector, especially in distribution. The main objective was to increase competition among producers and traders in order to provide better and cheaper fertilizer to the farmer-user. The system of operation agreed upon by the members of EFADT does not satisfy this objective because it eliminates competition at this level. However, there was significant competition at the wholesale and retail levels, and the farmers were apparently satisfied with the results.

Fertilizer Bottlenecks. Domestic production of nitrogen fertilizer is more than the amount needed by the agricultural sector. This surplus will increase in the future after the completion of Abu Qir IV and other new factories. However, bottlenecks occur in the market occasionally due to:

- Fluctuations in international prices vis-à-vis the relative stability of domestic prices.

- Shortages of hard currency available for manufacturers and distributors. Manufacturers need hard currency to finance imports of spare parts and other basic requirements for their factories. Distributors need hard currency to import

Table 8-10. DOMESTIC AND WORLD PRICES OF UREA , AND NOMINAL PROTECTION COEFFICIENT, 1995–2001 (LE/ton)

Year	Domestic Price*	World Price**	NPC
1995	450	716	0.63
1996	495	670	0.74
1997	495	467	1.06
1998	495	352	1.41
1999	450	291	1.55
2000	450	484	0.93
2001	450	985	0.46

Sources: World prices: Green Market, different issues. Domestic prices: Ministry of Public Enterprises, Supreme Council of Chemical Fertilizer, unpublished data.
* Ex-factory, Abu Qir (Alexandria).
** Black Sea, CIF Alexandria (additional $20 per ton).
Note: The exchange rate used was $1.00 = LE 3.4 from 1995 to 1999, $1.00 = LE 4.0 in 2000, and $1.00 = LE 4.5 in 2001.

other goods and chemicals they require. Even the public companies, whether manufacturing or trading, have been short of hard currency since they were grouped under holding companies and asked to find their own ways to obtain hard currency.

Accordingly, when international prices are higher than domestic prices these firms prefer to export instead of selling locally, which results in a shortage in the local market. When international prices are lower than domestic prices, exports are discouraged and imports are encouraged, resulting in a surplus of nitrogen fertilizer in the local market. One of the main solutions to this problem is to adjust local prices of nitrogen fertilizer periodically to match the international prices.

It should be kept in mind that the different fertilizer benchmarks aimed to increase the role of the private sector in the fertilizer subsector, whether in production or distribution, in order to realize the main objective of increasing competition among producers and traders, and thus to provide better and cheaper fertilizer to the farmer-user. However, the system of operation that is agreed upon by the members of EAFDT does not satisfy this objective because it eliminates competition among large traders, even though it operates to stabilize fertilizer prices.

Conclusions and Recommendations

Without the interference of the GOE, the market for chemical fertilizer seems to function in a relatively stable manner. However, due to lack of accurate and objective market information and analysis of this information, government policies caused disturbances in the market, which is expected to have adverse economic and social effects. Therefore, the following recommendations are essential for the effective functioning of the fertilizer market:

- Accurate and objective market information (collection, analysis, and dissemination) is a necessity for stable and effective agricultural policy.

- Domestic prices should be adjusted periodically in light of world prices.

- PBDAC should pay the same ex-factory price as other buyers and should be responsible only for strategic storage, not for trade in fertilizer.

- The 30 percent tariff on the importation of nitrogen fertilizer should be reduced to 0 – 10 percent.

Table 8A-1. COTTON GROWERS' PREFERENCES FOR DEALERS OF FERTILIZER (number of farmers)

Source Service Characteristics	PBDAC (1)	Cooperatives (2)	Private Traders (3)	1+2	2+3	1+2+3	Total
Availability All Times	0	8	71	0	1	0	**80**
Lower Price	2	3	3	0	0	0	**8**
Higher Quality	1	55	2	4	1	1	**64**
Better Facilities	0	8	0	0	0	0	**8**
Contract with Company	0	0	1	0	0	0	**1**
Availability + Lower Price	0	3	7	0	1	0	**11**
Availability + Higher Quality	0	11	0	0	5	0	**16**
Availability + Better Facilities	0	4	27	0	0	1	**32**
Lower Price + Higher Quality	0	20	0	1	0	0	**21**
Lower Price + Better Facilities	0	7	0	0	0	0	**7**
Higher Quality + Better Facilities	0	14	0	1	1	0	**16**
Better Facilities + Contract with Company	0	1	0	0	0	0	**1**
Availability + Lower Price + Higher Quality	0	27	0	6	2	0	**35**
Availability + Lower Price + Better Facilities	0	2	3	0	4	0	**9**
Availability + Higher Quality + Better Facilities	0	8	0	0	2	0	**10**
Availability + Higher Quality + Contract with Company	0	1	0	0	0	0	**1**
Lower Price + Higher Quality + Better Facilities	0	2	0	0	0	0	**2**
Availability + Lower Price + Higher Quality + Better Facilities	1	4	0	1	12	0	**18**
Total	**4**	**178**	**114**	**13**	**29**	**2**	**340**

Source: Morsy Ali Fawzy et al. (2002).

Table 8A-2. WHEAT GROWERS' PREFERENCES FOR DEALERS OF FERTILIZER (number of farmers)

Source Service Characteristics	PBDAC (1)	Cooperatives (2)	Private Traders (3)	1+2	2+3	1+2+3	Total
Availability All Times	0	10	126	0	1	0	**137**
Lower Price	2	8	13	1	0	0	**24**
Higher Quality	1	95	5	9	3	1	**114**
Better Facilities	2	11	79	0	0	0	**92**
Contract with Company	0	0	3	0	0	0	**3**
Availability + Lower Price	0	5	7	0	2	0	**14**
Availability + Higher Quality	1	34	3	2	7	0	**47**
Availability + Better Facilities	0	12	47	0	0	1	**60**
Availability + Contract with Company	0	0	2	0	0	0	**2**
Lower Price + Higher Quality	0	30	0	2	1	0	**33**
Lower Price + Better Facilities	0	9	1	0	0	0	**10**
Higher Quality + Better Facilities	0	16	1	2	4	0	**23**
Higher quality + Contract with Company	0	1	0	0	0	0	**1**
Better Facilities + Contract with Company	0	1	0	0	0	0	**1**
Availability + Lower Price + Higher Quality	0	33	1	9	3	0	**46**
Availability + Lower Price + Better Facilities	0	2	3	0	6	0	**11**
Availability + Higher Quality + Better Facilities	0	8	0	0	4	0	**12**
Availability + Higher Quality + Contract with Company	0	1	0	0	0	0	**1**
Lower Price + Higher Quality + Better Facilities	0	2	0	0	2	0	**4**
Higher Quality + Better Facilities + Contract with Company	1	0	1	0	0	0	**1**
Availability + Lower Price + Higher Quality + Better Facilities		3	0	1	13	1	**19**
Total	**7**	**281**	**292**	**26**	**46**	**3**	**655**

Source: Morsy Ali Fawzy et al. (2002).

Table 8A-3. MAIZE GROWERS' PREFERENCE FOR DEALERS OF FERTILIZER (number of farmers)

Source Service Characteristics	PBDAC (1)	Cooperatives (2)	Private Traders (3)	1+2	2+3	1+2+3	Total
Availability All Times	0	3	141	0	2	0	**146**
Lower Price	2	5	13	1	0	0	**21**
Higher Quality	0	78	6	8	3	1	**96**
Better Facilities	2	9	80	0	0	0	**91**
Contract with Company	0	0	2	0	0	0	**2**
Availability + Lower Price	0	3	7	0	3	0	**13**
Availability + Higher Quality	1	38	3	2	6	0	**50**
Availability + Better Facilities	0	9	49	0	0	1	**59**
Availability + Contract with Company	0	0	2	0	1	0	**3**
Lower Price + Higher Quality	0	28	1	2	1	0	**32**
Lower Price + Better Facilities	0	7	1	0	0	0	**8**
Higher Quality + Better Facilities	0	15	1	2	4	0	**22**
Higher Quality + Contract with Company	0	1	0	0	0	0	**1**
Better Facilities + Contract with Company	0	1	0	0	0	0	**1**
Availability + Lower Price + Higher Quality	0	37	1	10	2	0	**50**
Availability + Lower Price + Better Facilities	0	2	3	0	6	0	**11**
Availability + Higher Quality + Better Facilities	0	8	0	0	4	0	**12**
Availability + Higher Quality + Contract with Company	0	1	0	0	0	0	**1**
Lower Price + Higher Quality + Better Facilities	0	3	0	0	2	0	**5**
Higher Quality + Better Facilities + Contract with Company	0	0	1	0	0	0	**1**
Availability + Lower Price + Higher Quality + Better Facilities	0	3	0	1	15	1	**20**
Total	**5**	**251**	**311**	**26**	**49**	**3**	**645**

Source: Morsy Ali Fawzy et al. (2002).

Table 8A-4. RICE GROWERS' PREFERENCE FOR DEALERS OF FERTILIZER (number of farmers)

Source Service Characteristics	PBDAC (1)	Cooperatives (2)	Private Traders (3)	1+2	2+3	1+2+3	Total
Availability All Times	0	4	100	0	1	0	**105**
Lower Price	2	4	4	1	0	0	**11**
Higher Quality	1	69	2	7	2	1	**82**
Better Facilities	2	8	69	0	0	0	**79**
Contract with Company	0	0	3	0	0	0	**3**
Availability + Lower Price	0	1	6	0	2	0	**9**
Availability + Higher Quality	1	12	3	2	4	0	**22**
Availability + Better Facilities	0	3	35	0	0	0	**38**
Lower Price + Higher Quality	0	22	0	2	1	0	**25**
Lower Price + Better Facilities	0	8	0	0	0	0	**8**
Higher Quality + Better Facilities	0	16	1	2	2	0	**21**
Better Facilities + Contract with Company	0	1	0	0	0	0	**1**
Availability + Lower Price + Higher Quality	0	1	0	0	0	0	**1**
Availability + Lower Price + Better Facilities	0	1	0	0	0	0	**1**
Availability + Higher Quality + Better Facilities	0	2	1	0	5	0	**8**
Availability + Higher Quality + Contract with Company	0	4	0	0	4	0	**8**
Lower Price + Higher Quality + Better Facilities	0	3	0	0	1	0	**4**
Availability + Lower Price + Higher Quality + Better Facilities	0	3	0	0	1	0	**4**
Total	**6**	**162**	**224**	**14**	**23**	**1**	**430**

Source: Morsy Ali Fawzy et al. (2002).

References

Morsy Ali Fawzy, Mamadou Sidibe, and Osman Salama. *The Impact of APRP at the Farm Level.* MVE Unit – APRP, Impact Assessment Report No. 28. Abt Associates Inc. Cairo, Egypt. July 2002.

Zalla, Tom and Abdel-Hamid Youssef Saad. *Fertilizer Production and Marketing in Egypt: Baseline Study.* MVE Unit – APRP, Impact Assessment Report No. 2. Abt Associates Inc. Cairo, Egypt. December 1998.

Endnotes

[1] Thanks and appreciation are due to Dr. Hamid Houdhoud of the University of Mansoura and Mr. Refaat El-Sherif of the Supreme Council of Chemical Fertilizer, Ministry of Public Enterprises, for the great help and assistance in providing the data required for this study. It was not possible to complete this study without the help of these two persons.

[2] Abu Qir is owned by the public sector but organized under Law 159 for private companies.

9 Impacts of the Water Policy Reform Program[1]

John E. Keith

The Water Policy Reform Program (WPRP) has had significant impacts on water management and will leave a legacy of improved policy implementation in Egypt. There were three focus areas for the WPRP work: participatory decision-making, water quantity management, and water quality management. The program had demonstrated national impacts in: increased productivity of rice per unit of water; establishment of the MISD information transfer system; institutionalization of IAS; improved cooperation among the ministries; and increased MWRI capacity to develop and implement policy change. It also had important achievements in: revisions of Law 12 and Law 48; application of intermediate drainage reuse; and improved irrigation of sugarcane.

APRP and WPRP formed working groups—composed of various stakeholders, including GOE officials, representatives of the private sector, and technical assistance personnel—to focus on specific problems. The result was the creation of policy benchmarks that were both of interest to the GOE and feasible to achieve. WPRP assisted in the implementation of pilot activities, and the ministries were encouraged to extend the applications of the pilots when they proved successful. The process frequently results in "small steps" and conservative approaches to policy change. However, it also provides for more frequent success and the encouragement and incentive for the adoption of further change.

A wide variety of policy changes is now being discussed, considered, and tested that were rejected out of hand in the early stages of WPRP. While WPRP was not the sole cause of this change in perspective about water management, it played an important role in the development and implementation of policy changes within the Ministry. In trying to evaluate the impact of these policy changes, the lack of consistent datasets over the life of the project is a serious impediment. Policy change is a lengthy process, and changes in measurable national indicators of impact are not expected in the short term. This suggests that data collection should be a long-term activity.

Implementation of the Water Policy Reform Program (WPRP) was expected to have three major results:

- Improved irrigation policy assessment and planning process
- Improved irrigation system management
- Improved private sector participation in policy change

The overall objective of these results was "to increase the global efficiency and productivity of Egypt's Nile water system." The overall objective was to be met via the following five subobjectives:

1. Improve Ministry of Water Resources and Irrigation's (MWRI) knowledge and capabilities to analyze and formulate strategies, policies, and plans related to integrated water supply augmentation, conservation and utilization, and the protection of the Nile water quality

2. Improve water allocation and distribution management policies for conservation of water while maintaining farm income

3. Recover capital cost of *mesqa* improvements and establish a policy for the recovery of operation and maintenance cost of the main system

4. Increase water user involvement in system operation and management

5. Introduce a decentralized planning and decision-making process at the irrigation-district level

This impact assessment focuses on determining the extent to which the WPRP contributed to achieving the subobjectives and the overall objective.

The policy process used by WPRP, and by the Agricultural Policy Reform Program (APRP) in general, included input from all stakeholders. This process involved several steps:

- Identify possible policy change options by WPRP, in cooperation with its counterparts in the Water Policy Advisory Unit (WPAU)

- Hold workshops with WPRP, WPAU, MWRI, and other interested stakeholders, such as other ministries and private entities, to identify effective and feasible policy objectives

- Form working groups, which included representatives from WPRP, other ministries, the US Agency for International Development (USAID), and other stakeholders to develop the analyses, specific policy goals, and implementation activities

- Hold a workshop in which the ministries and USAID approve the specific goals and implementation activities, and benchmarks and indicators of achievement (verification indicators)

- Carry out the activities (working groups, WPRP, and other stakeholders) required to achieve the goals established in the benchmarks

- Hold a final workshop in which the policies and implementation activities are presented to the ministries and USAID for approval, and for Ministry adoption

- Transfer funds to the involved ministries after the approval was obtained

In many cases, this process was repeated through several tranches of the project, as policies were developed, approved, and implemented.

Adopting policy reform is usually a slow process because there is a significant amount of inertia in any sociopolitical system. That is, individuals and groups within the society have learned to gain benefits from the status quo, and are usually slow to accept change. Moreover, once a reform is adopted by the government, measurable national impacts are not easy to discern, and are even more difficult to trace to a specific policy change. Therefore, impact assessment must be a long-term activity and recognize that the steps between policy formation and measurable impacts are incremental.

Assessment Methods

Relationship of Impact Assessment to Benchmarks. Many of the water policy reform benchmarks were sequential steps taken to achieve the major results and objectives. Several of the benchmarks, particularly those for the latest tranches of the project, are only the initial steps in policy development. As such, it is unlikely that those benchmarks have had quantifiable, definitive effects on national impact indicators.

A benchmark-by-benchmark, tranche-by-tranche enumeration of verification indicators and their achievement is not the goal of an impact assessment. The verification indicators are specific to each tranche and each benchmark, and are not necessarily related to the overall impacts on water management or on the Egyptian economy. Rather, an impact assessment addresses the level to which the project or activity affected measures that reflect the achievement of the overarching objectives identified by the task order. This assessment focuses on these measures.

Performance Indicators. The benchmarks established for WPRP addressed five general areas of water policy reform:

1. Agricultural production and irrigation efficiency (agricultural production per unit of water)
2. Privatization/participatory management (private water user participation)
3. Water quantity management/decentralization
4. Water quality management
5. Institutional reforms

The analysis of impacts in this chapter is organized on the basis of these five areas. Policy change is expected to have broad effects, and no categorization of impacts of policy change is going to be completely exhaustive or mutually exclusive. This categorization represents, in the author's opinion, a useful description of the benchmark activities of WPRP. Discussion of the impact

indicators will reference specific WPRP benchmarks and/or verification indicators in order to define the links between the indicators and the project activities.

This report attempts to identify and quantify, where possible, the performance indicators, or to present evidence related to the indicators. Specific numerical and qualitative measures will be identified for each of the four performance indicators. However, because other donors and ministries have projects or programs that also will affect some of the same performance indicators, WPRP cannot be identified as the sole contributor to any or all of the changes in these indicators.

Specific Measures of Accomplishment. This impact assessment uses the performance indicators above as specific quantitative and qualitative measures of accomplishments to indicate the achievement of the objectives. Each measure is associated with the indicator/category to which it relates and with the benchmark activities, as is appropriate.

Agricultural production and irrigation efficiency (agricultural production per unit of water):

- Number or percentage of branch canals that have switched from rice rotation to standard rotation by the end of August 2001
- Percent of rice area planted with short-duration varieties
- Changes in rice yield
- Extent of sugarcane areas under improved irrigation
- Sugarcane yield changes in areas with improved irrigation

Privatization/participatory management (private water user participation):

- Number of Branch Canal Water User Associations (BCWUAs) formed and functioning and area covered
- Milestones in Irrigation Management Transfer (IMT) transformation process
- Awareness of public participation and irrigation management transfer within the pilot district
- Recognition and levels of acceptance of cost-sharing requirements
- Water user groups established in deep groundwater areas

Water quantity management/decentralization:

- Water savings from matching irrigation demand and supply
- Percent of districts matching irrigation demand and supply
- Changes in farmer complaints about water shortages
- Number of directorates implementing volumetric calibration
- Number of directorates delivering water on a volumetric basis
- Awareness of concept of integrated water management within the pilot district
- Qualitative assessment of flow from free-flowing groundwater into lakes
- Yield changes due to improved drainage in free-flowing groundwater areas
- Extent of Improved Irrigation Project (IIP) application

Water quality management:

- Adoption of changes to Law 48
- Requirement for Environmental Impact Assessments (EIAs) adopted
- Drainage reuse policies adopted
- Irrigation management transfer strategy adopted
- Integrated water management district strategy adopted
- Urban wastewater policies adopted
- Environmental impact statement policy/applications

Institutional reforms:

- Formal inter-ministry cooperation
- Adoption of changes to Law 12
- Institutionalization of Irrigation Advisory Service (IAS)
- Establishment of water quality unit in MWRI

Data Sources. Data on the impact indicators must be collected to complete an impact assessment. The data for this impact assessment were obtained from various sources:

- Benchmark completion reports by the Environmental Policy and Institutional Strengthening IQC (EPIQ) and APRP
- Other reports and studies by EPIQ and APRP
- 1998 and 2001 Knowledge, Awareness and Practices (KAP) surveys of Egyptian farmers (GreenCOM and EPIQ Report No. 54, respectively)
- Publications and reports by MWRI, the Ministry of Agriculture and Land Reclamation (MALR), and private agencies
- Questionnaire responses from local MWRI and MALR personnel
- Personal interviews with personnel from EPIQ, APRP, MWRI, and other involved ministries at the ministry and field levels
- Rapid surveys of local conditions by MWRI personnel
- Ministerial memoranda, decrees, and letters

Early benchmarks, as they were accomplished, often led to development of later benchmarks. Thus, many of the measures of accomplishment are "steps" to later indicators. Moreover, this sequential relationship is more significant for qualitative indicators. The discussion of the specific measures of accomplishment in the following section highlights the linkages among benchmark activities, measures of accomplishment, and more general impacts.

Specific Impacts of WPRP

Many of the indicators of accomplishment are cross-cutting, in that their achievement represents policy improvements in more than one general category. It is obvious that the activities under institutional reform will affect achievements in the other categories, but several of the other more specific categories involve

activities that also impact other categories. For example, the creation of water user associations should, in the long term, result in further decentralization of decision-making by MWRI and privatization of water management. Treating wastewater so that it can be used for irrigation complements integrated water management at the district and directorate levels. Creating integrated water management districts involves quantity and quality management, particularly with respect to drains and drainage reuse. Therefore, the treatment of the measures of accomplishment as part of a specific category is arbitrary.

Agricultural Production and Irrigation Efficiency. Two of the most water-consuming crops in Egypt are rice and sugarcane. These crops were specifically identified in the scope of work for the EPIQ program as targets for improved water use. Two working groups were formed from EPIQ, the Reform Design and Implementation (RDI) Unit of APRP, the MWRI and the MALR. These working groups developed programs to reduce water use and increase productivity for both of these crops.

The working group activity identified two programs to improve productivity per unit of water applied in rice and sugarcane. For rice, the substitution of short-duration rice varieties, which require about 120 to 130 days to mature, for long-duration varieties, which require about 160 days, would result in a reduction of water use. The rice water rotations (4 days on and 5 days off) could be changed to the traditional rotation (5 days on and 10 days off) for the last 30–40 days of the traditional rice-growing season.

For sugarcane, the application of improved irrigation techniques in the form of laser-leveling and gated-pipe delivery of water would reduce the amount of water required to irrigate fields when compared to the amount required using traditional flood irrigation. These improvements not only control over-application, but also increase yields in two ways: (1) the area of cultivation would be increased by reducing the number and size of open field ditches, and (2) reducing the water that pools in low areas increases productivity and reduces waterlogging.

The results of the activities for rice are as follows:

- By the end of August 2001, 100 percent of the branch canals in rice-growing areas had changed from the traditional rice water rotation, which continued through September, to the short-duration water rotation, thus reducing the amount of applied water necessary to irrigate the rice crop by approximately 25%. Overall, applied water reduction in the pilot areas for the May through September growing season was estimated to be about 13%, taking into account cropping during September after the rotation is changed [Ministerial Decision No. 63 of 2002; personal communications with Engineer Ragab Abdel Azim of the Irrigation Sector Central Directorate; EPIQ Report No. 22; EPIQ Report No. 26].

- In 2000, 83 percent of all rice grown was a short-duration variety, an increase of 51.7 percent from 1997. In 2001, an estimated 91 percent of all rice grown

was a short-duration variety [Holtzman et al. (2002); personal communication with Dr. John Holtzman, MVE Unit].

- Productivity of rice per feddan increased from 3.54 metric tons per feddan (mt/fd) in 1997 to 3.82 mt/fd in 2000, a gain of about 8%, primarily due to the higher yielding short-duration varieties [Holtzman et al. (2002)].

- Rice productivity per unit of water applied increased approximately 25 percent over the period, due primarily to the change to short-duration varieties and the reduction in applied water (calculated from the above data).

The results of the activities for sugarcane are as follows:

- 1,095 feddans of sugarcane were under improved surface irrigation in 2002, an increase of 982 feddans from 1998, the beginning of the pilot policy implementation [Sugar Crops Council (2000)].

- Yield of sugarcane under improved irrigation increased between 4 and 7 metric tons per feddan (mt/fd), or about 25 percent, although there was a wide range (from 2 to 10 mt/fd) of productivity changes [Sugar Crops Council (2000)].

- Applied water was reduced by 15 to 20 percent on most of the sugarcane pilot areas [APRP-RDI (1998)].

- In May 2002, the Minister of MWRI and the Minister of Military Production signed a protocol for joint cooperation to produce irrigation inputs—pumps and gated pipes—for 2,000 feddans of sugarcane, at a cost of 12 million LE [Egyptian newspaper articles from *El Akhbar*, *El Gomhoureya*, *El Wafd*, and *El Ahram*, all dated 28 May 2002].

The benchmarks associated with the rice and sugarcane activities included the following (see Table 9-1):

- Tranche II, Benchmark C.4. Water Use on Rice

- Tranche III, Benchmark C.6. Rice Water Use Policies

- Tranche II, Benchmark C5. Water Use on Sugarcane

- Tranche III, Benchmark C5. Sugarcane Water Use Policies

Table 9-1. BENCHMARK DESCRIPTION BY TRANCHE

Tranche	Benchmark	Verification Indicators
II	C4. The GOE (MPWWR and MALR jointly) will establish a strategy for the optimal water use for rice production.	1. Development of a strategy regarding water use on rice, which is embodied in a document giving the objectives of the strategy, the background information considered, and a statement of the proposed new policies. 2. The strategy is presented to both Ministers.
	C5. The GOE (MPWWR and MALR jointly) will establish a strategy for the optimal water use for sugarcane production.	3. Development of a strategy regarding water use on sugarcane, which is embodied in a document giving the objectives of the strategy, the background information considered, and a statement of the proposed new policies. 4. The strategy is presented to both Ministers.
	C6. The GOE will develop a policy to allow the formation of water user associations in areas that have not participated in the Irrigation Improvement Program, and begin to promote such associations.	1. MPWWR develops a policy to allow the formation of water user associations in areas that have not participated in the Irrigation Improvement Program. Evidence of a policy is a document specifying the background to the development of the policy, the objectives of the policy, and the proposed new policies. 2. The strategy is presented to the Minister of Public Works and Water Resources. 3. MPWWR staff promotes water user associations by meeting with farmers and explaining the benefits of, and procedures for establishing, water user associations.
	C7. The GOE will develop a national strategy for improving water use efficiency and agricultural productivity through irrigation improvement projects. This strategy will include priorities for implementing the desired improvements.	5. Development of a strategy for improving water use efficiency and agricultural productivity through irrigation improvement projects. Evidence of a strategy is a document giving the objectives of the strategy, the background information considered, and a statement of the proposed new policies. The strategy will include priorities for implementing the desired improvements. 6. The strategy is presented to the Minister of Public Works and Water Resources

Table 9-1. BENCHMARK DESCRIPTION BY TRANCHE (CONT'D)

Tranche	Benchmark	Verification Indicators
	C8. The GOE will develop an approve new policies, regulations, and criteria to promote drainage water reuse with appropriate incentives and technical support.	7. MPWWR develops a policy to promote drainage water reuse. Evidence of a policy is a document specifying the background to the development of the policy, the objectives of the policy, and the proposed new policy (s). The policy will include the provision of appropriate incentives and technical support. 8. The Steering Committee for Coordination and Monitoring of Water Resources Development through Agricultural Policies Reform approves the policy. 9. MPWWR identifies procedures required for the application of the policy.
III	C1. GOE (MPWWR) will implement policies and procedures to shift from distributing Nile River water based on water levels to distributing water based on water volumes using the Main System Management Telemetry System at Main Canal intakes, barrages on the River Nile and division points between Directorates for enhanced irrigation operations and decision-making.	1. Calibrate regulators located on the River Nile, at intakes to main canals and at points dividing Directorates where telemetry exists (53 regulators) and enter the calibration relationships into the telemetry system software to achieve volumetric flow measurements at these locations. 2. MPWWR approve a policy that water management will be based on volumetric flow and that telemetry data will be used for water management decision at points where telemetry stations exist.
	C2. The GOE (MPWWR) will adopt policies and procedures for reducing water loss and land degradation due to improper operation and management of free-flowing groundwater in the reclaimed areas of the Western Desert.	1. MPWWR will approve a policy package for free flowing groundwater in reclaimed areas. 2. Initiated the formation of a groundwater user association in a selected reclaimed area in the western Desert.

Table 9-1. BENCHMARK DESCRIPTION BY TRANCHE (CONT'D)

Tranche	Benchmark	Verification Indicators
	C3. GOE (MPWWR) will decree a policy and initiate an action program for formation of water user organizations at the distributaries and branch canal levels.	1. A Ministerial decree allowing the formation of water user organizations above the mesqa level. 2. Process Documentation reports that organizations were formed on two branch canals (one in an IIP and one in a non-IIP community). 3. A cost sharing plan prepared for two branch canals in consultation with the stakeholders.
	C4. GOE (MPWWR) will institutionalize an Irrigation Advisory and Support Service in the MPWWR.	1. Ministerial decree establishing the Irrigation Advisory and Support Services Central Directorate under the MPWWR. 2. Submittal of necessary documents to the Central Authority for Organization and Management to establish an Irrigation Advisory and Support Services Central Directorate.
	C5. GOE (MPWWR and MALR jointly) will designate two areas of private commercial sugarcane growers and promote improved sugarcane water management efficiency in Upper Egypt.	1. Improved irrigation technologies installed, including laser leveling and gated pipe delivery systems; water application monitoring program established; and training provided to farmers in the use of improved irrigation methods in two pilot sugar cane areas in Upper Egypt.
	C6. GOE (MPWWR and MALE jointly) will adopt policies for the substitution of short duration rice varieties for long duration rice varieties among private commercial growers and for changing water scheduling to achieve optimal use of water for rice production.	1. Approval by the two Ministers (MPWWR and MALR) of a national policy package, including a timetable for adoption, provision of seeds, farmer training, and changes in water scheduling, for the substitution of short duration rice varieties for long duration rice varieties.
	C7. GOE (MPWWR) will establish an intermediate drainage water reuse program for the Bahr Bagar Drain as a model for other areas.	1. Establishment of an intermediate drainage reuse program for Bahr Bagar Drain in at least one representative district to include preparation of an operations plan and tender documents for the pumps.

Table 9-1. BENCHMARK DESCRIPTION BY TRANCHE (CONT'D)

Tranche	Benchmark	Verification Indicators
	C8. GOE (MPWWR) will revise Law 48 of 1982 governing water quality management to more effectively control discharge of wastes and wastewater into the Nile and its waterways.	1. A draft revision of Law 48 of 1982 and its by-laws to be presented to the Ministers.
IV	C1. The GOE (MWRI and MALR jointly) will establish a system that improves the flow of real-time information between the Ministries with respect to irrigation demands and supplies.	1. A pilot program will be initiated by the MWRI and MALR in one irrigation district in each of two governorates for mutual information transfer for cropping patterns and calendars and water supplies by December 31,2000. 2. A joint MALR/MWRI national policy for the application of the pilot program will be approved by the two Ministries by December 31, 2001.
	C2. The GOE (MWRI) will adopt polices for improves management of discharge and reuse of urban wastewater in agricultural drains.	1. The MWRI will approve a policy and procedures for management and reusing urban wastewater discharges in agricultural drains and submit them to the Cabinet by 31 December 2000. 2. The MWRI in coordination with other ministries and authorities will apply the policy and procedures in one selected pilot area in the Delta by 31 December 2001.
	C3. The GOE (MPWWR) will establish a policy for allocating, distributing, and controlling water on a volumetric basis at the directorate and inspectorate levels.	1. A pilot program will be conducted by MPWWR in two directorates by 31 December 2000, to provide the basis for implementing volume-based water management policy at the directorate and inspectorate levels. 2. A policy document that includes a plan and instructions for volume-based water management in the Nile Irrigation System will be approved by MPWWR and distributed to all directorates by 31 December 2000.

Table 9-1. BENCHMARK DESCRIPTION BY TRANCHE (CONT'D)

Tranche	Benchmark	Verification Indicators
	C4. The GOE (MWRI) will adopt a policy and strategy for transferring management of selected sections of the irrigation system to stakeholders and/or the private sector.	1. The MWRI will develop a policy on irrigation management transfer, to include a plan for phased implementation and to identify legal requirements, by 31 December 2000. 2. Application of the policy will be initiated in tow selected pilot areas by 31 December 2001.
	C5. The GOE will prepare revisions to Law 12 of 1984 on irrigation and drainage and its supplementary laws, to improve effective water resource management.	1. MWRI will complete an analysis and review with stakeholder's participation, of the modification needed for law 12 of 1984 on irrigation and drainage and its supplementary law by 31 December 2000. 2. A draft revision of law 12 of 1984 on irrigation and drainage and its supplementary laws will be approved by MWRI by 31 December 2001.
V	C1. The GOE (MWRI) will adopt a policy to integrate all water management functions at the district to support decentralized management.	1. MWRI will approve a policy to integrate all water management functions at the district level. 2. MWRI will designate two pilot districts and initiate activities in these districts to show how the policy is to be implemented.
	C2. The GOE (MWRI) will adopt a policy to facilitate public participation in decision-making regarding planning, development, and management of Egypt's water resources.	1. MWRI will approve a policy addressing mechanisms and procedures for interactive participation by stakeholders in water resource development and management decision-making. 2. MWRI will conduct at least one public participation activity on a selected issue to identify implementation mechanisms and procedures.
	C3. The GOE (MWRI) will approve a policy to improve environmental management of water resources in MWRI operations.	1. An approved MWRI policy that addresses procedures, mechanisms, and a plan to assure environmental concerns are addressed in MWRI activates by requiring environmental impact assessments be conducted for proposed new projects.

Short-duration rice is now the predominant rice in production, and seeds for long-duration rice are not readily available on the market. While there was already interest in short-duration rice in the GOE (Field Crops Research Center of MALR), APRP units (EPIQ and RDI) were instrumental in providing implementation support for the initial pilot and for the first round of expansion. Once a sufficient cadre of individuals in both MALR and MWRI were trained in the process, the remainder of the implementation was accomplished by the GOE. Although measures of the actual reduction in water application for rice are not available, the change in rice rotation is clear.

The GOE continues to implement gated-pipe irrigation. Because sugarcane is grown on 5-year cycles and the investment required is relatively high, the adoption of gated-pipe irrigation is slow relative to that of short-duration rice. However, there was a 10-fold increase in the number of feddans of sugarcane under improved irrigation from 1998 to 2002. Implementation of the pilot projects in Upper and Middle Egypt was accomplished with EPIQ and RDI Unit support. The results were sufficient to encourage MWRI and MALR (Sugar Crops Research Institute) and the quasi-private Sugar Crops Council to expand the program. A new accord between MWRI and the Ministry of Defense Production will increase the availability of locally produced equipment to farmers and should contribute to a more rapid implementation. While not an "Improved Irrigation Program" package, this activity represents one approach to improved irrigation schemes.

During the process of developing these benchmarks and meeting the verification indicators, discussion between MWRI and MALR personnel (specifically the Central Administration for Water Distribution at MWRI and the Rice Research Institute and Sugar Crops Research Institute at MALR) led to the conclusion that water deliveries were often not well-timed relative to the water needs of the crops (farmer demands), particularly for rice cultivation. The bad timing was due to the failure of communications and the lack of rapid information transfer among farmers, the local MALR extension agents, and the MWRI district engineer. As a result, a follow-on benchmark for developing a system of information transfer about planting dates and crop rotations from the farmers to the district engineer was developed.

Privatization/Participatory Management. Privatization of irrigation systems requires an organization capable of financing, managing, and maintaining those systems. Many water user associations (WUAs) at the *mesqa* level have been organized in Egypt in association with irrigation improvement projects, but the transfer of management of tertiary or secondary canals will require associations of larger scope and capacity.

EPIQ and IAS personnel worked together to create BCWUAs in pilot programs that demonstrated both the feasibility and the requirements for formation of such

associations. The next step was to use the BCWUA form to develop irrigation management transfer mechanisms and to apply them to pilot areas. The achievements are as follows:

- Inclusion of Articles 33 and 34 in the revision of Law 12/1984, which permits the formation of WUAs and private sector management entities at all levels of the irrigation system [EPIQ Report No. 48; Ministerial letter of transmittal to the People's Assembly dated 12 December 2001].

- A ministerial announcement that WUAs can be formed in non-IIP areas [EPIQ Report No. 9].

- While only 6 percent of farmers had knowledge of WUAs, once the concept was explained, 75 percent of farmers indicated a willingness to join a WUA if it were formed in their area [EPIQ Report No. 54].

- Nine initial BCWUAs have been formed in the Nile Basin by ministerial decree. Four were formed as a part of tranche III, four are a part of the IMT activities of WPRP and are only in the pilot stages, and one (under the title of a Water Users Federation of Water User Unions [WUUs]) was formed in a free-flowing deep groundwater area [EPIQ Report No. 17; Ministerial Decree No. 28/1998; EPIQ Report No. 47]. The area covered by these associations varies between 2,000 and 12,000 feddans, with an average of about 7,000 feddans.

- MWRI ministerial and governorate decrees establishing the policy for irrigation management transfer [EPIQ Report No. 47, Appendix A].

- Memoranda of Understanding between MWRI and BCWUAs signed [EPIQ Report No. 47].

- The pilot program in public participation resulted in a significant portion of farmers reporting the following [Rapid survey of stakeholders, 9-10 March 2002, EPIQ Trip report]:

    - Reduction in delivery problems at the tail end of both pilot canals
    - Reduction in number of complaints related to cleaning and maintenance
    - Recommendations by farmers to expand the pilot program

- Inclusion of Articles 34 and 117 on cost-sharing as a part of the revision of Law 12/1984 [EPIQ Report No. 48; Ministerial letter of transmittal, 12 December 2001].

- A ministerial decree requiring MWRI to develop and implement plans for public participation in decision-making, following the procedures used in the WPRP pilot program [Ministerial Decree No. 432/2001].

- A 10 percent increase in farmer willingness to share costs for improvements in the canal and drainage systems [EPIQ Report No. 54].

- Increase in awareness of MWRI activities at the district level by stakeholders, particularly farmers [EPIQ Report No. 54; EPIQ Trip Reports on Public Participation in Decision Making, Gharbeya governorate and Beheira Directorate, 9-10 March 2002].

- A manual for implementing public participation activities was provided by EPIQ and adopted by MWRI [WPAU/EPIQ/WPRP *Manual for Public Participation*; Ministerial Decree No. 432/2001]

- Both farmers and the Undersecretary of Irrigation indicated a desire to see public participation extended both in the area covered and in the number of issues considered [EPIQ Trip Report on Public Participation in Decision Making, op. cit.].

- Three WUUs for wells were established in deep groundwater areas in Farafra in tranche III. Six additional WUUs were established after completion of the tranche III benchmark [EPIQ Report No. 16; personal communication with Dr. Fatma Abd-El-Rahman, Head of the Groundwater Section, MWRI].

The benchmarks associated with privatization and participatory management included the following (see Table 9-1):

- Tranche II, C6. Water User Associations
- Tranche III, C3. Branch Canal Water User Associations
- Tranche IV, C4. Irrigation Management Transfer
- Tranche V, C2. Public Participation in Decision Making

There is a clear trend of development in the activities under the privatization/participatory management category. EPIQ's activities began when it received the legal authority to form WUAs outside of IIP areas. Once the legal authority was obtained, secondary-level BCWUAs were developed, which entailed building the local expertise to manage the organization, including financial accounting. The next step was to transfer local management to the BCWUAs, which involved an agreement between the MWRI and the BCWUAs regarding the activities that each would perform. The formal transfer of management to the BCWUAs is planned to take place in the near future. The result of this will be the users' assumption of both responsibility and authority at the BCWUA level, which is a major step toward privatization. An important aspect of this process was the involvement of stakeholders in management decisions (public participation), which established mutual confidence between the MWRI district engineering staff and the farmers with respect to the ability to manage tasks on the branch canals to the benefit of both. Without this confidence, privatization will be a much slower process.

The formation of secondary WUAs has been relatively slow because the current Law 12/1984 provides for legally establishing WUAs only in IIP areas. While ministerial decrees can permit the creation of BCWUAs in specific locations, the passage of the changes in Law 12/1984 is essential to give broad-based legal foundation to BCWUAs. In addition, Law 12/1984 is critical to many institutional reforms, including non-IIP WUAs and irrigation management transfer. Even after revised Law 12 is adopted, it is expected that the process of developing IMT from MWRI to BCWUAs (or water boards) will be lengthy. It is doubtful that specific impacts will be observed for several years. In fact, the phased development plan outlined in EPIQ Report No. 47 includes a national policy for extending IMTs. This policy calls for replication of the activities in pilot areas to be undertaken by the end of 2002, and to be completed by 2020. A monitoring and evaluation system has been suggested and is being developed, which should provide evidence of the program's impacts. It is obvious that implementing IMT will require extensive resources to train members of BCWUAs and to purchase the equipment necessary to carry out the BCWUAs' functions.

While the public participation pilot was limited to two pilot areas and to a single issue (canal cleaning), the results appeared to have been positive for both the MWRI personnel involved and the farmers. Farmers noted fewer delivery problems at the tail of the pilot canals and there were fewer complaints related to the scheduling and performance of canal cleaning and maintenance. The establishment of communications among farmers and Irrigation Engineers is another crucial step toward irrigation management transfer.

Water Quantity Management. The water quantity management activities were targeted at the objective of decentralizing decision-making in MWRI. There were three distinct activities contributing to that goal: (1) developing an information transfer system that will provide better water management in the short term, and be a basis for demand management in the long term, (2) using volumetric releases and telemetry capability in the main system management, and (3) creating a pilot program in which surface water, drainage, and groundwater are managed in an integrated water management district. Note that all three objectives relate to volumetric control of water at the directorate, inspectorate, and district levels.

Although the Irrigation Improvement Project was considered in one early benchmark, it was not targeted for implementation by the EPIQ project. Therefore, the impacts of WPRP on IIP are expected to be limited. The installation of telemetry equipment in the Nile irrigation system took place under the Main System Management (MSM) program, which was administered separately from the EPIQ project until terminated in 1997. MSM activities under WPRP from 1998 to 2000 included the calibration of flow measurements at the directorate and inspectorate level, with the objective of switching from water level releases to volumetric releases using telemetry.

The working groups associated with each of the three activities identified the specific actions necessary to achieve the goals. For matching supply and demand, data collection and computer software were developed to permit agricultural and

irrigation personnel to exchange information on cropping patterns and water availability at the district level. The telemetry and volumetric delivery required the calibration of water levels to volumetric flows at each of 53 points of diversion between directorates and 113 points of division between districts. Integrated water management needed substantial support because it requires realignment of the four water districts (Irrigation, Drainage, Mechanical [pumped water], and Groundwater), as well as a restructuring of personnel and functions. Because time was limited, only pilot integrated districts could be formed during the project. The following are the measures of achievement of these APRP/WPRP activities:

- 31 MWRI districts out of 198 total (15.7%) distributed over five directorates currently have the Matching Irrigation Supply and Demand (MISD) program implemented fully. These districts supply 1.281 million feddans, or 16.1 percent, of the 7.95 million irrigated feddans in Egypt. The program has expanded from a pilot of 5 districts in 2 directorates begun in 1999 [MWRI data sheet Tranche IV, C.1, Matching Irrigation Supply with Demand expansion data].

- 38 MWRI districts (19.2% of the total 198 districts) are currently in the process of implementing the MISD program. These districts supply 1.66 million feddans, or 20.9 percent, of all irrigated areas in Egypt [MWRI data sheet. op. cit.].

- Approximately 2.94 million feddans (39% of the total 7.95 million feddans) are covered by either the fully implemented MISD program or are in the process of implementation [APRP data sheet Irrigation Districts and Agricultural Administrations Participating in the MISD Program, 14/05/02].

- The pilot studies showed potential significant decreases in the oversupply and undersupply of water after the full implementation of the MISD program [EPIQ Reports Nos. 45 and 55].

- Farmer complaints in the pilot areas have decreased by an average of 44 percent, from 137 per year to 60. The minimum decrease in complaints was 15 percent in the East Isna pilot (from an average of 44 per year from 1995 to 1998 to 29 per year from 1999 to 2001). The maximum decrease in complaints was 77 percent in the Abou Hummos pilot (from an average of 57 per year from 1995 to 1998 to an average of 13 per year from 1999 to 2001) [MWRI data sheet Tranche IV,C.1, Matching Irrigation Supply with Demand, Pilot District Complaint Data].

- All 53 division points between directorates calibrated and using volumetric distribution [MWRI APRP Water Policy Reform Program, Tranche III, Benchmark C.1.MSM Utilization data sheet: Status Report as of 2002].

- 2 directorates have completed the process of calibrating water-level releases to determine volumetric flows at 43 locations that have telemetry capability. Water deliveries are being made on a volumetric basis at the locations [MWRI APRP Water Policy Reform Program, Tranche III, Benchmark C.1.MSM Utilization data sheet, op. cit.].

- An additional 70 locations in 13 directorates are being calibrated [MWRI Telemetry Calibration data sheet, 2002]. A total of 113 designated telemetry locations are either calibrated or are being calibrated.

- A ministerial decree stating that water distributions for all locations that separate districts within all directorates will be based on flows as well as on water levels beginning July 1, 2002 [Ministerial Decree No. 450/2000].

- A policy that all new wells implemented by the MWRI will be controlled in the Farafra area. All wells in the investor area are capped [personal communication with Dr. Fatma Abd-El-Rahman, Head, Groundwater Sector].

- A ministerial decree establishing two pilot areas for integrated water management [Ministerial Decree No. 506/2001].

The benchmarks for the water quantity management category included the following (see Table 9-1):

- Tranche II, C7. National Strategy on Irrigation Improvement
- Tranche III, C1. Main System Management Program Utilization
- Tranche III, C2. Free-flowing Groundwater Management
- Tranche IV, C1. Reducing Mismatch of Irrigation Deliveries
- Tranche IV, C3. Water Management at the Directorate Level
- Tranche V, C1. Integrated Water Management at the District Level

MWRI is moving toward a fully integrated system for water quantity management in which all water supplies are considered, with volumetric deliveries based on irrigation demand. Each of the benchmarks and measures of accomplishment are a part of that transition. Computer programs were created for the MISD activity with the support of the RDI and EPIQ Units to provide real-time crop water demand data to the district level of MWRI. Training was completed at the district level for both extension agents and irrigation personnel.

Expansion of the MISD implementation has been rapid, with full participation of MWRI and MALR. EPIQ provides no implementation support for this expansion; the RDI Unit provides some support to MALR. The reduction in the number of irrigators' complaints is, at least in part, the result of the better water management that resulted from expansion of MISD. The commitment by the two ministries to rapid expansion of the MISD program is an indirect indicator of its positive impacts, which includes the benefits of better water management, demonstrated by

the analysis of historical data. The MISD process will eventually be a part of the integrated water management system, including telemetry.

There is clear evidence of the impacts of WPRP's activities on telemetry activity, as well. Forty-three division points on 26 districts are currently ready to deliver water on a volumetric basis, and 70 additional division points with telemetry capability are being calibrated. The expansion of volumetric measurement to all of the directorates by July 2002 is a policy mandated by ministerial decree.

The ministerial approval of the integrated water management pilots represents a significant step forward in the development of effective water management, although this activity will not likely extend beyond the pilot stage for some time. The conjunctive use of water by a single management agency reduces both physical and fiscal overlap. A major expenditure of scarce resources—money and time—by MWRI is required to evaluate each independent district (Irrigation, Drainage, Mechanical, and Groundwater Districts) to determine the appropriate boundaries for the integrated district, to train managers as well as engineers, and to complete the transition.

The Groundwater Sector has established nine water user groups on the basis of EPIQ input. In addition, some of the recommendations for policy changes (e.g., reducing well flows to match irrigation demands on a seasonal basis and controlling the free-flowing wells in general) have been adopted by the sector and applied not only in Farafra but also in other groundwater regions. All new wells implemented by MWRI in deep groundwater areas must be capped and controlled. In addition, all wells in the investor areas are capped and controlled.

Water Quality Management. Water quality is a serious problem in Egypt. Municipal, industrial, and agricultural effluent have polluted drainage water so severely that in some areas it cannot be mixed with fresh water for use in the irrigation of consumable crops. Seven of the 23 Ministry mixing stations in the Nile Delta area have been closed as a result. WPRP focused on water quality management and environmental control and several other ministries have improving water quality as a target, including MWRI, the Ministry of Health and Population (MOHP), Ministry of State for Environmental Affairs (MEA), and MALR, all of which were involved in discussions led by WPRP.

Several different working groups were formed to deal with the water quality issue. Initially, the primary activity of WPRP was to develop a pilot for the use of drainage water for irrigation before municipal and industrial effluents precluded even mixing. The potential for controlling urban wastewater was the second area of interest. Finally, the revision of environmental law and the inclusion of an EIA was determined to be a critical policy for water quality maintenance. WPRP accomplishments in water quality management included the following:

- The Minister has allocated enough funds to install intermediate water reuse on at least 20 sites, based on the pilot results on the Bahr Bagar Drain [personal communication, Dr. Ragab Abdel Azim, Central Directorate for Irrigation].

- Revisions of Law 48 of 1982 have been approved by the Steering Committee and forwarded for review [Steering Committee approval of revisions, 12 June 1999].

- The Minister signed a policy statement indicating that MWRI will "integrate the environmental dimension to all activities of the MWRI…" beginning 1 January 2002 [EPIQ Report No. 51]. Included in this policy is the application of an EIA.

- A source book for EIA procedures was completed and provided to MWRI in Arabic and English [*Environmental Impact Assessment Source Book*, Appendix A, EPIQ Report No. 51].

- Ministry adoption of 11 policy reforms for urban wastewater management [EPIQ Report No. 34].

- A prioritization for urban wastewater treatment facility construction and improvement was developed and adopted by MWRI and NOPWASD. [Letter from Chairman of Egyptian Public Agency for Drainage Projects (EPADP) to Chairman of National Organization for Potable Water and Sanitary Drainage (NOPWASD), 29 August 2001].

The benchmarks for the water quality category included the following (see Table 9-1):

- Tranche II, C8. Drainage Water Reuse
- Tranche III, C7. Intermediate Drainage Water Reuse
- Tranche III, C8. Water Quality Regulation
- Tranche IV, C2. Urban Wastewater and Drainage Reuse
- Tranche V, C3. Improved Environmental Management

Three major thrusts of water quality management were associated with WPRP activities. The first was to develop procedures to enable Egypt to use drainage water for irrigation. The results of the intermediate drainage water interception and reuse pilot project, implemented with support from EPIQ, indicated that reuse of drainage water before it becomes heavily polluted by municipal and industrial wastes was highly beneficial. MWRI recently funded a program to provide pumps and training sufficient to extend intermediate drainage reuse pilot programs to many sites in the Nile Delta area.

The second thrust was to examine the problem of urban wastewater being discharged into agricultural drains. Cooperative efforts in the wastewater working group (composed of representatives from MWRI's Egyptian Public Agency for

Drainage Projects [EPADP], MALR, MOHP, NOPWASD, and the Egyptian Environmental Affairs Agency [EEAA]) resulted in several recommendations regarding environmental monitoring and management, including the implementation of a prioritization approach for allocating funds to construction and rehabilitation of municipal wastewater treatment plants in a pilot area (El Salaam Canal).

The third thrust of the water quality activity was to develop policies with regard to environmental management in general within MWRI. Two major activities were undertaken: (1) revision of Law 48 of 1982 and (2) institutionalizing an environmental impact process within MWRI. Since revisions of the law require approval of the legislative branch of the national government, the revision is still in process, and while the EIA process was approved by the Minister in November 2001, its implementation has begun only recently.

Institutional Reform. Almost all of the benchmarks and measures of accomplishment are some form of institutional reform. This overarching indicator reflects MWRI's official recognition of that reform in its actions to establish offices within the Ministry, having staff participate in training, providing workshops to inform both professionals and the public, and changing the laws and regulations under which it operates. Moreover, WPRP itself has had recognizable impacts on other donors' existing efforts and plans for the future.

The institutional reforms that were undertaken by MWRI with WPRP technical assistance were usually a part of one of the other specific categories. The specific measures addressed below, however, are more reflective of the increasing capacity of MWRI to make and create policy reforms now and in the future. Within the category of institutional reforms are included changes in the legal environment, creation of administrative agencies, and training. The accomplishments of the WPRP included the following:

- A ministerial decree establishing the Central Department and the governorate directorates (Upper and Lower Egypt) of IAS [Ministerial Decree No. 143/1999; EPIQ Report No. 18].

- The IAS is now a recognized department of MWRI, and has line item budget allocation [personal communication with Dr. Essam Barakat, Head, IAS].

- Ministerial letter of transmittal of revised Law 12 to the People's Assembly, dated 12 December 2001.

- Adoption of the management transfer strategy [EPIQ Report No. 47, Appendix A].

- Adoption of the Integrated Water Management District model (EPIQ Report No. 49; Ministerial Decree No. 506/2001].

- MISD inter-ministry coordinating groups and committees [Ministerial Decree No. 469/2001; Ender (2002)].

- 6 training study tours under DT2 involving 67 individuals to the United States, Jordan, Mexico, and Turkey [EPIQ Quarterly Reports, January–March 1998 through January–March 2002].

- 3 training study tours involving 58 individuals are planned for summer 2002, and will be implemented by the WPAU [Personal communication with Engineer Sarwat Fahmy, WPAU].

- 113 workshops or training meetings on specific water management problems or approaches, involving approximately 3,000 individuals [EPIQ Quarterly Reports op. cit.].

- Established bases on which other donors developed and expanded programs [personal communications with Jan Bron, Director of the Water Boards Project, and Rob van der Weert, Acting Director of the NWRP Project].

The benchmarks for institutional reform included the following (see Table 9-1):

- Tranche III, C4. Irrigation Advisory and Support Service
- Tranche IV, C5. Revision of Law 12

The revision of Law 12 of 1982 is essential for implementation of almost all of the reforms recommended and/or piloted by WPRP. WPRP's role in developing the current revision was critical. Without its efforts to organize a working group and sponsor the group's activities, it is doubtful that the revision would have been completed in the near future. The revised Law 12 is now under consideration by the legislative branch of the GOE. Major revision of basic laws is a difficult process in any country, and final approval of the revised Law 12 is not expected immediately. However, the impact of the revision is expected to be significant in many areas, among them the creation of WUAs, the private development of facilities, stakeholder involvement in water allocation, planning, and management, cost sharing, and groundwater use.

The establishment of IAS was essential for the development of WUAs throughout Egypt. IAS will provide technical assistance and guidance to these WUAs as they are created, as well as over the long term.

Although inter-ministerial efforts concerning water policy were ongoing in the GOE prior to the beginning of WPRP, the creation of several working groups focused on specific tasks and objectives—such as rice and sugarcane policy, MISD, intermediate drainage reuse, and urban wastewater reuse—has led to a better understanding of each ministry's position and concerns. The establishment of permanent joint committees to oversee both pilot activities and their extension to other areas, such as MISD and urban wastewater treatment, provides better

recognition of the problems faced in water quantity and quality management enhanced cooperative efforts that, according to Ministry observers, were not evident in the past.

Finally, other donors, in particular the Water Boards Project and the National Water Plan Project, both funded by the Netherlands, indicated that several parts of WPRP provided the bases on which further applications and extensions were developed. Examples were the revisions to Law 12, which WPRP led; the process for development of BCWUAs, which led to the Water Board Project's extension of the BCWUAs in two areas to form special Water Boards; intermediate drainage reuse; and the application of volumetric water delivery. It was noted that implementation activities were essential for the successful extension of pilot programs and that the limited time available for WPRP reforms to be tested and applied left a substantial effort remaining to implement the policy changes.

General Assessment

As indicated above, quantitative indicators of national physical, economic, and social impacts are not likely to be available for two reasons. First, WPRP has been in place for less than 5 years, and the length of time necessary to move from problem identification to possible policy solutions to pilot projects to full implementation to measurable impacts of policy changes is, in most cases, much longer than that. Second, without a relatively intense and sophisticated monitoring program, it is difficult to discern the impacts of a given program or policy when it is just one of several focused on similar quantitative outcomes (e.g., productivity per cubic meter of water).

Some detailed and quantified data available for a baseline and impact analysis for WPRP are those from the two KAP surveys. While these surveys show that many farmers were more aware of the policies at the end of WPRP than at the beginning (short-duration rice, saving water, and communications with the local irrigation engineer), specific production and water savings data were not part of the survey. Other data are available from Monitoring, Verification and Evaluation (MVE) Unit publications and some anecdotal information from APRP and the ministries. Therefore, it is expected that the impact of policy changes will be determined primarily from more indirect measures such as ministerial decrees and pilot program expansions.

Moreover, the achievements of APRP and WPRP with respect to water policy can be evaluated from the point of view of a process of policy change rather than as specific outcomes. The process involves both the methodological approach to policy development and to policy development itself.

As an approach to policy change, APRP and WPRP have used working groups composed of various stakeholders, including GOE officials, representatives of the private sector, and technical assistance personnel. These working groups were formed to address some of the specific problems that were identified in the

original scope of work. The result was the creation of policy benchmarks that were not only of interest to the GOE but also feasible to achieve. Where multiple ministries were involved, communication was improved dramatically and ministries were able to cooperatively achieve a given objective on which all agreed. Next, WPRP assisted with implementation of pilot activities to test the agreed-upon policy changes in order to provide evidence of success, and thereby to provide the incentive and the capacity to achieve broader change among the various stakeholders. Finally, the ministries were encouraged to extend the applications of the pilots when they proved successful, often with the aid of technical assistance. This process frequently results in "small steps" and conservative approaches to policy change. However, it also leads to more frequent success, and these successes provide encouragement and incentive for the adoption of further change.

There were three focus areas for the WPRP work: participatory decision-making, water quantity management, and water quality management. The policy change process within each category demonstrates a sequence of small steps leading to the development of more significant changes in the management of the Nile system. With respect to participatory decision-making, the steps included (1) providing the legal ability to form non-IIP WUAs, (2) forming pilot BCWUAs, (3) developing a program for the transfer of management of branch canals from MWRI to the private users' BCWUA, (4) developing a pilot for management transfer, and (5) implementing an approach to public participation in management decision. All of these steps are necessary for the transfer of operation, maintenance, and management responsibilities and authority to water users, which was a major thrust of the original task order. The WPRP activity has set the stage for a broad application of this policy across Egypt.

The water quantity management policy program began under the rubric of "optimal use of water for rice and sugarcane." As the activities involving the substitution of short-duration varieties of rice for long-duration varieties and applying improved irrigation practices in sugarcane proceeded, it became obvious from the discussions between MWRI and MALR personnel on the working groups that the supply of water from MWRI was often delivered at the wrong time in the wrong amounts relative to the demands for the crops. Changes in planting dates and cropping patterns under the farmer free-choice regime coupled with irrigation deliveries based on fixed crop rotations often resulted in both a waste of water and lost crop productivity. The consensus of the working groups was that the next step in water management was "matching irrigation supply and demand." The development of cropping data collection in the field by extension agents, aggregation of the data in a computer program, electronic transfer of those data to the irrigation district, and the automatic calculation of the water requirements based on crop evapotranspiration rate provided a mechanism to optimize water delivery. It also will help WUAs, when they assume control of the canal, to be prepared to provide real-time demand data to MWRI, which can then plan releases from the High Aswan Dam as needed. Further, the use of telemetry and volumetric delivery, also currently in the pilot stages, will allow MWRI to release

the appropriate quantity of water at the appropriate time at the directorate and district levels. Moreover, the creation of integrated water districts, which take into account all available water supplies, will also enhance the ability of MWRI to supply water effectively and efficiently.

The development of a demand-driven decentralized system was another objective of the original task order. WPRP has provided the base on which such a system can develop. This base includes the establishment of BCWUAs and the implementation of pilot programs for integrated water management at the district level, for irrigation management transfer, and for public participation in decision-making.

The water quality management policy program began with an examination of irrigation water reuse from drains. The result of that examination demonstrated that more sewage and industrial wastes were found closer to the end of the drain. In fact, several official mixing stations had been shut down because water at the end of the drains was highly polluted and mixing it with fresh water would have caused serious health hazards to both farmers and consumers. Reuse of the better quality water found in the upper reaches of drains was then developed as a pilot. At the same time, conflicts among the laws indicated that Law 48 of 1982 should be revised to be consistent with both Law 12 and current water quality practices. Moreover, it was determined that construction and improvement of urban wastewater treatment plants should be prioritized based on the impact each source has on drainage water quality, rather than on a relatively arbitrary list of projects submitted by the governorates. Finally, the recognition of the need EIAs was adopted by the Ministry as an additional way to enforce general environmental protection, including preservation of water quality in the system. These activities correspond to the general objective of developing strategies for maintaining water quality in the original task order.

The attitude toward and acceptance of policy reform has dramatically changed during the span of WPRP. The establishment of WPRP was concurrent with a change in the Ministry leadership, when Dr. Mahmoud Abou Zeid was appointed Minister of Water Resources and Irrigation in 1998. WPRP provided technical assistance and many specific policy recommendations that the Minister, after evaluation, approved for adoption. A wide variety of policy changes is now being discussed, considered, and tested that were rejected out of hand in the early stages of WPRP. Among these policies are the creation of integrated water management districts, the transfer of responsibility and authority from MWRI to private organizations including user associations, cost sharing and some forms of cost recovery on the part of farmers, and the establishment of enforceable water quality controls coupled with compliance agreements. It cannot be concluded that WPRP was the sole cause of this change in perspective about water management. However, even according to Ministry officials, WPRP activities played an important role in the development and implementation of policy changes within the Ministry. The fruits of these changes will not be apparent in quantifiable

national statistics for several years, but the acceptance of change throughout MWRI is clearly evident.

In summary, the impacts of WPRP can be characterized as follows:

1. Demonstrated national impacts
   - Increased productivity of rice per unit of water
   - Establishment of MISD information transfer system
   - Establishment of IAS
   - Improved cooperation among ministries
   - Increased MWRI capacity to develop and implement policy change

2. Important achievements
   - Revisions of Law 12 and Law 48
   - Application of intermediate drainage reuse
   - Improved irrigation of sugarcane

3. Significant beginnings
   - Irrigation management transfer to water users
   - Integrated water management districts
   - Urban wastewater treatment policies
   - Environmental impact assessments

4. Remaining challenges
   - Urban wastewater treatment control
   - Adoption of revised Law 12 and revised Law 48
   - Cost sharing and/or privatization programs
   - Integrated demand-driven irrigation with volumetric releases

Conclusions and Recommendations

Based on the measures of achievement identified by EPIQ, MWRI, and USAID, WPRP has been successful, has had significant impacts on water management, and will leave a legacy of improved policy implementation in Egypt. There is ample evidence that WPRP provided, and continues to provide, a progressive MWRI administration with the foundation on which to base significant policy changes in the coming years that will achieve the kinds of national impacts identified in the task order.

While analysis of policy problems is a valuable tool, it is also clear that implementation activities are significant with respect to policy change. The MVE Unit has drawn a similar conclusion [Ender (2002)]. These activities provide models that the Ministry and its stakeholders can examine, alter, and implement as well as the incentives to do so. Support for implementation by donor agencies is a critical factor.

The lack of consistent datasets over the life of the project is a serious impediment to an evaluation such as this. Policy change is a lengthy process, and changes in

measurable national indicators of impacts are not expected to be apparent in the short term. This suggests that data collection should be a long-term activity. Monitoring programs should be established for all major activities of USAID. Monitoring is often a costly process, but without it, only anecdotal evaluations are possible. Moreover, the ability to develop and maintain a monitoring and evaluation process over the long term should be as much a part of a project's legacy as other reforms.

References

APRP–RDI. *Egypt's Sugarcane Policy and Strategy for Water Management.* Report No. 33. June 1998.

Ender, Gary. *Accomplishments in Agricultural Policy Reform In Egypt, 1997-2001.* MVE Unit - APRP, Impact Assessment Report No. 19. Abt Associates Inc. Cairo, Egypt. April 2002.

EPIQ. *Matching Irrigation Supplies and Demands: Potential Impact on Water Conservation.* Report No. 55. February 2002.

EPIQ. *Knowledge, Attitudes and Practices of Egyptian Farmers Towards Water Resources.* Report No. 54. 2001.

EPIQ. *Environmental Management at MWRI.* Report No. 51. December 2001.

EPIQ. Revised *Law 12 of 1984 on Water Resources and Its Executive Regulation.* Report No. 48. December 2001.

EPIQ. *MWRI Policy on Irrigation Management Transfer.* Report No. 47. December 2001.

EPIQ. *Matching Irrigation Supplies and Demands.* Main Report No. 45. December 2001.

EPIQ. *Water Management at the Directorate Level.* Report No. 35. December 2000.

EPIQ. Policies and Procedures for Improved Urban Wastewater Discharge and Reuse. Report No. 34. December 2000.

EPIQ. *Rice Water Use Policy Phase I: Water Monitoring and Evaluation Program.* Report No. 26. December 1999.

EPIQ. *Short-duration Rice Variety Pilot Program Results*. Report No. 22. June 1999.

EPIQ. *Institutionalization of the MPWWR Irrigation Advisory Service*. Report No. 18. June 1999.

EPIQ. *Establishment of Branch Canal Water User Associations in the Egyptian Irrigation System*. Report No. 17. June 1999.

EPIQ. *Free-Flowing Groundwater Management in the Western Desert*. Main Document. Report No. 16. June 1999.

EPIQ. Water User Association Formation Outside the Irrigation Improvement Program Area. Report No. 9. June 1998.

GreenCom III. *Knowledge, Attitudes and Practices of Egyptian Farmers.* December 1998.

Holtzman, John, Gary Ender, Adel Mostafa, Sherif Fayyad, Samar Maziad, Ezz Eldin Abdel Kader, and Nabil El Santricy. *Intermediate Effects of Policy Reform Under APRP: Progress Indicators, 1990-2001*. MVE Unit–APRP, Monitoring Report No.4. Abt Associates Inc. Cairo, Egypt. July 2002.

Holtzman, John, Abdel Rahim Ismail, Sherif Fayyad and Samar Maziad. *Rice Subsector Baseline Update II.* MVE Unit – APRP, Impact Assessment Report No. 18. Abt Associates Inc. Cairo, Egypt. February 2002.

Sugar Crops Council. *Sugar Crop Council Annual Report 2000.* 2000.

Endnote

[1] The author would like to thank all those who helped provide data, information and direction to the preparation of this report and who gave a part of their scarce time to review and comment on the drafts of the report. These include Engineer Sarawat Fahmy and Engineer Nasser Ezzat and the staff of WPAU, Dr. Ragab Abdel Azim of the MWRI Irrigation Sector, Dr. Ebrahim El Assiouti and Dr. Robert J. Cardinelli from EPIQ, Dr. Gary Ender from MVE, and Dr. Jane Gleason from RDI. Thanks are also due to Dr. Adrian Hutchins and Dr. El Sayed Mahdy for their efforts in initially developing the assessment approach. Special thanks are due to Engineer Gamil Mahmoud, Chairman of the MWRI WPRP steering committee and Mr. Andy Tczap, EPIQ WPRP team leader. Thanks are also extended to the USAID technical team, Dr. Ross Hagan and Dr. Wadie Fahim Mankarious, CTO, for their support and guidance.

10 Impacts of APRP Policy Reforms on the Horticultural Subsector

John E. Lamb and Noubia Gribi

The Agricultural Policy Reform Program (APRP) and other USAID-supported activities sought progress in both the productivity and competitiveness of Egyptian horticulture—particularly export-oriented horticulture—through a variety of policy reforms and technical, marketing, and organizational support services. APRP interventions aimed to strengthen research and extension (with special attention to horticulture), improve access for Egyptian producers to imported seed (mainly vegetables), improve the efficiency of the vegetable seed registration process, improve exporters' access to cold storage and refrigerated containers, reduce transport barriers to timely horticultural exports, strengthen policy advocacy in collaboration with associations (especially the Horticulture Export Improvement Association) and the Agricultural Commodity Council, and improve subsector participants' access to market information and GOE trade policies.

APRP achievements in the seed, technology transfer, transport, institutional development, and trade promotion areas had led to modest improvements in subsector performance by mid-2002, but policy-related impacts on horticultural exports are likely to lag and will become evident in the future. An APRP follow-on activity should concentrate on improving the policy and enabling environment for productivity and competitiveness, while explicitly recognizing and strengthening ties to technology and market development. Any future USAID-funded project would benefit from a comprehensive horticultural subsector baseline study, which would help to document more systematically improvements in subsector performance.

Under the Agricultural Production and Credit Project (APCP), the Government of Egypt (GOE) progressively removed restrictions on farmers' production and marketing decisions and brought about a gradual shift toward a more outward orientation, both of which laid the foundation for expanding non-traditional agricultural exports (NTAE). Continuing the liberalization process, the Agricultural Policy Reform Program (APRP) was undertaken to achieve greater economic growth, with the following areas related to export horticulture:

- Open and competitive agricultural markets
- Growth of exports and trade based on Egypt's comparative advantage

- Liberal conditions favoring private investment, including the privatization of GOE-owned enterprises in agriculture and agribusiness
- Increased efficiency and productivity of Egypt's Nile water system and land resources, including increased effectiveness of public investment in Government services such as market information services, research, and consumer protection

This chapter assesses the impact of APRP policy reforms on the horticultural subsector in general and on horticultural exports in particular. It documents successes in relieving key constraints, whether through the achievement of particular benchmarks or by other means, and discusses subsector participants' perceptions of the degree of improvement brought about by policy reform as well as needed future reforms.

This impact assessment involved a thorough literature review followed by structured interviews with key informants. The literature review covered outputs of APRP, the Agricultural Technology Utilization and Transfer (ATUT) project, the Agriculture-Led Export Business (ALEB) project, and the U.S. Department of Agriculture (USDA)–supported projects such as AgLink and the Farmer-to-Farmer Program. Relevant GOE, International Food Policy Research Institute (IFPRI), World Bank, International Monetary Fund (IMF), World Trade Organization (WTO), and European Union (EU) publications were scanned for relevant data and information. Finally, more than 50 semi-structured interviews were held with a cross-section of: (1) direct participants in the supply chain (i.e., profit-seeking individuals or entities who grow, process, or market horticultural products); (2) indirect participants in the supply chain (i.e., profit-seeking individuals or entities who provide goods or services that support the process); (3) non-economic actors such as development projects, donor agencies, and GOE agencies.

APRP Benchmarks Relevant to Horticulture

APRP Horticultural Development Strategy. APRP's highest level categorization of policy reform benchmarks was based on goals rather than on subsectors, commodity groups, or individual commodities. In that context APRP never had an *explicit* strategy for horticulture in general, nor for horticultural export development in particular. Nevertheless, as horticultural exports began to gather momentum and official support, policy benchmarks specific to horticulture were developed, and cross-cutting benchmarks relevant to horticultural exports also assumed greater importance.

APRP's *implicit* strategy for horticulture included the following elements:

- Strengthening research and extension (in support of horticultural production for export)

- Improving access for Egyptian producers to imported seed (mainly vegetables) and improving the efficiency of the vegetable seed registration process
- Promoting contract farming, where horticultural exporters contract with smallholders
- Improving access for exporters to cold storage by allowing private cold storage in airports and to refrigerated containers by reducing the refrigerated truck tariff
- Reducing transport barriers to timely horticultural exports by enhancing competition in air cargo
- Strengthening policy advocacy in collaboration with associations (e.g., the Horticulture Export Improvement Association [HEIA]) and the Agricultural Commodity Council (ACC)

Generally speaking, APRP-supported reforms were oriented much more toward input than output markets, and more toward the alleviation of perceived constraints than toward the creation of new opportunities (e.g., through improved market access via trade negotiations).

APRP Benchmarks Relevant to Horticultural Subsector. To better track and understand progress toward agricultural reform, the MVE Unit recategorized APRP policy benchmarks into 22 different "thrusts," some of them commodity-specific, others more thematic in nature. One such thrust was entitled "horticulture." However, since this assessment looks specifically at horticultural exports, which involves a supply chain that extends from Egyptian farms to foreign consumers, anything that APRP might have affected in the areas of inputs, technology, production, post-harvest handling, transport, and marketing is potentially relevant. Some of these economic activities spill over into other MVE Unit–defined policy thrusts such as "seed," "government services-research/extension," "government services-information," "subsidies and taxes," "farmer cost-sharing," and "institutional development-private."

A total of 21 benchmarks relevant to horticulture were identified, all of them created for tranches III, IV, and V. Since some benchmarks were complex or long enough to merit multiple indicators, there were actually 35 associated verification indicators. These benchmarks can be grouped as follows:

- Private sector research and extension (2; largely accomplished)
- Promotion of agricultural commodity associations and organizations (3; accomplished)
- Pesticide licensing and registration (2; largely accomplished)
- Vegetable seed laws and regulations (3; partially accomplished)
- Plant breeders' rights (1; largely accomplished)
- Horticultural stock renewal and modernization (1; accomplished)
- Truck transport regulations and refrigerated containers (2; partially accomplished)
- Air and sea freight transport regulations (3; partially accomplished)

- Airport terminal cold storage (1; partially accomplished)
- GOE transparency in formulating trade policies and regulations, as well as information about trade agreements and trade flows/values (2; accomplished)
- Policy and contract template for contract farming (1, partially accomplished)

APRP Accomplishments with Respect to Relevant Benchmarks. MVE Unit research determined that full accomplishment was "exceeded" for 4 of the 35 verification indicators, that 19 indicators were "accomplished," that 9 were "partially accomplished," and that 3 were "not accomplished." That means that 11% of the indicators were exceeded, 54% were satisfied fully, 26% were partially satisfied, and 9% were not accomplished. Looking at it another way, benchmarks were met or surpassed in 23 of 35 instances (i.e., about 2 of every 3). "No progress" was made in about 1 of every 10 cases. Another 4 benchmarks relevant to horticulture would have been classified as "accomplished" had they been rated within a year of the closing of each tranche, raising the apparent success rate to 77%, based on 27 out of 35 indicators.

Overview of Horticultural Subsector

Historical Growth Trends. According to Ministry of Agriculture and Land Reclamation (MALR) figures, between 1965 and 1995 the area cultivated (i.e., not counting multiple crop cycles in a given year) with vegetables increased 106% from 304,000 to 627,000 feddans, while the area for fruits increased 487% from 178,000 to 1.045 million feddans (MALR, 2000). Of the estimated 13.03 million feddans harvested (i.e., accounting for multiple cycles) in 1998, just under 20% involved horticultural crops. Vegetables predominated, at about 1.67 million feddans (partly because for many vegetables the same area can produce 2–3 crop cycles), but fruits were almost as important, at 1.06 million feddans (DAI/Abt Associates, 2002). There were also very small but expanding areas devoted to herbs, spices, medicinals, aromatics, and ornamentals. Since the cultivated area for all crops rose just 37% between 1965 and 1995, and the cropped area rose just 32%, a significant portion of this growth in horticulture came from displacement of other crops.

FAOSTAT figures show that the overall area for edible horticultural crops seems to have increased 37% during the 1991–2001 period. It is likely that this growth reflects both an increase in farming area devoted to horticultural crops and an increase in cropping intensity, both occurring in response to perceived profitability as compared with cereals or other alternatives. FAOSTAT data also show a 47% increase in overall production of the most important edible horticultural crops between 1991 and 2001. The top three categories in 1991 (tomatoes, potatoes, and oranges) were also the top three in 2001.

The data also indicate that horticulture is gaining in terms of contribution to sectoral output. This is not surprising because horticultural crops typically generate a higher gross value/feddan and value-added/feddan than other crops.

The Central Agency for Public Mobilization and Statistics (CAPMAS) data on the total value of crop production in current LE terms between 1982 and 1999 show a dramatic increase in the share of fruits (from 11% to 22%), a modest increase for ornamentals/medicinal crops (from 0.4% to 1.1%), and a slight decrease for vegetables (from 17.9% to 17.6%) (DAI/Abt Associates, 2002). Although the share of value for vegetables peaked at 23% in 1987, planting reductions in the late 1980s seem to indicate that for certain years the relative profitability of other crops provided incentives to switch out of vegetables.

Table 10-1 summarizes annual export volume and value throughout the 1990s. In an increasingly global marketplace it was reasonable to expect that the upward trend in available supply of fresh horticultural products would have led to corresponding increases in exports, yet in the aggregate that did not happen for Egypt. In fact, the total volume of fresh produce exports for 2000 was equivalent to just 2.7% of that year's production volume.

There appear to be various explanations. First, Egypt did experience fairly rapid population growth (just over 2%) in the 1990s, which would lead to some increase in domestic consumption even if all else remained the same. Second, increases in per capita gross domestic product for an economy at Egypt's stage of evolution generally lead to increased consumption of fruits and vegetables because fresh produce has a relatively high-income elasticity of demand. Unfortunately, however, the main explanation in this instance seems to be a third factor, which consisted of two external shocks that adversely affected two traditional horticultural export crops: citrus and potatoes.

The first of these external shocks, the collapse of the Soviet Union, occurred in 1991–1992, and led to the rapid loss of Egypt's largest horticultural export market. Although a downward trend in horticultural exports to the Soviet Union had actually started in the late 1980s, the decade of the 1990s opened with Egypt exporting about 145,000 metric tons (mt) of fresh oranges (with a value of $49 million) to the Soviet Union,. By 1993, however, exports had fallen to a new equilibrium level of about 56,000 mt, worth only $17 million. In addition, the Saudi Arabian market, a strong market for Egypt in the early 1990s, contracted suddenly as well, and exports to Saudi Arabia at the end of the decade were only 40% of the exports at the start. Facing a worldwide glut of citrus, Egyptian exports have still not recovered.

The main export market for Egyptian potatoes at the start of the 1990s was the European Union (EU), which then absorbed more than 75% of Egypt's fresh potato exports. Ten years later, however, EU countries accounted for only 63% of Egyptian potato exports. Worse still, total Egyptian exports of fresh potatoes decreased 17% between 1990 and 2000, so the 63% share was calculated from a smaller total volume than the 75%. The basic problem was potato brown rot. Although it has existed for many years in both Egypt and southern Europe, generally it was kept under control until a major crisis occurred in the European potato industry in the mid-1990s, the effects of which hurt Egypt severely.

Table 10-1. EGYPTIAN EXPORTS OF FRESH FRUITS AND VEGETABLES

1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Fruit + Vegetables – 05 Exports – Quantity (metric tons)									
487,772	519,768	509,413	416,997	711,371	696,013	507,334	721,288	539,252	444,242
Fruit + Vegetables – 05 Exports – Value (1000$)									
161,579	162,238	141,067	119,918	206,799	174,123	140,453	184,326	134,465	122,036

Source: FAOSTAT

Meanwhile, the Egyptian processed food industry began to show some dynamism in terms of export performance. In the aggregate, a 155% increase in the export volume of processed foods occurred between 1996 and 2001. Subsumed within that was a 202% increase in export volume for products derived from fruits and vegetables. While the latter accounted for about 75% of total processed food exports in 1996, the share had risen to almost 90% by 2001.

The overall value of processed food exports increased 83%, while that of products derived from fruits and vegetables increased 90%. That means that unit prices for all categories decreased on the average, but unit prices for the horticulture-based products generally decreased more than the others. This is consistent with conventional wisdom about rising global competition in horticulture-based food products and/or with the need to lower prices to penetrate new markets and/or emphasis on lower-priced items. Devaluation of the Egyptian Pound since 2000 has spurred export growth for processed food, while on the other hand, there has been severe price pressure as Egyptian processors try to expand their markets. The need to become more competitive has become evident even before Egypt's protective tariffs on imports are scheduled to decrease in 2005 under WTO agreements.

Product Mix. Egypt produces numerous horticultural crops, both edible and ornamental. There are more than 40 commercially traded fruit and vegetable types, as well as dozens of cut flowers, ornamental plants, foliage crops, medicinal plants, herbs, and spices.

For the domestic market, the most important edible horticultural products include tomatoes, potatoes, oranges, watermelons, onions, mandarins, dates, dry beans, mangos, garlic, and sweet potatoes. Lettuce and table grapes are probably rising in share as incomes rise and they become more available. For export, the most important edible items include potatoes, oranges, table grapes, strawberries, bobby beans, fine beans, melons, mangos, and both storage and green onions.

Egypt's principal spices, herbs, and medicinals include anise, fenugreek, sweet basil, black cumin, licorice, fennel seed, coriander, dill, and peppermint. Egypt is also renowned for its herbal teas, especially chamomile, hibiscus (*karkade*), and rose

geranium. In the case of ornamental horticultural products, hard data are lacking, but local nurseries offer many different flowers (e.g., roses, spray carnations, gypsophila, eustoma, and limonium latifollum) and also many ornamental plants (e.g., hibiscus, philodendron, schlefflera, ficus, impatiens, euonymus, dieffenbachia, dracaena, begonia, calathea, and cane plants).

Non-Traditional Crops. In the horticultural export arena, support from the United States Agency for International Development (USAID) has actually been channeled much more directly through the Agricultural Technology and Utilization (ATUT) Project (Litschauer, 2001), which in turn was closely linked to MALR support for the horticultural subsector. Because APRP always considered ATUT advice when designing policy reforms that affect export horticulture, and also worked with ATUT's principal client HEIA in trying to implement them, it is important to understand the scope of ATUT involvement.

ATUT was set up essentially to give horticultural exports a boost through a flexible mix of technical assistance, training, and financial support. After a scoping down exercise that considered both domestic supply and international market conditions, a long list ("Level I Crops") of promising crop-market combinations was created, which included artichokes, cherry tomatoes, fine green beans, green onions, mangos, strawberries, table grapes, and cut flowers. However, as the project progressed and resource limitations became evident, efforts were focused on just two of the Level I Crops: table grapes and strawberries.

Production of table grapes and strawberries reportedly has increased in the last 5 years: 50.5% (23,200 mt) for strawberries and 28% (192,000 mt) for table grapes, and exports of these two leading NTAE crops have begun to gather momentum. Between 1997 and 2000, strawberry exports increased 119% by volume, while exports of table grapes increased 194%. In neither instance do exports yet represent a significant percentage of overall domestic production. For 2000, the latest year for which both production and export data are available, strawberry exports represented only 5% of Egyptian production, while table grape exports represented only 0.5%.

In 1999/2000 ATUT began devoting attention to another two export crops: melons and fine green beans. In the case of melons, data from the Food and Agriculture Organization of the United Nations (FAO) indicate that Egypt harvested some 35,000 hectares of cantaloupe and other melons in 2000, but these data are not particularly useful because most of the harvested melons were not the types used for export (especially Galia for most of the EU, Charentais for France). Since ATUT reports that its client growers produced 17% of the 1,992 mt exported from the 1999/2000 season on 351 feddans of land, and they presumably got higher exportable yields using newer production systems, one can assume that there were no more than 2,065 feddans planted to Galia or Charentais melons, and probably 20% less than that.

In the case of green beans, FAOSTAT reports that in 1999 there were 19,348 hectares (46,067 feddans) harvested in Egypt. That same year, ATUT reported

serving growers who controlled about 15,000 feddans (i.e., about 32.5% of total area planted), but only 10,600 feddans (23% of the area) changed production systems under ATUT leadership. They in turn reportedly exported 16,400 mt of green beans, which was about 80% of the total 20,439 mt exported that year.

Recapping these data on ATUT's second-stage NTAE crop choices, Egypt exported 1,992 mt of melons during the 1999/2000 season, plus 20,439 mt of green beans. Here again, these numbers represent only a small percentage of domestic production for this product category, only 0.4% (1,992 mt/56,000 mt) for melons and about 10.2% (20,439 mt/200,021 mt) for green beans.

Small Farmer Participation. Small farmers participate widely in production of horticultural crops in Egypt. Assuming an average of 1–1.5 feddans/farmer, the 1.045 million feddans cultivated with fruits and vegetables would directly involve between 700,000 and 1 million small farmers. Since the cropping intensity for vegetables is at least 2, the latter figure is more likely than the former for any given agricultural year. Yet the extent of participation by small farmers in *export-oriented* horticulture appears to be limited, even in traditional horticulture crops.

Small farmer participation for the non-traditional horticultural export crops targeted by ATUT has been even more limited. In the case of table grapes, for example, ATUT assisted 27 producers in 2000, and their collective production on 3,685 feddans accounted for 78% of all exports by Egypt. In the case of fresh strawberries, ATUT assisted 15 producers, and their output on 835 feddans amounted to 96% of exports. ATUT helped 18 melon producers, whose collective production on 351 feddans accounted for 17% of all exports, and 18 green bean producers, whose output on 15,000 feddans amounted to 80% of exports.

Associations Supporting Horticultural Industry. Various organizations operate within, support, or affect the horticultural industry in Egypt.

Horticultural Export Improvement Association. HEIA was created in 1996 "to increase exports of fresh and processed produce through continuous improvement of quality production, marketing, policy advocacy, training and management aspects assuring Egypt's international quality reputation and raising agriculture labor force standards." Although formed with considerable assistance delivered through ATUT, HEIA is a member-driven private association. As of this writing, HEIA claims a membership of 155: 121 full members, 18 associate members, and 1 corporate member. According to its literature, HEIA membership can be disaggregated as follows: growers–40%, grower/exporters–33%, exporters–11%, suppliers–12%, and service providers–4%. HEIA members reportedly grow and handle the vast majority of Egypt's fresh fruit and vegetable exports.

As often happens in the evolution of the NTAE subsector, the initial membership was composed of the larger, well-capitalized exporters and grower-shippers, but over time it has expanded to include smaller exporters, and more recently, some groups of

small and medium growers. In terms of area planted, HEIA reports that 14% of its members plant less than 50 feddans, 45% plant 50–200 feddans, 11% plant 200–500 feddans, 13% plant 500–1,000 feddans, and 17% plant more than 1,000 feddans.

HEIA's stated objectives are to (1) achieve sustained growth in horticultural exports, (2) widen Egypt's exporting base of horticultural products, (3) diversify export products and services, (4) improve the presence of Egyptian horticultural products abroad.

The HEIA service menu originally focused on (1) networking assistance, (2) advocacy, (3) horticultural community development (which includes a gender program, establishment of a perishables terminal at Cairo Airport, and vocational education), and (4) information dissemination. New programs include a pilot technology transfer program that includes some important hands-on training for MALR extension agents at the farms of the larger HEIA members, as well as membership training and a nascent quality assurance service.

HEIA has organized itself by commodity groupings (i.e., councils for table grapes, strawberries, melons, nurseries, green beans, and cut flowers). The councils frequently invite service providers and suppliers—whether or not they are HEIA members—to their meetings, with the objective of collectively negotiating lower prices and improved quality for services and inputs. This approach has succeeded in a number of instances, such as collective purchasing of cartons by the Cut Flower Council, importation of new varieties at lower prices by the Mango Council, collective buying of insecticides and fertilizers by several other councils, and collective bargaining for freight rates with transportation companies.

Egyptian Agribusiness Association (EAGA). EAGA seeks to provide a similar set of services to enhance the competitiveness of the food industry. Core founders are directly involved in the food processing business, but the membership also includes some service companies involved in packaging and shipping, and a few growers (i.e., owners of large farms that are currently supplying food processing companies or exporting fresh produce themselves). However, EAGA has only about 40 members so far, and the association has not yet initiated any significant, sustainable efforts to provide services to members or to recruit more members. EAGA appears to be relying on its own staff and on ALEB technical advisors to get the association off the ground. As of this writing, no direct donor funding has been obtained, which leaves EAGA at a significant disadvantage compared to Expo-Link and HEIA. This in turn militates against further integration of the fresh and processed segments of the Egyptian horticultural subsector.

Egyptian Seed Association (ESAS). ESAS was formed in 1998 with APRP support to help achieve a more integrated and efficient, privately led seed industry by representing, protecting, and serving the interests of its members, which include seed companies, plant breeders, multiplication and production companies, distributors, and traders.

ESAS was on the forefront of reasonably successful efforts to facilitate, accelerate, and lower the cost of vegetable seed importation and registration, to guarantee plant breeders' rights, to get the Seed Law of 1997 enacted, and to get intellectual property rights legislation through the Parliament. The latter passed finally in May 2002.

Other Relevant Entities. Other member-driven associations that provide less direct support to horticulture or that are just getting started include Crop-Life Egypt, the Egyptian Association of Traders of Seeds and Agricultural Pesticides (EATSAP), and the Egyptian Cold Chain Association (ECCA).

The most relevant GOE-supported entities include the ACC, which provides a useful forum for public-private dialogue, and Expo-Link, which provides trade information, trade statistics, representational services at trade fairs, and some generic promotion of Egypt as an exporter of agricultural products.

Industry Perceptions of APRP Achievements

To obtain a representative set of opinions about the impact of APRP-supported policy reforms on the horticultural sector, the authors conducted about 50 interviews (counting multiple participants separately), ranging as far north as Alexandria and as far south as Luxor. Interviewees included (1) small, medium, and large farmers, (2) medium and larger processors and exporters, (3) suppliers of inputs such as seeds and agrochemicals, (4) suppliers of services such as technical assistance, training, cold storage, refrigerated transport, customs clearance, freight forwarding, and air and sea transport, (5) development projects, (6) government agencies, and (7) associations.

General Observations. Responses varied depending on the location and role of the person interviewed and on his/her degree of familiarity with relevant development programs in Egypt. Not surprisingly, those who worked in Cairo were more familiar with APRP, ATUT and ALEB than those whose base of operations was farther away. Respondents whose main activity was closer to farming tended to know more about ATUT, whereas those whose main activity was processing tended to know more about ALEB. Those involved in exporting tended to know more about APRP. Individuals who had been consulted in the definition of APRP benchmarks tended to know more about progress indicators and tended to give APRP more credit. Relatively more credit was given to donor-supported activities than to GOE-supported activities. Last, respondents were sometimes not sure which donor-supported project had taken the lead in any given activity or intervention.

Positive Responses. Respondents most often cited technical assistance and training in production, post-harvest handling, and to a lesser extent marketing as a positive contribution from USAID-supported projects in the horticultural subsector. Where attribution for direct technical assistance was made, it was most often given to ATUT rather than to APRP.

It should be noted that a separate status assessment (Dale, 2001) and a later impact assessment (Brinkerhoff et al., 2002) both found significant progress and recognition for APRP-supported work in market-oriented, demand-driven approaches to horticultural technology transfer that were pilot-tested in Ismaileya, Luxor, Giza, Beni Suef, and Beheira. These studies also report that, in collaboration with MALR and HEIA, APRP made progress in these areas at improving export infrastructure such as packing houses and cooling units, at proposing model contracts for contract farming, and at facilitating produce sourcing/marketing arrangements between groups of small farmers and traders or exporters.

Transport issues were the second area of intervention most often cited by interviewees. Obtaining approval for and moving forward with the construction of the airport cold store was the most common example. Informants also mentioned the increased availability of reefer containers and generator sets, although there were still complaints about cost and availability. Reduced dwell time for reefer containers was mentioned by some respondents, but was generally not considered very significant. Dwell time seems to affect incoming more than outgoing containers, and apparently long dwell times often reflect either a conscious choice of the interested party to leave the container in port as free storage or the importer's inability to get documentation and bank guarantees lined up. Respondents tended to give APRP some of the credit for these changes, but usually mentioned HEIA or ATUT first.

The emergence of private agribusiness associations, especially HEIA but also ESAS, was also cited as a positive result of USAID assistance, with due recognition of private sector impetus as well. Those who commented on the service menu tended to note that the associations were relatively young and therefore not yet as helpful as they could be.

Finally, some respondents noted that GOE-supported and connected entities, especially Expo-Link and the ACC, were also making a solid contribution to agricultural and horticultural export development, particularly because of their usefulness in stimulating and guiding dialogue between the private sector and Government agencies and decision-makers.

Negative Responses. The most common negative response concerned customs rules and administration, which were seen as a drain on resources in terms of time, cost, red tape, and uncertainty, with respect to both the import of necessary inputs and equipment and the export of the final product. One respondent argued that the system was "set up to fail" because it provides incentives for officials and the customs service as a whole to maximize both legally sanctioned and other rents, all without any administrative rules and regulations to guide the process and make it transparent. Customs duties were sometimes cited as well, especially the persistence of high tariffs on new trucks and tires used to transport goods destined for export. In the view of some interviewees, this contributes to a high cost structure that forces Egyptian truckers to overload the roads and also provides an opening for Jordanian and Syrian truckers to undercut Egyptian carriers on back-hauls made once they have dropped off incoming shipments of goods.

Many respondents believe that the Egyptian cost structure for horticulture is still uncompetitive in general when inputs, transaction costs, domestic and international logistics, and interest rates are all factored into the equation.

Speaking more generally, various respondents expressed the opinion that the GOE does not help Egypt's horticultural subsector as much as the governments of competing countries help their horticultural subsectors. For example, Morocco, Jordan, and Chile all have relaxed restrictions and/or lowered duties on imported capital goods, implemented duty drawback schemes and export subsidies, and offered incentives to invest or engage in corporate farming.

General Findings

Combining the results of the data analysis, literature review, and field interviews, the authors reached the following conclusions on export horticulture in Egypt and APRP's involvement with the horticultural subsector:

- Horticulture in Egypt is an activity of great importance both to economic and agricultural sector growth because it utilizes a significant and increasing portion of arable land, provides employment to millions of Egyptians, offers considerable room for expansion in both export and domestic markets, and can generate substantial foreign exchange and income.

- The advantages of horticulture over field crops is that horticulture includes a generally higher return relative to land, to water, and to labor, and provides greater opportunities for differentiation and value-added than field crops.

- Despite these widely recognized benefits, APRP did not assign horticulture as high a priority as it did other subsectors (such as cotton, rice, and seeds) because the policy environment for the latter items was perceived as more highly distorted and, therefore, more important to address in APRP's early years.

- As a result, APRP never had an explicit strategy for horticulture in general, much less for horticultural export development.

- Nevertheless, over time an implicit strategy did emerge from a series of analyses, stakeholder meetings, and pilot interventions.

- While there were no benchmarks that specifically targeted export horticulture**,** four benchmarks did mention fruits and vegetables.

- APRP's implicit strategy for horticultural subsector development was evident in a total of 9 benchmarks of moderate relevance, plus another 12 that had some potential impact on horticulture.

- APRP interventions relating to the 21 relevant benchmarks were virtually all of a cross-cutting nature, not specific to any particular horticultural crop, which left out potentially important interventions needed by specific supply chains such as citrus, potatoes, and green beans.

- Consistent with APRP's overall approach to policy reform, the relevant interventions concentrated more on relieving perceived constraints than on creating opportunities, which was the focal point of ATUT and ALEB.

- The 21 benchmarks relevant to the horticultural subsector were associated with 35 verification indicators, two-thirds of which were accomplished on time and three-fourths of which were accomplished either on time or within a year after the specified deadline.

- Taken together, achievement of the benchmarks produced certain noteworthy results:

  - For the first time, licensing of private operators to act as shipping agents or to operate storage, warehouse, and container handling facilities
  - Creation and introduction of contract templates for contract farming
  - Simplified entry of refrigerated containers, including use of bank guarantees for temporary use of refrigerated containers
  - Promulgation of regulations regarding plant breeders' rights
  - Coordinated inspections of incoming containers at the port
  - Updating of pesticide legislation and coordinated protocols for registration and labeling
  - Promising pilot tests of new approaches to technology transfer
  - GOE affirmation and ratification of the role of private associations in export promotion
  - Establishment and funding of the ACC (including subcommittees for horticultural crops)
  - Establishment of a new and improved system for farm income statistics
  - Approval to build a new cold storage facility at Cairo Airport
  - Simplification and shortening of the process for importing new vegetable seeds
  - Introduction of new fruit and tree crop planting materials
  - Some success in disseminating trade statistics over the Internet
  - Official GOE support for transparency in trade data, trade agreements, and export-related rulemaking.

- These accomplishments and results notwithstanding, *APRP has not yet had a measurable aggregate impact on Egypt's horticultural exports, for several reasons:* (a) a late start in efforts in the horticultural subsector, (b) lack of an explicit strategy, and (c) not approaching horticulture as a vertical supply chain.

- Yet APRP work in the seed, technology transfer, transport, institutional development, and trade promotion areas was certainly helpful, and was perceived

positively by many people interviewed, *so it is likely that some delayed impacts on horticultural exports will become evident in future years. They will not, however, be easily attributable to APRP because of collaboration with other development projects, with HEIA, and with other associations.*

Structure, Conduct, and Performance of Horticultural Export Industry

The final assessment of progress in achieving horticulture-related benchmarks did not attempt a S,C,P analysis of the industry. We encourage any follow-up project to APRP to carry out an in-depth baseline study within its first year. Such an early baseline study will allow for better assessment of project impacts over the life of the project.

From the analysis above, it is clear that horticultural production of commodities destined for export is dominated by larger producers, some of whom are also exporters. HEIA membership information suggests that horticultural export is competitive, however, even in commodities that tend to be limited to larger producers and producer-exporters, such as floriculture, strawberries, and table grapes.

In providing future support to the horticultural subsector, USAID and other donors need to provide support to producers, traders, and exporters working with a larger number of crops, not just a limited number of the most promising export commodities. Encouraging as competitive a horticultural export industry as possible will lead to more broad-based development of the subsector.

Recommendations for Future Horticultural Subsector Interventions

Building on the experiences described above, while taking into account best practices noted in other successful horticultural development programs around the world, the authors offer the following recommendations for future projects:

- Policy interventions should not be seen as the cause of growth in horticultural exports, but rather a contributing factor to growth organically driven by private enterprise.
- The role of policy reform in horticulture should be not only to alleviate policy and regulatory constraints but also to create new opportunities through enhanced market access.
- If there is a follow-on activity to APRP, it should definitely include horticulture because of the importance of the subsector to Egyptian agriculture in general, and to rural employment and incomes in particular.
- The scope of a follow-on activity that involves horticulture, however, should cover the entire horticulture subsector, not just export horticulture, because (1) exports are likely to remain a fairly small percentage of overall volume marketed, (2) upgrading domestic production and marketing solidifies the

foundation for exporting, and (3) fresh produce feeds into and complements processed produce.

- A follow-on project should concentrate on improving the policy and enabling environment for productivity and competitiveness while recognizing ties to technology and market development.
- A follow-on project should start its activities in this subsector by catalyzing and facilitating the formulation of a long-range strategy and plan for horticultural subsector development (with HEIA, ESAS, EAGA, the implementers of ALEB and AERI, and all other stakeholders).
- Policy and institutional issues that need to be addressed include:
  1. Need to improve trade-related policy dialogue between cognizant public entities and private organizations
  2. Maintenance of a realistic real exchange rate
  3. Continued simplification and greater transparency in customs administration
  4. Final enactment and full implementation of the Seed Law of 1997, hopefully leading to greater willingness by foreign seed suppliers to make the latest cultivars for crops like strawberries, grapes, and cut flowers available promptly to Egyptian growers.
  5. Improvements in the use of grades and standards, especially sorting by size, quality, and condition
  6. Removal of disincentives to use domestic truckers for carrying produce destined for export
  7. Innovations in marketing institutions and practices that improve price discovery and transparency, smooth out supply peaks, lower price volatility, reduce marketing losses, and increase leverage of smallholders and their groups
  8. Greater frequency, accuracy, and diffusion of relevant statistics and other information on matters of production, marketing, and trade
  9. Parity in General Sales Tax treatment for produce destined for export and for the domestic market

References

Brinkerhoff, Derick et al. *The Impact of APRP on the Roles of the Public and Private Sectors in Egyptian Agriculture.* MVE Unit–APRP, Impact Assessment Report No. 20. Abt Associates Inc. Cairo, Egypt. 2002.

CAPMAS. *Statistical Yearbook.* Various issues. Cairo, Egypt.

Dale, Heather. *Status Assessment of Agricultural Research and Extension Reform.* APRP/RDI Unit. Cairo, Egypt. 2001.

DAI/Abt Associates Inc. *Assessment of the Competitiveness of Egyptian Agriculture.* RAISE IQC. Bethesda, Maryland. 2002.

Food and Agriculture Organization of the United Nations. FAOSTAT, FAO Statistical Databases, "Agriculture." http://apps.fao.org/.

Lamb, John and Noubia Gribi. *The Impacts of Horticultural Exports of Policy Reforms under APRP.* MVE Unit–APRP, Impact Assessment Report No. 22. Abt Associates Inc. Cairo, Egypt. 2002.

Litschauer, John. *An Evaluation of the Agricultural Technology Utilization and Transfer Project.* RONCO, Cairo, Egypt. 2001.

MALR. *The Strategy of Agricultural Development until the Year 2017.* Cairo, Egypt. 2000.

Pietrus, Joseph. *Horticulture Subsector Policy and Regulatory Constraints*. APRP–RDI Unit Report No. 57. Cairo, Egypt. 1999.

11 Changes in Structure, Conduct, and Performance of the Wheat Subsector in Egypt during APRP

Roger J. Poulin, Abla M. Abdel-Latif, and John S. Holtzman

Applying structure, conduct, and performance analysis to the wheat subsector in Egypt revealed significant insights. This is a clear case where GOE segmentation of the wheat market into three distinct and independent channels has led to predictable performance outcomes and, to a large extent, pre-determined that subsector performance would be sub-optimal. Strict GOE rules and controls are required to keep the channels distinct and to keep the flows of domestic and imported wheat and wheat flour separate. Fixed prices and (low) fixed milling fees in the 82-percent flour channel have led to unprofitable operation of 82-percent flour mills, significant leakage of wheat from the 82-percent flour to the 72-percent flour channel, and the likely closure of nearly all private sector stone mills producing 82-percent flour. This last development is due in large part to the GOE decree mandating that all stone mills convert to cylinder milling technology, which has significant investment costs and is unprofitable (for milling 82-percent flour) at current fixed prices and margins. One measure designed to prevent leakage of 82-percent flour that has succeeded is the mixing at several mills of wheat and maize flour used to bake subsidized baladi bread.

Egypt is the world's largest wheat consumer per capita, at 184 kilograms in 2000. In 2000, wheat consumption totaled 12.2 million tons, of which 5.8 million tons were imported, making Egypt the world's second largest wheat importer. Egypt's self-sufficiency ratio in wheat consumption is politically important, as domestic production supplied 52.5 percent of estimated consumption in 2000. The Government of Egypt (GOE) devotes a great deal of attention and media coverage to the size of the Egyptian wheat crop, the volume of domestic wheat deliveries to the General Authority for Supply Commodities (GASC), and how both indicators, as well as the national wheat self-sufficiency ratio, have improved over time.

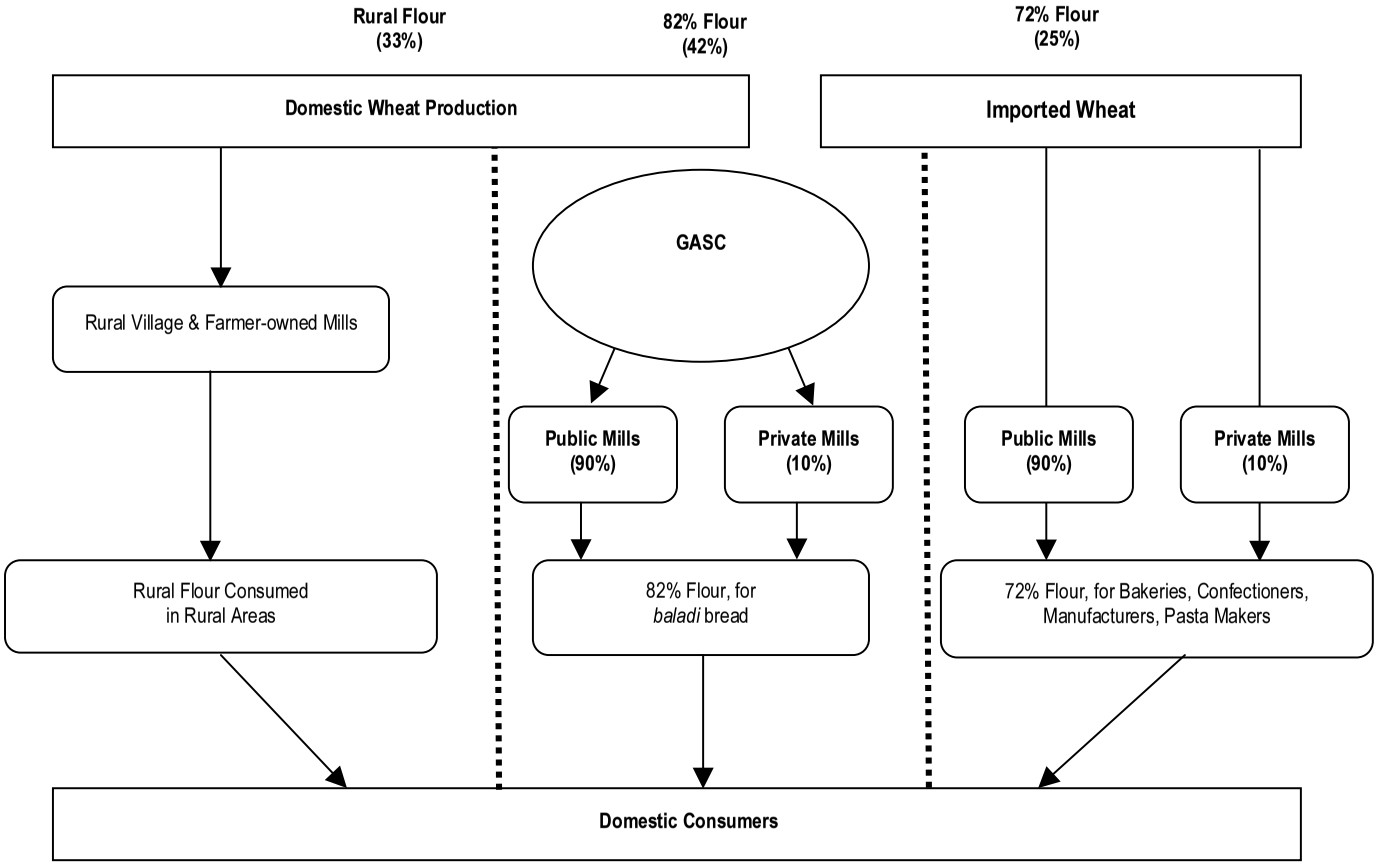
There are 10 APRP benchmarks directly or indirectly related to the wheat subsector. One was aimed at reducing market restrictions, another addressed increasing private sector participation in wheat flour milling, and the other eight dealt with various aspects of the wheat flour subsidy program. Many of the benchmarks were accomplished, but efforts to change the wheat flour/bread subsidy system ultimately did not succeed. It appears that some GOE officials believe that changing food subsidies could harm the poor and potentially be politically de-stabilizing, despite needed efficiency gains. Note, however, that mixing of wheat and maize flour at a couple mills has begun successfully and appears to be expanding more quickly in order to reduce leakages of 82-percent flour into the 72-percent flour channel.

While examining and addressing food subsidy issues, the International Food Policy Research Institute (IFPRI) undertook a nationally representative sample survey (Egypt Integrated Household Survey [EIHS]) of 2,700 households that focused on food purchases and consumption patterns and that was used to establish proxies for measuring income. IFPRI also carried out near-censuses of wheat millers and traders in the course of its work on the wheat subsector.[1] This rigorous empirical work, combined with the Monitoring, Verification and Evaluation (MVE) Unit's comprehensive wheat subsector baseline (see Tyner et al., 1998) and final impact assessment studies, provides an excellent base upon which to build future research, analysis, and policy reform efforts. This chapter summarizes key findings from an end-of-project, in-depth examination of changes in the wheat subsector from 1997 to 2001 (Poulin and Abdel-Latif, 2002) and recommends policy actions to improve subsector performance.

Structure of Wheat Subsector

The structure of the wheat subsector in Egypt is presented in Figure 11-1. The subsector is divided into three market segments, or channels: the subsidized flour market, the 72-percent flour market, and the rural market. The subsidized flour market is the largest, accounting for 42 percent of total wheat consumption (about 5 million metric tons [mt] in 2000). This segment is totally controlled by the Government and is isolated from almost all market forces. GASC imports wheat on the world market or purchases domestic wheat at a fixed producer price and contracts with mills to produce 82-percent extraction flour. Ninety percent of this flour is produced by public sector mills, which in 2001 accounted for 85 percent of total milling capacity. GASC takes delivery of the flour from the mills and distributes it to nearly 11,000 licensed bakeries and over 20,000 retail flour warehouses, both of which sell the subsidized *baladi* bread and flour at prices fixed by the Government (LE 0.55 per kilogram).

The second market segment, the 72-percent flour market, accounts for 25 percent of total wheat consumption (about 3 million mt in 2000). This flour is used for high-quality breads, pastries, pasta, and other manufactured wheat products. This market segment is officially unregulated, as mills are unrestricted in the



Note: The percentages on the top row indicate the proportion of national consumption of each type of flour.

Figure 11-1. WHEAT SUBSECTOR MAP, 2000

quantity or source of the imports. Nor do the mills face any restrictions on the quantities they can mill, the prices they can charge, or to whom they can sell. There are also no restrictions on the building of new mills or the expansion of existing ones. However, this segment is subject to certain restrictions that are necessary to keep the subsidized flour market isolated. The specific restrictions are: 72-percent flour can be produced only from imported wheat; mills are only allowed to produce 72-percent or lower extraction flour; and individual mills may produce either 72-percent or 82-percent flour, but not both. Despite these restrictions, there is reportedly significant leakage of 82-percent flour into the 72-percent flour channel.

The third market segment is the rural market, which consists of the wheat that is produced and consumed in rural areas and accounts for about 33 percent of total wheat consumption. In 2001, total production of the rural market segment was about 6 million metric tons of wheat, and about 4 million metric tons of this was consumed in rural areas. This market is unregulated. Farm households take their wheat to thousands of small village mills for processing and either consume it themselves or sell it on the local market. Distribution channels are short, and this market operates competitively. Localized markets for the other two major grains, maize and rice, operate in much the same way.

Producers can either sell their wheat at unregulated prices in the local market or at a fixed price of LE 100 per ardeb to GASC. Rural households are also permitted to grow maize and use it for human consumption or animal feed, or sell it to GASC at a fixed price of LE 80 per ardeb. The GOE, in an effort to reduce its wheat import bill, is buying increasing quantities of white maize to produce mixed wheat/maize flour for making *baladi* bread.

Changes in Subsector Structure

The wheat subsector underwent three significant structural changes between 1997 and 2001. First was the introduction of an 80:20 wheat:maize mix in subsidized flour. The Government started a pilot wheat:maize mixing program in 1996 as a way to reduce the cost of the flour subsidy program and to save foreign exchange. An additional benefit is that, if the wheat and maize flours leave the mill already mixed, the 82-percent wheat flour cannot be sifted into 72-percent flour and leaked into the unsubsidized market. In 1999, one of the APRP benchmarks required the Government to produce at least 50,000 tons of wheat:maize flour, mixed at the mill. This target was achieved in 2000, but progress since then has been minimal. Between 600,000 and 800,000 tons of maize are being milled for the subsidized flour program, but only 95,000 tons are being mixed at the mill, thus preventing the program from having much of an impact on the leakage problem.

A second significant change was implementation of a ministerial decree (MSHT Decree No. 45, issued in January 1998) requiring all mills producing 82-percent flour to convert from stone mills to cylinder mills by the end of 2002. At the end of 2001,

stone mills still accounted for 35 percent of public sector subsidized flour capacity and 88 percent of private sector capacity. Although these percentages will decrease somewhat in 2002, there is no possibility that all of the stone mills will be converted to cylinder by the end of the year. Only 4 of the 33 private sector mills that produce 82-percent flour had been upgraded to cylinder technology by 2002, while 4 declared that they would close due to this GOE-imposed requirement. As of May 2002, 25 private mills had not made the conversion.

The third major change was the rapid growth in private sector production capacity for 72-percent flour. In 1997, total production capacity for 72-percent flour was 2.65 million tons per year, of which 71 percent was in the public sector. By 2001, productive capacity had increased to 5.1 million tons, with all of the increase occurring in the private sector. The private sector now accounts for 61 percent of total 72-percent flour milling capacity, up from 29 percent in 1997 (see Table 11-1). While productive capacity for milling 72-percent flour increased by a modest 4.6 percent in the seven public milling companies between 1997 and 2001, private sector capacity expanded continuously from 1997 through 2001, increasing 306 percent to 9,990 mt/day in 2001.

Table 11-1. MILLING CAPACITY FOR 72-PERCENT FLOUR

	1997			2001		
Sector	No. of Mills	Tons/Day	Percent of Total Capacity	No. of Mills	Tons/Day	Percent of Total Capacity
Public	19	6,050	71.1	19	6,330	38.8
Private	8	2,460	28.9	30	9,990	61.2
Total	27	8,510	100.0	49	16,320	100.0

Source: Statistical Annex, Tables 6 and 8 from Poulin and Abdel-Latif (2002).

Despite these three major changes, the basic structure of the wheat subsector remains largely unchanged from what it was when APRP started. The subsector remains characterized by three distinct markets: the subsidized flour market, where the Government is the only buyer; the 72-percent flour market, where the flour is sold on the open market; and the rural market, where the wheat is consumed by farm households or sold to other rural households. The need to keep the 82-percent flour market totally separate from the other two means that there are almost no unregulated ties between the three markets.

Subsector Conduct

How subsector participants behave in the highly controlled structure described above depends to a large extent on whether they are in the public or private sector, and on the rules and restrictions that govern their behavior.

In the public sector, the key player is GASC. As a Government agency its role is to implement the food subsidy program. Between 1997 and 2001, GASC deliveries to *baladi* bakeries and subsidized flour warehouses decreased by 11 percent. This is the combined result of a 3-percent increase in deliveries to bakeries, most of which are located in urban areas, and a 43-percent decrease in deliveries to flour warehouses, which are located mostly in rural areas. Over this same period, GASC increased its purchases of domestic wheat from 1 million mt in 1997 to 2 million mt in 2001, and reduced its wheat imports from 4.8 million mt in 1997 to 1.7 million mt in 2001 (see Table 11-2). None of these changes, which have ramifications throughout the subsector, are affected by open-market forces. The decrease in deliveries most likely reflect Government budget constraints, and the increased domestic purchases and reduced imports reflect the Government's policy of maximizing domestic purchases regardless of relative prices.

Table 11-2. GASC WHEAT AND MAIZE PURCHASES FOR SUBSIDIZED FLOUR (000 metric tons)

Type of Purchase	1996/1997	2000/2001	% Change
Wheat imports	4,768	1,700	- 64.3
Domestic wheat	980	2,013	105.4
Domestic maize	188	500	166.0
Total	5,936	4,213	-29.0

Source: MSHT unpublished data for domestic purchases, and U.S. Embassy Agricultural Attaché reports for imports.

Unlike GASC, the public sector milling companies are intended to function as autonomous businesses. They are, however, overwhelmingly influenced by Government decisions, not by market forces. Their main activity is to produce subsidized flour for a milling fee that is too low to cover all of their costs. This accounts for 85 percent of their total production. Not only are these companies continuing to produce 82-percent flour despite the low milling fee, but they are also being forced to shift production from marginally profitable stone mills to unprofitable cylinder mills. The public milling companies also produce 72-percent flour in competition with the private sector. This accounts for 15 percent of their total

production. They produce a generic 72-percent flour and have tended to compete on price rather than quality, product differentiation, or customer service.

In late 1999, the Holding Company for Rice and Flour Mills was dissolved, and the seven public milling companies were transferred to the Food Industries Holding Company (FIHC), most of whose affiliated companies were oilseed processing companies. FIHC hesitated to privatize any of its assets during the 1990s, and it has a reputation for closely managing its affiliated companies. Reports that some public milling companies had begun buying imported wheat through private traders, from whom they could obtain lower prices, were denied by FIHC. The increased willingness of public millers to use cheaper private shipping and handling firms, who move imported wheat from the port to the mill, has helped to stimulate a 45-percent decrease in that cost component. While there are some cost-reducing forces at work that will help public millers compete better, the FIHC prefers to import wheat itself and have public companies use the services of the Public Company for Silos and Storage (PCSS). It is likely that outsourcing to private service providers will continue to be discouraged.

Baladi bakeries and subsidized flour warehouses are private firms, but are in the same situation as the public mills. They have no flexibility in what they produce or how much, nor in their baking and retail margins. Their sole objective is to minimize operating costs. Since the retail price for *baladi* bread and 82-percent flour has not changed since 1991, bakeries and flour warehouses are making ends meet by leaking some 82-percent flour into the 72-percent market. Unofficial MSHT estimates of 82-percent flour leakage range from 30 to 45 percent, compared to estimates of about 20 percent in 1998.

The private milling industry presents a strikingly different picture. The driving force for private mills is the 72-percent flour market. In 1997, there were eight private sector mills producing 72-percent flour, with a total capacity of 750,000 tons per year. By 2001, there were 30 mills, with an annual capacity of 3.1 million tons. These firms are highly market oriented, and they are constantly upgrading their mills to meet customer needs. This includes increasing capacity, installing blending machines, and investing in storage facilities to prevent disruptions in wheat supplies. They compete primarily on quality, product differentiation, and customer service, and less on price. As a result, they have increased market share relative to public sector firms while receiving higher prices for their products.

Private millers are also very aware of economies of scale. Very few mills have a capacity of less than 500 mt per day, and some are aiming for 1,000 tons per day. In 2001, private sector production capacity to mill 72-percent flour totaled 5 million mt per annum, twice the total consumption of 2.5 million mt. This overcapacity for milling has led quite a few mills to operate at less than 30 percent of capacity. Given investment needs in the agricultural sector and agribusiness system, this appears to be a serious misallocation of scarce resources. Some of this excess capacity could be used

to mill 82-percent flour, but GOE controls on prices and margins keep all but the oldest and smallest private mills from milling 82-percent flour at a modest profit.

The private mills that do mill 82-percent flour are stone mills, which required smaller investments that have already been paid off. Cylinder mills are costly, and the GOE-mandated conversion of stone mills to cylinder mills will force most private millers to exit the 82-percent flour market. Private sector mills produce subsidized flour for the Government under the same arrangements as the public sector mills. In contrast to the public milling companies, however, most of the private milling companies are not investing in cylinder mills for subsidized flour production. The low milling fees effectively exclude the private sector from the large 82-percent flour market.

The rural market (i.e., the domestic wheat that remains in rural areas) is uncontrolled, but the behavior of rural producers is heavily affected by what GASC pays for wheat, which is fixed by the Government. The proportion of total production of the rural market that was sold to GASC increased from 17 percent in 1997 to 32 percent in 2001, which means that the quantity of domestic wheat consumed directly in rural areas has decreased significantly. Actual deliveries to GASC doubled from just less than 1 million mt in 1997 to slightly more than 2 million mt in 2001.

The conduct of the wheat subsector presents a picture of firms coping the best they can in a largely centrally planned marketing, milling, and distribution subsystem. Public milling companies are forced to accept milling fees that do not cover costs and to convert their profitable stone mills to unprofitable cylinder mills for 82-percent flour production. Private milling companies are investing heavily in 72-percent flour production and, with a few exceptions, are phasing out of 82-percent flour. Overall, the firms operating in the least regulated market (i.e., private mills producing 72-percent flour) have been the most vibrant. Throughout the subsector, however, it is clear that Government restrictions are distorting markets, causing firms to make less-than-optimal decisions, and adversely affecting overall subsector performance.

Changes in Private and Public Sector Milling Shares

Actual milled quantities of 82-percent and 72-percent flour (unofficial estimates by MSHT), and public and private market milling shares, are shown for the time period 1990–2001 in Table 11-3 and Figure 11-2. For 82-percent flour, private mills produced between 593,000 and 698,000 mt per year from 1990 through 2000, and the private sector market share ranged from 10 percent (in 1995) to 20 percent (in 1992). In 2001, private firms milled a record 1.128 million mt of 82-percent flour, accounting for 16.9 percent of the total quantity milled in commercial-scale mills. The volume of 82-percent flour milled by public mills increased from an annual average of 2.756 million mt in 1990-1992 to 5.954 million mt in 1999–2001. During this entire period, the public sector share ranged between 82 and 91 percent, ending in 2001 at 83.1 percent. Clearly, public mills have dominated the 82-percent market segment.

Table 11-3. WHEAT MILLED BY PUBLIC SECTOR AND COMMERCIAL-SCALE* PRIVATE MILLS, 1990–2001 (000 mt of wheat)

Calendar Year	Private 82%	Private 72%	Total Private	Public 82%	Public 72%	Total Public	Total 82%	Total 72%	Grand Total
1990	619	0	619	2,747	2,296	5,043	3,366	2,296	5,662
1991	593	0	593	2,841	2,233	5,074	3,434	2,233	5,667
1992	598	0	598	2,681	2,432	5,113	3,030	2,432	5,711
1993	635	0	635	4,250	788	5,038	4,885	788	5,673
1994	666	0	666	4,559	814	5,373	5,225	814	6,039
1995	645	0	645	5,962	986	6,948	6,607	986	7,593
1996	662	369	1,031	5,177	1,077	6,254	5,839	1,446	7,285
1997	690	863	1,553	5,283	1,143	6,426	5,973	2,006	7,979
1998	698	1,337	2,035	5,511	1,274	6,785	6,209	2,611	8,820
1999	680	2,006	2,686	6,124	893	7,017	6,804	2,899	9,703
2000	653	1,931	2,584	6,185	1,126	7,311	6,838	3,057	9,895
2001	1,128	2,277	3,405	5,552	1,436	6,988	6,680	3,713	10,393

Source: MSHT, unpublished data.
Note: Commercial-scale private mills do not include small village mills that grind as much as 4 million mt of domestic wheat per year in rural areas.

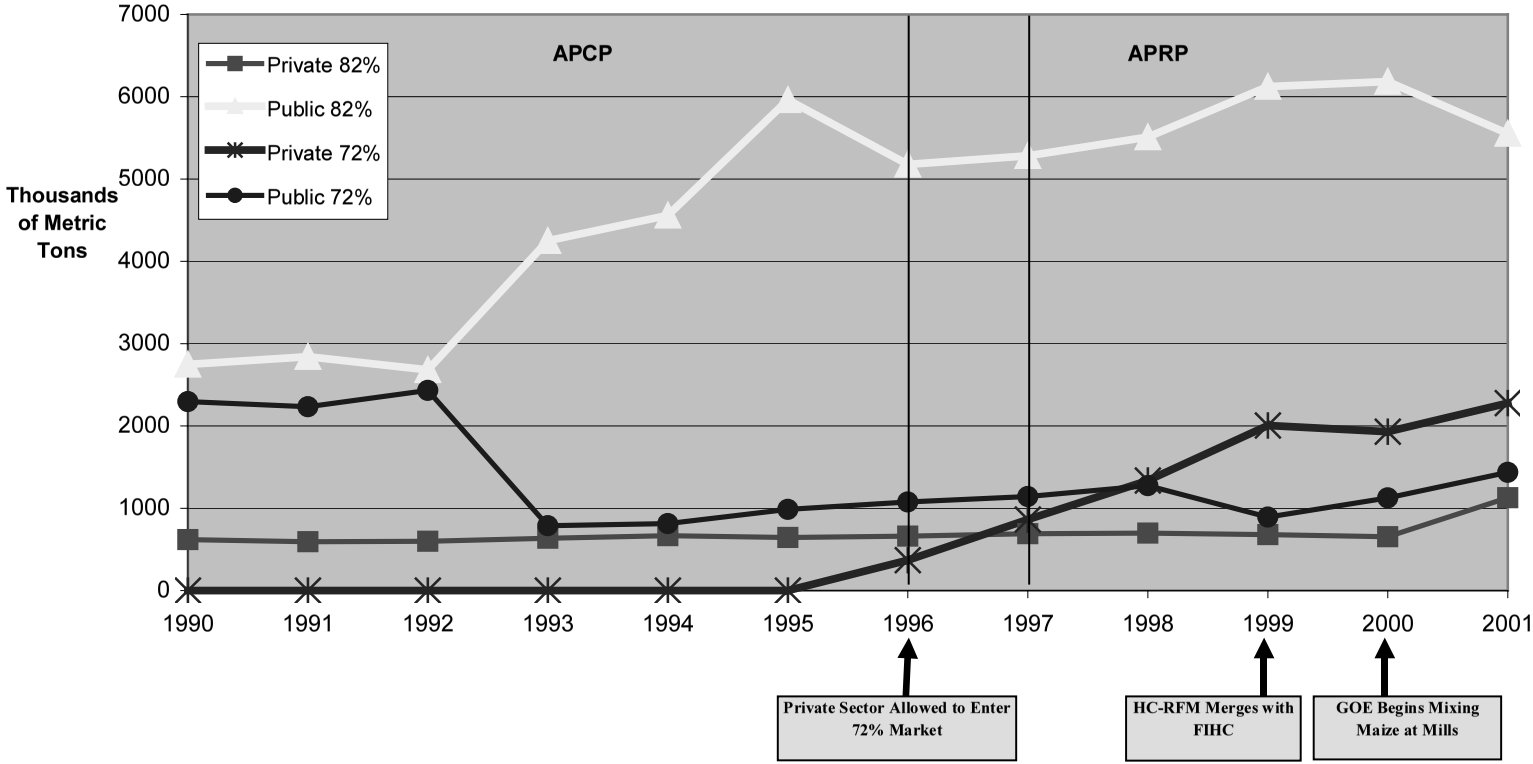


Figure 11-2. TRENDS AND MILESTONES IN WHEAT IN MILLING IN EGYPT, 1990-2001

Public mills also processed all of the 72-percent flour up through 1995, but this began to change in 1996 when private mills were allowed to mill imported wheat. The volume of flour produced by private mills increased from 369,000 mt in 1996 to 2.277 million mt in 2001, a six-fold increase. The private sector market share was greater than 50 percent in 1998, reached nearly 70 percent in 1999, and finished the 1990–2001 period at 61.3 percent.

The share of 72-percent flour in the overall commercial wheat market was only 13.0 percent in 1995, but it expanded to 25.1 percent in 1997 and 35.7 percent by 2001. Given the relative preponderance of 82-percent flour, however, the overall share of the private sector was only one-third (32.8%) in 2001, though it had expanded from 19.5 percent in 1997. The share of private mills would be much greater if the controls were relaxed on using domestic wheat to produce 72-percent flour and if the fixed prices/margins in the 82-percent flour channel were removed.

Subsector Performance

It is useful to look at four measures of subsector performance: efficient use of resources, profitability, ability to cope with external shocks, and market efficiency.

Efficient Use of Resources. There are numerous examples of the inefficient use of resources resulting from Government controls:

- Public sector milling companies are investing in 82-percent flour milling despite negative returns.
- GASC wheat import decisions are not based on world prices relative to the domestic price.
- Mills producing 72-percent flour are prohibited from purchasing domestic wheat, even if it is less expensive than imported wheat.

The high level of leakage from the subsidized to the unsubsidized market means that the cost of the flour subsidy program per intended beneficiary is much higher than it needs to be.

The situation in the private sector is more mixed. Here the measure of efficiency is the soundness of investment decisions. Private sector investments in 1997 and 1998 came as a response to the huge profits achieved from renting public mills during the period from 1993 to 1996. They had clear potential profitability as motivation for investment. Most of these initial investors have continued to invest in increasing their capacity and upgrading their equipment. On the other hand, the second wave of private investments, starting in 1999, took place despite the confirmed and continuing excess capacity problem in 72-percent flour production. Capacity utilization in these new mills is low and most are incurring large losses.

The explanation for this paradox (of good money following what became bad investments) is that some agribusiness investment opportunities have evoked herd behavior in Egypt. Private investment in commercial-scale rice mills followed a parallel path, where considerable investment continued despite closures of some older, less-efficient, less well-located, or less well-financed commercial mills or obvious under-utilization (and hence absence of profitability) of other operating mills. The wheat and rice private mill investment phenomenon also demonstrates either a perceived or actual shortage of potentially viable agribusiness investment opportunities in Egypt, or perhaps a lack of knowledge of the agribusiness system among many investors.

Profitability. In profitability, the major differentiation is between the public and private sectors. Most of the mills in the public sector are cylinder mills producing 82-percent flour, and all of these are incurring losses because of the low milling fee. As noted in the previous section, the established private mills producing 72-percent flour appear to be profitable, but the mills that have opened in the last 3 years are unprofitable. Public sector mills producing 72-percent flour, which are operating at 50-percent capacity, appear to be marginally profitable. Although there are no data on profitability, information obtained in interviews indicates that, as a group, the private mills are profitable and the public mills are unprofitable. Overall, the trends are negative. For the 72-percent flour mills profits are decreasing because of the overcapacity and currency devaluation. For the 82-percent mills losses are increasing because (1) milling fees have not increased since the early 1990s, (2) the profitable stone mills are being forced to close, and (3) the currency devaluation is increasing the cost of imported wheat.

Ability to Cope with External Shocks. The major external shock over the last 3 years was the 25-percent devaluation of the Egyptian pound. The immediate impact was to increase the cost of imported wheat. This would normally have resulted in increased wheat flour prices and reduced profitability across the board, but Government controls have prevented the normal adjustment process from working efficiently. First, the Government helped the public mills to import wheat at the official rate, while private mills were forced to obtain foreign exchange at black market rates, thus causing a shift in the competitive balance from the private to the public mills. Second, mills producing 72-percent flour cannot shift from imported to domestic wheat, and conversely farmers are not receiving the market signals that would induce them to increase production in response to changing terms of trade. Finally, the devaluation makes it more expensive to replace stone mills with cylinder mills, thus ensuring the continued leakage of subsidized flour into the unsubsidized market. The inability of the subsector to respond appropriately to the currency devaluation is indicative of the impact of Government controls on the ability of the subsector to cope with external shocks.

Market Efficiency. The previous sections discussed numerous examples of market inefficiency. The major findings are:

- The 82-percent flour production and marketing chain is not subject to any market forces.
- The rural market segment is free of Government controls, but farmers are virtually isolated from all wheat market forces outside of the rural areas.
- Markets are functioning best for the 72-percent flour, but with significant distortions.

The wheat subsector marketing system will not operate efficiently until most of the Government controls are removed and the barriers between market channels are dismantled.

Policy Recommendations

The principal recommendation is that the Government remove most controls on the wheat sub-sector and privatize the public milling companies. This would eliminate the division of the wheat marketing system into three arbitrary channels and open the entire subsector, including subsidized flour production, to free market forces. Instead of the existing controls all along the subsidized flour production and marketing chain, there would be only two Government interventions in the wheat subsector. One would be a producer floor price designed, first, to stabilize the wheat price for farmers and, second, to encourage maximum wheat self-sufficiency in line with the country's comparative advantage. The second intervention would be Government purchases of a wheat-maize flour mix from mills at competitive open-market prices for the flour subsidy program, which would continue at its present level. This one far-reaching change in Government policy would eliminate virtually all of the market distortions and inefficiencies identified in this chapter.

A second, less desirable, but more politically feasible, approach would be to maintain existing Government policies, including the three separate market segments, but improve the implementation of those policies. Under this approach, we recommend the following actions:

- Fully and rapidly implement the wheat-maize mixing program, which would virtually eliminate the leakage problem.
- Allow public milling companies to use private services, thus recognizing that they should be allowed to operate as private businesses.
- Reduce ambiguity and haphazardness in Government policies vis-à-vis the public milling companies. This would increase their efficiency as well as improve the business climate for private sector firms.
- Rationalize the flour subsidy program and redefine "social responsibility" for public sector firms.
- Restrict public milling companies to the production of subsidized flour. This would leave the 72-percent flour market to the competitive, uncontrolled, and unsubsidized private sector. Hence, the Government would not feel obliged to assist public milling companies in the domain of 72-percent flour when external shocks hit the wheat subsector.

- Take measures to bring the subsidized flour milling fees in line with actual costs. With milling fees reaching full cost levels, the social responsibility is clearly passed on to MSHT in its direct relation with consumers instead of being forced onto the public milling companies.

Trends to Monitor in 2002/03 and Beyond

Several trends and developments evident early in the marketing season for the 2001/02 wheat crop merit highlighting and further monitoring:

- Did private milling companies exit the 82-percent flour milling industry? The deadline for conversion of stone to cylinder technology in milling 82-percent flour was originally set for the end of 2002; presumably this deadline was extended for 1 year, though such an extension would not likely lead to increased conversions by private milling companies.

- The devaluation of the Egyptian pound once again in January 2003 to LE 5.5 = US$1 increased the LE cost of importing wheat.[2] This should depress imports and increase the use of Egyptian wheat in milling. It should also encourage greater leakage of wheat from the 82-percent marketing segment into the 72-percent channel, assuming less imported wheat is available.

- Domestic wheat procurement by GASC for the subsidized flour program will fall even more below its target as private millers have a greater incentive, post-devaluation, to offer farmers higher prices than the official procurement price. Though such transactions would be illegal according to MHST Ministerial Decree No. 150 of April 1996, the savings achieved by buying the domestic wheat instead of the imported wheat are high enough to cover for the risk of going against the law.

- Over time, there should be a greater incentive for Egyptian bakers of 82-percent wheat bread to mix white maize with Egyptian wheat. This will reduce their raw material costs and increase their profitability at the margin.

- With devaluation and significant attendant increases in the general (nominal) price level, it is likely that GOE-fixed milling fees will be increased. It would be better if prices and margins were set competitively rather than administratively.

- Investment in private sector wheat milling capacity should greatly slow down, if not stop altogether, due partially to higher investment costs (for imported milling machinery) stemming from devaluation, and partially to the widespread realization that industry capacity is excessive.

The tendency of the Government to tilt the playing field toward public sector milling companies to the disadvantage of private millers, manifested in January

2002, may be repeated in the future. The GOE reneged in early 2002 on its announced policy of allowing free competition in 72-percent wheat flour production with absolutely no interference on its part. The FIHC helped its affiliated milling companies obtain their dollar needs at the official price of LE 4.6 for the dollar when private millers could only get dollars from the open market at the price of LE 5.35 to the dollar. What is important here is not the incident, which put private millers at a disadvantage, as much as the willingness of the Government to intervene to support public milling companies at the first sign of trouble. Ideally, all 72-percent wheat flour production should be private, but under the current segmentation of the flour market and GOE rules, public milling companies need the profits from milling the 72-percent flour to subsidize their unprofitable production of 82-percent flour.

Postscript on Method

Applying structure, conduct, and performance analysis to the wheat subsector in Egypt revealed significant insights. This is a clear case where GOE segmentation of the wheat market into three distinct and independent channels led to predictable performance outcomes and pre-determined, to a large extent, that subsector performance would be sub-optimal. GOE rules and controls have limited the behavioral responses of individual wheat subsector participants, particularly firms in the milling industry, to a narrow range.

The behavior or conduct that appears hard to justify is (1) continued investment by private entrepreneurs in 72-percent cylinder mills, despite evidence of excess capacity, and (2) operation of public sector mills producing 82-percent flour at a loss. In the first case, continued investment lags what were perceived to be high returns to 72-percent flour milling during the mid to late 1990s; this is a classic case in which perception lags reality by several years in an economy where current information about the milling industry, in particular, and the wheat subsector in general, is limited or of poor quality. A general problem in the Egyptian agribusiness system is the limited knowledge and analysis of probable returns and possible risks associated with alternative investment opportunities.

Underlying the second apparent paradox is the likely offsetting of operating losses on milling of 82-percent flour by milling of some Egyptian wheat into 72-percent flour and sale of this wheat profitably into the 72-percent market. Egyptian public millers also are able to earn profits on milling 72-percent flour, whose price has adjusted upward with devaluation and increased the scarcity of imported wheat.

The analysis presented and discussed in this chapter shows how the structural characteristics of the wheat milling industry, as well as the conduct of public and private mills in procuring wheat for milling, determine the performance of the Egyptian wheat subsector. A highly segmented marketing system, organized around a costly bread subsidy program designed to benefit low-income consumers, requires extensive controls and policing in order to operate. Over time, incentives for leakages, concentration of milling of 72-percent flour in private sector mills,

and abandonment of 82-percent flour milling by private millers will increase, leading to continued sub-optimal performance outcomes.

References

Abdel-Latif, Abla. *The Egyptian Milling Sector: Structure, Policy Environment and Present Challenges.* IFPRI Report for USAID/Cairo. February 1998.

Abdel-Latif, Abla M., Mylène Kherallah, and Peter Gruhn. *Evolution of Wheat Policy in Egypt and Its Impact on Wheat Production and Marketing.* Egypt Food Security Project Paper Series, No. 1. Cairo, Egypt. May 1998.

Badiane, Ousmane, Mylène Kherallah, and Abla Abdel-Latif. *Evolution of Wheat Policy Reform in Egypt and Adjustment of Local Markets.* IFPRI Report for USAID/Cairo. 1997.

Bouis, Howarth and Akhter U. Ahmed. *The Egyptian Food Subsidy System: Impacts on the Poor and an Evaluation of Alternatives for Policy Reforms.* IFPRI Report. March 1998.

Holtzman, John, Gary Ender, Adel Mostafa, Sherif Fayyad, Samar Maziad, Ezz Eldin Abdel Kader, and Nabil El Santricy. *Intermediate Effects of Policy Reform Under APRP: Progress Indicators, 1990-2001.* MVE Unit - APRP, Monitoring Report No.4. Abt Associates Inc. Cairo, Egypt. July 2002.

Kherallah, Mylène, Hans Lofgren, Peter Gruhn, and Meyra M. Reeder. *Wheat Policy Reform in Egypt: Adjustment of Local Markets and Options for Future Reforms.* IFPRI Research Report No. 115. IFPRI, Washington D.C. 2000.

Kherallah, Mylène, Nicolas Minot and Peter Gruhn. *Adjustment of Wheat Production to Market Reform in Egypt.* IFPRI, Washington D.C. 1999.

Kherallah, Mylène, Gruhn, Peter, Abdel-Latif, Abla. *The Wheat Milling Sector in Egypt: Structure, Performance, and Future Prospects.* IFPRI Report. April 1998.

Poulin, Roger J. and Abla Abdel-Latif. *Changes in the Structure, Conduct and Performance of the Wheat Subsector in Egypt Since 1997.* APRP/MVE Impact Assessment Report No. 21, Cairo, Egypt. June 2002.

Tyner, Wallace, B. Adair Morse, Ragaa El-Amir, Adel Mostafa, and Sherin Sherif. *Wheat Subsector Baseline Study.* MVE Unit - APRP, Impact Assessment Report No. 6. Abt Associates Inc. Cairo, Egypt. May 1999.

Endnotes

[1] IFPRI Research Report No. 115 (2000). *Wheat Policy Reform in Egypt: Adjustment of Local Markets and Options for Future Reforms*, by Mylène Kherallah et al., summarizes this work. Studies by Abdel-Latif (1998), Kherallah et al. (1998), and Kherallah et al. (1999) were interim outputs prepared for USAID. IFPRI also conducted surveys of wheat producers and retail wheat prices in selected markets.

[2] By early May 2003, the exchange rate had depreciated to LE 5.93 = US$1.

12 Impacts of Policy Reform on the Rice Subsector in Egypt

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Under APCP, the rice marketing system was liberalized quickly and decisively in 1992/93, leading to significant private sector entry into paddy assembly, paddy and rice wholesale trading, rice exporting, and, with a lag of 2–3 years, rice milling. Unfortunately, privatization lagged liberalization by 5–6 years, which crippled MPE and Holding Company efforts to sell to anchor investors or to sell shares on the stock market. These efforts failed in 1997 and led MPE to consider the ESA privatization method. Seven ESA privatizations were completed in 1998/99. Since privatization, ESA mills have never operated at more than 25% of capacity, and only three companies have ever turned a profit.

The rice subsector continued to mature under APRP, following initial liberalization progress during APCP. Private sector shares remained high in paddy assembly, milling, rice distribution, and export. Private firms continued to enter all stages of the rice subsector, although there was some exit, particularly of private commercial mills. Firm conduct or behavior within industries and between subsector stages remained competitive, despite GOE and Food Industry Holding Company (FIHC) efforts to keep the public/ESA mills operating at a reasonably high level of capacity, which clearly put competitive pressure on private commercial mills. Subsector performance overall was strong, and the rice subsector was often cited as a model for market liberalization in Egypt. Rice trade and milling created many employment opportunities for workers based in rural areas and small towns in the Delta.

One of APRP's main achievements was to assist MALR and MWRI to manage scarce irrigation water resources better, particularly in cultivation of short-season rice varieties. APRP played an important role in coordinating irrigation schedules as new short-season rice varieties were introduced to large numbers of farmers along major irrigation canals in the Delta. Another significant APRP achievement was in helping to create, and in providing partial funding for, the Agricultural Commodity Council. One of the first and strongest subcommittees to emerge was the Subcommittee for Rice and Grains, which became an articulate and convincing advocacy organization for the rice subsector, particularly for exporters and large commercial millers. APRP also encouraged MPE to privatize

the public rice milling companies, and provided some post-privatization training to ESA mill managers.

We recommend that future work on rice policy examine the viability and capacity utilization of the ESA rice milling companies, and the role played by the FIHC in managing and financing ESA operations. It is also important to improve estimates of area cropped to paddy, as well as yield and production forecasts and estimates. The GOE should consider lowering the tariff on imported rice progressively, perhaps 5 percentage points per year over 3 to 4 years. Export subsidies should not be used, even as a one-off solution to a problem of excess supply in a particularly good crop year, if subsidies cannot be sustained in later years. Periodic GOE interventions in the rice market have tended to be more destabilizing than helpful. In the reformed Egyptian agribusiness system, the GOE's role is best reserved for improving paddy crop area and production estimates and rice market information, ensuring their timely and broad dissemination, and maintaining a level playing field for participants in the rice subsector.

Rice Subsector at Beginning of APRP

The Agricultural Production and Credit Project (APCP) undertook a major program of policy reform in the early 1990s that changed the rice subsector in fundamental ways. The major reforms were as follows:

- Crop area controls were removed.
- Mandatory rice deliveries were abolished.
- Paddy and rice prices were no longer fixed and were allowed to vary.
- Public rice mills were no longer guaranteed paddy through compulsory deliveries to rice marketing cooperatives.
- The private sector was allowed to trade, mill, and export rice.

By the beginning of the Agricultural Policy Reform Program (APRP) in 1996/97, the paddy and rice trade had been liberalized, and private market shares in trading, milling, and exporting had risen sharply. The cooperatives had become secondary buyers of paddy, and the public rice mills were operating at a low percentage of their large installed capacity. Exports fell 53% from their 20-year high of 355,000 metric tons (mt) in 1995/96 to 166,000 mt in 1996/97, the lowest level during the APRP period. Massive investment in private commercial rice mills was well under way and would continue at a rapid pace for another 2 years. Public milling companies purchased and milled 96,300 mt of paddy in 1996/97, only 2% of the crop. The Holding Company for Rice and Flour Mills (HCRFM) acted as if it were under siege, bitterly complaining about rice market imperfections and predatory pricing by wholesale traders, as well as the low quality of rice produced by private mills, many of which were unlicensed.

The rice subsector baseline study showed, among other things, the following:

- Rice area and production had increased steadily since the 1980s.
- Short-season varieties (SSVs) were beginning to replace long-season varieties by the mid-1990s, before the start of APRP.
- Rice consumption increased significantly between 1990/91 and 1997 (the time of the International Food Policy Research Institute's [IFPRI] integrated household survey), especially in Upper Egypt.
- Demand for rice was both price elastic and income elastic over most income ranges.

The key policy issues early in APRP, during the first three tranches, were:

- How, when, by which method, and at what cost would privatization of public rice milling companies be achieved?
- Would public millers receive special advantages, such as preferential access to credit and the ability to operate (indefinitely) in the red?
- Was there scope to lower the tariff on imported rice (30% with sales tax and port fees)?
- How much area should be planted to rice, a high water-consuming crop, relative to cotton and maize, the two major competing summer field crops? The underlying issue was that of allocative efficiency in agricultural production.

Another significant thrust of APRP was the need to limit water use on rice and sugarcane, partly to conserve water for horizontal expansion schemes such as Toshka and North Sinai. Some analysts perceived rice exports as high water content exports, suggesting the apparent ludicrousness of a desert country with scarce irrigation water exporting a heavy water-consuming crop.

A final set of concerns, which emerged by 1998, was that of which advocacy organization could best represent the rice industry. The Rice Branch, Cereals Chamber, under the aegis of the Egyptian Federation of Industries, was perceived as dominated by public millers and Holding Company officials. Given this organization's orientation, who would represent the strongly emerging private rice trade and milling industry, and where (institutionally) would it be located? How would it be funded, who would the membership be, and what would be its initial policy advocacy agenda? The consensus among APRP analysts was that a new federation would need to be formed.

Changes in Rice Subsector during APRP

This section summarizes changes in the rice subsector over the course of APRP, from the baseline period of 1995/96 through 1997/98 to the endline period of 1999/00 through 2001/02. Table 12-1 summarizes changes over time in selected indicators of rice subsector structure and performance. Three-year averages are

used to compare the baseline and endline situations for most of the indicators. In some cases, data were not available to calculate 3-year averages, so shorter time-series or even 1 year (e.g., 1996/97 for the baseline and 2000/01 for the endline) are used. Exceptions to the 3-year averages are mentioned in the table notes.

- Although paddy area cultivated increased only 3.1% from the baseline to the endline, a 10% expansion in rice yields was the main contributor to a 13% increase in total paddy output.

- The yield increase was driven largely by the large expansion in paddy area planted to high-yielding SSVs. By summer 2001, 88% of total paddy area was cultivated to SSVs.

- Paddy and rice prices fluctuated considerably over the life of APRP, with paddy wholesale and rice export prices showing significant volatility. Using 3-year average baseline and endline prices, into-mill wholesale paddy prices dropped 9.7% over APRP, while rice export prices declined 28%.

- Egyptian export prices are weakly correlated (0.37) with domestic wholesale paddy prices. (This is a correlation between monthly export unit values and Giza 177 paddy prices, a leading export variety. Using other varieties, correlations were slightly lower).

- Export volume expanded 52% from the baseline to endline period, while export prices dropped 28%. One-third (34%) of the expanded rice production (from baseline to endline) was exported, while the rest was consumed domestically.

- Although precise figures are not available, participation (and employment) in paddy assembly, rice milling, and rice distribution and export increased over the life of APRP. Most of the expansion in commercial rice milling took place early in APRP, as a lagged response to APCP rice market liberalization.

- The share of the paddy crop milled by public/ESA mills, already low at the start of APRP (8%), declined 50% to only 3.9%. Private sector milling capacity expanded rapidly from 1995 to 1998 and then slowed down in 1999-2001, as closures of commercial mills nearly offset new capacity coming on stream.

- Per capita rice consumption expanded an estimated 22% from the baseline to the endline. Rice has become increasingly important in urban consumers' diets and in Upper Egypt, where it did not become a major staple until the 1990s. Wheat (particularly bread) remains the most widely consumed grain.

- Year-end rice stocks (held mainly as paddy) are estimated to have decreased by 63% from the baseline period to the endline. This is due to increased

domestic rice consumption and expanded exports. It may also reflect better matching of supply and demand.

Paddy Area and Production. An important consequence of early rice market liberalization from 1991 to 1994 was a steady expansion in area cultivated to paddy from the late 1980s to 1997. The area sown declined in 1998 but returned to record levels in 1999 and 2000. Low producer prices in 2000/01 led to less area cultivated in 2001. High producer prices in 2001/02, especially from November 2001 on, led to large areas being cultivated in summer 2002.[1] Since 1997, therefore, paddy area and output have fluctuated quite a bit, albeit around a higher level than before APRP. Shifting relative prices (rice/cotton) and profitability are responsible for much of this fluctuation.

A notable success for the Ministry of Agriculture and Land Reclamation (MALR), particularly the Rice Research Institute, during the second half of the 1990s was the successful introduction of high-yielding SSVs on nearly 90% of paddy planted by 2001. Note that the area cultivated to SSVs was only 5% in 1995, when Gizas 177 and 178 were introduced. Both Gizas 177 and 178 were introduced rapidly and effectively, followed by Sakhas 101/102 beginning in 1997. APRP played an important coordination role in working with the MALR and the Ministry of Water Resources and Irrigation (MWRI) to coordinate planting of SSVs in pilot areas along particular irrigation canals by particular groups of farmers. This led to a shorter irrigation cycle designed to save water, where water savings have been estimated at about 13% (see chapter 9).

Paddy Assembly and Pricing. As shown in Table 12-1, there are a number of indicators related to paddy assembly and pricing. One finding is that the number of paddy buyers by the endline period certainly equaled and probably exceeded the number of paddy buyers estimated during the baseline.[2] Paddy buyers in 2000/01 and 2001/02 were handling greater volumes than traders in 1997/98, as overall marketed surplus expanded. Since it appears that the average volume handled per paddy buyer in 1997/98 was probably underestimated, the number of paddy traders estimated during the baseline was perhaps exaggerated. Hence, we are reasonably confident that there were more paddy buyers by the endline period.

Another finding is that paddy prices fluctuated considerably during APRP. Into-mill wholesale paddy prices showed considerable variability (Holtzman et al., 2002). These prices decreased nearly 10% between the baseline and endline periods, largely due to greater paddy supply and marketed surpluses. Significant swings in paddy (and rice) prices led to a cobweb-type pattern of decreased area planted (1998, 2001) in response to prior year low prices and significantly increased area planted (1999, 2000, 2002) in response to prior year high prices.

The rapid and decisive liberalization of the rice trade in the early 1990s led to broad private sector entry into paddy buying, which required minimal capital and skills. While there are often allegations of paddy hoarding by large-volume wholesale traders and some accusations of unfairly low pricing by small

Table 12-1. SUMMARY MEASURES OF CHANGE IN RICE SUBSECTOR OVER TIME

Market Structure or Performance Measure	Baseline Situation, 1995/96 to 1997/98	Endline Situation, 1999/00 to 2001/02	Change Over Time
Area Planted to Paddy	1.454 million feddans	1.499 million feddans	3.1 %
Average Paddy Yields	3.48 mt/feddans	3.84 mt/feddans	10.2 %
Paddy Production	5.033 million mt	5.681 million mt	12.9 %
% Area to SSVs	19.7 %	87.5 %	444 %
Average Producer Prices	696 LE/mt	683 LE/mt	-1.9 %
Wholesale Prices	690 LE/mt	623 LE/mt	-9.7%
Number of Traders	2,150	1900-2300	Approx. same
Export Prices, FOB	354 LE/mt	254 LE/mt	- 28 %
Exports	310,170 mt	472,783 mt	52 %
Number of Commercial Mills	225-250	275-300	10-20 %
Total Milling Capacity	7.0 million mt	> 7.0 million mt	Approx. same
% Capacity Private	79 %	> 79 %	Approx. same
Number of Exporters	76	115	51 %
% Crop Milled by Public/ESA Mills	7.9 %	3.9 %	- 50 %
Export Concentration (top five exporters)	52.6 %	49.3 %	- 7 %
Public Export Share	13.6 %	17.9 %	32 %
Export Revenues	$105.5	$110.3	4.5 %
Per Capita Consumption	35.4 kg	43.3 kg	22.3 %
Year-End Stocks (milled rice equivalent terms)	1.028 million mt	382,000 mt	- 62.8 %

Notes:

1. Average producer prices are reported by MALR/EAS. 2001 prices were not available, so a 3-year average was taken for 1998-2000.
2. Wholesale prices are annual averages of MVE Unit's own series on into-mill wholesale prices for 1997/98 and 1998/99 (baseline) and 1999/00 through 2001/02 (endline). These data were collected by MVE from industry sources.
3. Based on a March 2002 survey of rice traders, MVE found that sample traders bought an average of 2,570 mt each in 2000/01 and 1,650 mt in 2001/02 (where the marketing season was not yet quite complete). After estimating marketed surplus of paddy in both years from official MALR production figures and MVE producer survey data about crop disposal, MVE calculates that there were 1,900-2,300 paddy buyers in Egypt in 2000/01 and 2001/02.
4. Export prices are average unit values over 1996/97 and 1997/98 for the baseline, and 1999/00 through 2001/02 (only through March 2002) for the endline. CAPMAS is the source.
5. Exports for 2001/02 are forecast to reach 325,000 mt. 272,300 mt had been exported as of early June 2002.
6. Export concentration included five private exporters in 1996/97 and one public exporter (Rice Marketing Company) and four private exporters in 2000/01.
7. The public export share increased, due to the large exports of the Rice Marketing Company in 2000/01. The highest public share was 21.8% in 1997/98.
8. Both per capita consumption estimates and estimates of year-end rice stocks are taken from Table 3-1, "Paddy and Rice Supply and Use Estimates, 1990/91-2001/02" from *Rice Subsector Baseline Update II*, Impact Assessment Report No. 18, February 2002.

assemblers in isolated rural zones, most of the evidence points to a competitive domestic market for paddy and rice. Despite this, many millers, exporters, and FIHC and Government of Egypt (GOE) officials believe that paddy traders contrive artificial scarcities through hoarding, which they contend is responsible for the run-up in paddy and rice prices in Egypt from October 2001 to the spring of 2002.

Although no formal proposal emerged from the Rice Subcommittee to limit paddy price volatility, millers and exporters seemed to favor centralizing paddy purchasing in one organization, most likely the Rice Marketing Cooperatives, whose role in paddy assembly is far smaller than it was during the late 1980s and early 1990s. The industry consensus was that one organization would offer farmers a fair, fixed price that would be sufficient incentive for producers to continue growing rice, but that would allow Egypt to remain competitive in export markets. While paddy price volatility has posed problems for both farmers and the industry during the past four years, it is not clear that channeling all paddy purchases through cooperatives would solve the problem. The authors' evidence from field interviews and surveys is that paddy traders operate on low overheads with minimal capital in a competitive manner. Given widespread participation in paddy trading and the fact that rice production is relatively geographically concentrated,[3] the rice trade is competitive, and excessive price swings are more likely to result from changes in fundamentals (particularly inter-annual supply shifts), destabilizing GOE announcements and interventions, and trade/industry responses to limited, inaccurate information.

An important area of ongoing policy concern and uncertainty is how the GOE will respond to Agricultural Commodity Council (ACC) proposals to limit paddy price fluctuations. The authors believe that investments in improving generation, processing, and timely dissemination of production and marketing information (and possibly periodic surveys on trader and miller stocks in a second generation) would do more to reduce market volatility than any price-fixing scheme. Furthermore, forcing all farmer paddy sales through rice cooperatives would deprive producers of choice of market outlets. In many ways, it would be a return to the pre-liberalization crop assembly system. Although the rice marketing cooperatives would clearly welcome an enhanced role, it is not clear that they could assemble the paddy crop more efficiently or at lower cost than private traders. The cooperatives should be allowed to operate in a competitive paddy assembly system, but should receive no particular advantages. The more viable market outlets for paddy, the better off producers will be.

The domestic paddy trade appears to be as open and competitive as it was at the beginning of APRP. There are no known barriers to entry. The number of buyers (and the workers they employ) have probably increased since 1996/97. Farmers cite that the market for paddy is competitive and that there are numerous buyers (see chapter 15). Large miller and exporter allegations of paddy traders buying up all the paddy at harvest, hoarding it, and contriving scarcities to propel prices

upward do not seem to be empirically based. However, it may be that rumors and press announcements about GOE intentions to subsidize rice exports led to accelerated paddy buying in the fall of 2001, as traders, millers, and exporters realized that the paddy crop was short and they reacted to cover their requirements as early as possible. An interesting finding from the Monitoring, Verification, and Evaluation (MVE) Unit producer survey was that farmers who grow paddy sell most of their crop and consume relatively little of it.

Rice Milling Industry. Major changes in the rice milling industry were under way during the baseline period, as private sector investment increased at a spectacular rate from 1995 to 1998 in response to the early and nearly complete liberalization of rice marketing in Egypt under APCP. The number of commercial mills continued to increase from the baseline to the endline period, although the major part of the investments were made before and during the baseline period. We estimate (see Table 12-1) that the number of private commercial rice mills, defined as mills with the capacity to process at least 20 mt of paddy per day, increased 10–20% over APRP. At the same time, some of the weaker, typically small- to medium-size commercial mills actually had closed down by 2001/02. By 1999/00, it appears as if commercial mill closures began to nearly offset new mill openings.

Following liberalization of the rice trade in 1992/93, with a lag of several years, agro-entrepreneurs unleashed a torrent of investment in rice mills, ranging from large commercial mills capable of processing 50 mt/day of paddy or more, to *farrakha* that can mill 5–10 mt/day. Investors waited 2–3 years to see if rice market liberalization would stick, and when they were convinced it would, they moved quickly and aggressively to expand private sector milling capacity. The fact that liberalization led to a tumbling in the public milling industry's market share contributed to investors' perception that rice milling was going to be a profitable industry in which to invest. The period from 1995 to 1998 witnessed heavy investment in private mills, while the public mills continued to struggle. The availability of cheap Chinese milling equipment reduced the start-up costs of many millers, although this equipment is reported to have a far shorter life than higher-end, more costly milling equipment imported from Japan (Sataki) and Switzerland (Buhler). Overall investment in commercial rice mills alone, capable of processing at least 10 mt/day of paddy, was at least LE 13.6 million from 1995 to 1998, assuming an average investment of at least LE 100,000 per mill and 136 new commercial mills established during that 4-year period.

Private investment continued after 1998, though its pace slowed. It also appears that small, single-pass, village-level *mawani* were eclipsed by omnipresent *farrakha*, which could operate on a larger scale (milling 5–20 mt/day of paddy) and achieve scale economies, while serving producers, small traders, and larger millers/traders. MVE Unit surveys of commercial rice mills showed that most millers thought that too much investment had already taken place by 1998/99, as millers reported that certain paddy producing zones were saturated with large and

smaller mills. By early 2002, this view was even more strongly held. Although millers' views on this issue might be biased, their perception of industry overcapacity is corroborated by empirical estimates of national milling capacity.[4]

Commercial mills and *farrakha* operate efficiently and behave competitively, competing for customers[5] and paddy in their zones of operation. Commercial mills surveyed in March-April 2002 almost universally complained of over-investment in *farrakha* in their areas and strong competition for limited paddy supplies, particularly in 2001/02, when the crop was smaller and marketed surplus was tighter. The fact that 27% of the mills surveyed in late 1998 were not operating in 2002 is evidence that private millers face a tough and competitive market environment. When operators of closed-down mills were asked why they were no longer operating in 2001/02, most cited tight paddy supplies, high paddy prices, and a lack of liquidity.

Commercial mills' profitability, taking investment costs into account, is largely a function of capacity utilization. Some commercial mills sit idle or operate limited hours for a limited number of months, due in part to finance constraints or because they face too many competitors in their production zones.[6] In other cases, the largest commercial mills benefit from better liquidity and access to bank loans, so they can afford to keep their mills running at higher rates of capacity utilization. It is interesting to note that after three seasons, milling rates and millers' own estimated milling costs have changed little. This is partly due to the fact that diesel and electricity rates have changed little in rural areas and secondary towns, but also due to very limited wage inflation.

As the private milling industry matures, there is increasing evidence of specialization in milling tasks along the lines of competitive advantage. *Farrakha* and small commercial mills concentrate more on first-stage milling operations, particularly dehulling. Large commercial mills and some exporters focus on cleaning, polishing, sorting, and packaging of rice for export or for sale in upscale domestic outlets, such as supermarkets, mini-markets, and eating establishments. Whereas most rice exports were shipped in 25-kg polyurethane sacks 5 years ago, there are now more exports of rice shipped in cartons containing 1-kg and 5-kg retail packs. Brand or trade names are also more common now. Some rice mills produce brown rice or cargo, which is shipped to specific foreign markets, such as Romania, in order to get around tariff walls.[7] Some of the larger exporters have invested in sorting equipment that allows them to meet importer specifications precisely with respect to the percentage of brokens, impurities, and discolored and immature grains. These exporters tend to work with 10–20 smaller mills, which do the first-stage processing at lower cost in rural areas. Shipping dehulled rice to export staging locations, rather than paddy, also economizes on transport costs.

The Egyptian experience in rice milling investment during the 1990s is in some ways a success story and in some ways a cautionary tale of the pitfalls of uneven agricultural market liberalization. It is a success in that it showed that private

entrepreneurs were willing and able to make significant agribusiness investments once the GOE liberalized an important commodity market, let prices be market-determined, and left public enterprises (milling companies) largely on their own to survive. At the same time, there is widespread consensus that the second half of the 1990s witnessed excessive investment in rice milling, partly due to a bandwagon effect, but also because agro-industrial investment opportunities in Egypt were limited to a handful of subsectors (rice, horticulture) as GOE intervention and control of trading/processing companies were too heavy-handed in other leading subsectors (cotton, wheat, sugarcane, oilseeds). The Egyptian experience in rice milling is also a cautionary tale about privatizing public sector companies, which is discussed in detail in the next section.

The rapid and decisive liberalization of the rice market in Egypt contrasts starkly with the gradual, halting liberalization of the cotton market. It is no surprise that prospective agribusiness investors responded enthusiastically to the opportunities in the rice subsector, while they were hesitant to commit resources to a cotton subsector characterized to this day by administrative pricing, quotas and administrative allocation of market shares, and GOE control over what cotton varieties farmers can grow in which areas. The narrow channeling of investment opportunities in the Egyptian agribusiness system led to excessive investment in rice milling, which has led to some mill closures and represents, from a sectoral perspective, a misallocation of scarce resources.[8] In addition, the fact that rice producers and millers in Egypt are protected by a 30% effective tariff rate on rice imports further enhanced the financial profitability of paddy production and milling.

ESA Privatization Experience and Lessons Learned. As argued in the *Rice Subsector Baseline Update* (Holtzman et al., 2000), the GOE and HCRFM acted too slowly to privatize public sector rice milling companies. Several companies were offered for privatization in 1997, and the investor response was at best lukewarm. Bids were low, and no sales took place. By mid-1998, the Ministry of Public Enterprise (MPE) had committed to ESA privatizations of public milling companies. Over the next year, all but one of the eight public companies had been privatized, with employee stakeholder associations "owning" 90% of the shares, the Holding Company 9.9%, and private investors (mill managers) 0.1%. ESA ownership was, however, nominal and not real. The ESAs are supposed to buy the milling companies from the HC over a 12- to 15-year period, but by mid-2002 only two companies had made any installment payments. The Holding Company, the Food Industries Holding Company (FIHC) as of December 1999, controls a majority of the seats on the ESA mills' Boards of Directors, retains the authority to appoint company managers (few of whom have changed since privatization), and convenes weekly meetings in Cairo of senior ESA mill managers to discuss and make decisions about paddy procurement, pricing, milling operations, and sales, particularly exports. FIHC continues to negotiate export deals with foreign governments (particularly Libya and Syria) on behalf of the ESA mills. It also guarantees and secures loans from public sector banks for these mills, most of

which would be unable to obtain credit to cover working capital requirements without the FIHC guarantee as to their creditworthiness.

As of mid-2002, the rice milling privatization experience continues to be problematic. During the past 3 years, the ESA mills have operated at no more than 20% of their originally installed capacity. Many GOE and FIHC officials, as well as industry analysts, feel that it is important to keep this significant installed capacity in productive use. They point out that the ESA mills have generally better milling equipment (Sataki and Buhler; never Chinese) that is better suited to producing a higher-quality milled rice output. Broken rates, in particular, are much lower, so the output of public mills is considered more readily exportable than the output of many private Chinese-equipped mills. In recognition of the inferior output of some Chinese-equipped rice mills, the private milling industry has made investments in expensive sorting equipment, which removes brokens and discolored, immature, or chalky grains. Most of this "sortex"[9] equipment is found at larger commercial mills and with exporters, who do the final "polishing" of roughly milled rice (purchased from smaller mills that use Chinese equipment), sorting, and packing.

Many Egyptian officials and analysts also feel that the GOE cannot afford to lose or abandon the large sunk cost in public/ESA rice mills, even though most of the investments in rice mills and equipment date from the 1980s or earlier, and that the ESA mills need to be kept in operation. Some analysts argue that the real issue underlying the reluctance to close down public mills is the short-term negative employment impact of laying off public sector workers. While the employment implications of privatization decisions are always an important consideration, it is noteworthy that employment in public/ESA rice mills by 2000/01 was less than half (46%) of the estimated 10,830 workers in 1996/97. This contrasts markedly with the 129,395 workers in the public textile companies reported for 2000/01 (Holtzman et al., 2002), where employment is much higher and a prime consideration.

The public/ESA mills still represent 21% of national milling capacity. Although the ESA rice milling equipment may have been underutilized during the APRP period, it was used over a long enough time horizon and amortization period to invalidate the argument that the large, sunk investment needs to be maintained. Second, the ESA rice mills could shut down overnight, and private milling industry capacity would be sufficiently large to mill the entire paddy crop at recent output levels (of 6 million mt or less).[10] Some observers argue that significant ESA rice mill purchases of paddy during several recent years, particularly early in the season when guaranteed credit has been obtained, have pushed paddy prices to higher levels than would have prevailed otherwise, crowding out (in both credit and raw material markets) some private millers. Following this logic, private mill profitability would likely be higher without ESA mills competing for paddy.

While the point of this discussion is not to denigrate the ESA privatization mechanism or ESA mills, the ESA rice mill privatization experience raises several serious issues that need to be considered by policymakers:

- Should FIHC be allowed to manage and control ESA mills over the medium term?
- Should FIHC secure credit for ESA mills, as well as export market outlets?
- Will ESA mills become de facto instruments of GOE paddy price policy, by virtue of the fact that they are able to obtain large loans early in the marketing season and enter paddy markets aggressively and with strong financing, buying at suggested GOE prices?
- Should ESA mills receive operating subsidies and indirect support to continue operating at moderate levels of capacity utilization when some private domestic mills face financial difficulties? In other words, should the GOE and FIHC maintain the full, existing ESA rice milling capacity in place when there is overall excess industry capacity and the private sector has made sufficient investments to cover the entire rice crop?

Our answer to all these questions is "no." In a liberalized market environment, privatized companies should not receive special advantages or subsidies that allow them to operate unprofitably and at low levels of capacity utilization.

Export Performance and Subsidies. Rice exports from Egypt expanded significantly from the late 1980s through the early 2000s, although the record export level of 755,400 mt achieved in 2000/01 was not repeated in 2001/02. Exports fell to 332,053 mt in 2001/02 and were forecast not to exceed 400,000 mt in 2002/03 (see USDA/FAS, *Egypt Grain and Feed Rice Report*, December 2002). The record exports of 2000/01 were driven primarily by export subsidies, which allowed Egypt to recapture declining market share in Eastern Europe and some Mediterranean markets (such as Turkey), as well as to enter new markets in Sub-Saharan Africa (particularly countries in the Common Market for Eastern and Southern Africa, COMESA), of which Egypt is a member and where duties are partially or fully waived). Entry into low-income and highly price-sensitive African markets proved to be a one-off experience, however, as exports were only 18,700 mt as of early June 2002, as opposed to 141,200 mt in all of 2000/01.

Nevertheless, it is important to note that Egyptian rice exports expanded significantly (by 52%) between the baseline and endline periods. Annual export revenues increased only modestly, largely because world rice prices (and Egyptian rice export prices) dropped to cyclically very low levels during the late 1990s through the early 2000s. Increased paddy output and supply of commercialized rice led to greater entry of traders into the rice export business; the number of exporters increased by an estimated 51% (see Table 12-1). This resulted in a modest decline in concentration in rice exporting, though the top five firms still captured nearly 50% of total exports during the endline period. The share of the public sector, including FIHC, the Rice Marketing Company, and several

public/ESA rice mills, fluctuated from year to year during APRP; surprisingly it increased somewhat between the baseline and endline periods. This result was due to the aggressive export sales of the Rice Marketing Company and FIHC in recent years.

Success of MALR's Rice Breeding Program and Introduction of SSVs. Strong rice breeding programs have enabled Egypt to introduce blast-resistant, high-yielding, and short-season varieties that are well suited to Egypt's growing conditions and to domestic and regional consumers' tastes. Average paddy yields increased 10% between the baseline and endline periods of APRP, largely on the strength of the new SSVs. These averages across all varieties actually understate the yield differences between long-season and short-season varieties, as the annual averages are an average across all types of varieties. Over the 3-year endline period (1999 to 2001), SSVs yielded 16% more than long-season varieties (3.92 mt/feddan versus 3.39 mt/ feddan).

As presented in the MVE Unit's final monitoring report (Holtzman et al., 2002), the paddy yield increases over the life of APRP resulted in higher estimated production per unit of water. Until 2001, these calculations assumed that all the paddy grown in Egypt was long-season. By accounting for the fact that the higher-yielding SSVs use less water than the long-season varieties that dominated rice cultivation at the beginning of APRP, rice output per unit of water is estimated to be even higher.

Returns to Paddy Producers. The fact that paddy continues to be planted on large areas in the Delta and Fayoum suggests that rice cultivation (or rice/berseem, rice/wheat rotations) is profitable. The MVE Unit producer survey found that the gross margin per feddan of rice was a rather low LE 1,050/feddan in 2000/01, higher than maize at LE 814/feddan but well below cotton at LE 2,173/feddan. The MVE Unit producer survey findings (see Morsy et al., 2002) show that cotton/berseem rotations were more profitable (in 2000/01) than any rotations involving paddy, which may have been a function of low paddy prices paid to farmers following the very large summer 2000 crop (reported as an average of LE 483/mt). Using higher 1999/00 or 2001/02 prices paid to farmers could substantially change the ranking of different crops and rotations. Sensitivity analysis of gross margins to output prices would be a useful exercise that would show how variable returns can be.

Part of the attractiveness of rice for farm households is that the overall labor requirements per feddan are much lower than for cotton (29.0 person-days of labor are required per feddan of rice, as opposed to 70.3 person-days for cotton cultivation). Hired labor needs and payments are greater per feddan for cotton, requiring greater cash outlays at a time when rural households need cash for other purposes (e.g., school expenses and marriages).[11] Other than the time-consuming rice transplanting operation, done mainly by hired labor in June, rice cultivation is easier than cotton cultivation, which presents special challenges at harvest time (when many children are back in school).

Related to the labor availability issue, most of the commercialized paddy crop (61% of sample farm rice output) comes from large farms of 5 feddans or more, which represented 33% of the producer survey sample. Generally, as farm size increased, a higher proportion of farmers (in different farm size categories) grew rice. Large commercial rice growers want to minimize their cash outlays for hired labor, as well as the management headaches, and so most larger rice producers use mechanical harvesting methods.

Changes in Rice Subsector Structure, Conduct and Performance

Changes in Subsector Structure. By the beginning of APRP, major structural changes were well under way in the rice subsector, as market reforms had been swiftly implemented during APCP and there had been significant private sector entry into paddy and milled rice trading, commercial rice milling, and rice exporting. Further entry took place under APRP, particularly continued entry into commercial rice milling and rice exporting. The number of commercial mills increased 10–20% from 1996/97 to 2001/02 (see Table 12-1), although some underutilized mills closed during APRP. The estimated number of rice exporters increased from 77 in 1995/96 to 115 in 2000/01, with average volume shipped increasing from approximately 4,610 mt to 6,600 mt per shipper. The concentration ratio for the largest five private exporters was over 50% from 1996/97 to 1999/00, but decreased to 37% in 2000/01. The private sector dominated both milling, with public/ESA mills milling only 3.9% of the paddy crop, on average, from 1999/00 to 2001/02, and exporting, with the private share ranging from 78% to 94% from 1996/97 to 2000/01. Paddy and rice trading had many participants by the end of APCP, and the number likely expanded during APRP as the size of the paddy crop and marketed surplus increased.

Changes in Subsector Conduct. The marketing system was competitive by the beginning of APRP and became even more competitive during APRP. Larger-volume exporters established strong working relationships with preferred commercial millers, who milled rice for export under informal contracts. Nine of the exporters during 2000/01 were also millers. The GOE proposed indicative producer paddy prices during several years that were paid by public/ESA mills that received ample funding on favorable terms early in the marketing season. This increased early marketing season price levels during those years. Once the public/ESA mills had exhausted their funds, prices tended to return to equilibrium levels that reflected market fundamentals. The Rice Subcommittee of the ACC, dominated by larger exporters, advocated the implementation of rice export subsidies in 2000/01, which was adopted by the Cabinet. The Rice Subcommittee also proposed that the Principal Bank for Development and Agricultural Credit (PBDAC) organize paddy procurement in 2002/03 at a fixed price of LE 500/mt, following a market year (2001/02) of high paddy prices and greatly reduced exports relative to the record year of 2000/01. This anti-competitive measure was never adopted by the GOE and would have put many private paddy traders out of work.

GOE interventions in the market, typically in the form of announcements about anticipated producer paddy prices, export levels, and export subsidies, tended to destabilize the market, leading to behavior that pushed up prices faster than they would have risen and exacerbating emerging scarcities. Paddy and rice price volatility, partly a function of underlying domestic supply and demand conditions, partly due to poor information about the paddy crop size, and partly exacerbated by GOE announcements that destabilized the market, hurt the competitiveness of Egyptian rice exports during certain years and pushed up domestic prices to levels that hurt domestic consumers. This price volatility accentuated year-to-year swings in paddy area planted and bewildered many farmers. In response, exporters and large millers called for stabilization of paddy prices**.**

Changes in Subsector Performance. The performance of the private sector–led rice subsector was quite strong during APRP. The rice subsector responded well to the opportunities and challenges following market liberalization during the early to mid-1990s. In addition, the too-slow cotton subsector liberalization tilted the area planted, investments in processing, and trading opportunities toward the rice subsector. From an agribusiness system perspective, too many resources have been allocated to the rice subsector. Completion of the cotton market reform agenda, and more vigorous and realistic efforts to privatize cotton ginning, trading, and spinning companies could redress this imbalance. This would lead indirectly to less area planted to paddy, though somewhat higher paddy prices, probably net disinvestment in rice milling, and lower rice exports. At the same time, water use on summer crops grown in the Delta would decline.

It is also important to note that water surpluses behind the Aswan Dam during APRP allowed Egyptian farmers to plant excessive areas to paddy. If scarcities emerge, paddy area will decline to the benefit of crops that consume less water. Easy availability of cheap rice in the 1970s and 1980s contributed to higher levels of domestic rice consumption than would have prevailed with less paddy cultivation and fewer GOE transfers of milled rice from the Delta to urban areas and Upper Egypt.

Some commercial millers and exporters have adapted to changing world market conditions by milling, packing, and shipping rice in retail packs in cartons rather than in 50-kg bags (semi-bulk). Private exporters are also able to compete effectively in the Mediterranean region by supplying buyers in Turkey, Jordan, Syria, and Lebanon with smaller, more frequent shipments that lower importers' finance (and storage) requirements and allow them to sell off their stocks quickly. International shipments of Australian, Chinese, and U.S. medium-grain rice tend to be in large vessels, requiring importers to have greater financial resources, to carry higher inventory and to pay higher storage costs, and to take a longer time to liquidate imported stocks per shipment.

Egyptian short- and medium-grain rice is suitable for *mahshi*-style cuisine, whereas long-grain rice (which dominates international trade) is not. Egypt

continues to develop and produce short- and medium-grain rice varieties that are popular in the Eastern Mediterranean, which is Egypt's core rice export market. By imposing high barriers on imports (effective taxation of 30%), Egypt has made large-volume imports of cheap foreign rice too expensive for domestic consumers and contributed to higher overall domestic price levels. Poorer consumers might benefit from no or lower rice import barriers.

Significant APRP Achievements

This section summarizes and reviews important APRP achievements in the rice subsector. It is not an exhaustive discussion of policy benchmarks. The interested reader is referred to an earlier MVE Unit Impact Assessment study (Holtzman, 2000) for a more detailed classification and treatment of benchmarks.

Benchmarks most directly related to the rice subsector fell into four categories:

- Market and trade liberalization
- Privatization of public rice mills
- Conserving water in rice cultivation
- Policy advocacy

APRP had, and will continue to have, an important impact on the rice subsector. First, APRP, particularly through the efforts of GreenCom, created an awareness of (the coming) water scarcity. KAP (knowledge, attitudes, practices) surveys in 1998 and 2001 (Zanaty and Associates, 2002) showed that more producers are now aware of which crops consume the most water and why it is important to conserve water in irrigated agriculture. APRP technical assistance and public awareness–raising efforts also convinced all parties, including producers, extension agents, irrigation system managers, and marketing system participants, of the need to better balance water supply and demand. At a more operational level, APRP strengthened the capacity of MALR and MWRI to manage and coordinate water distribution, particularly in cultivation of short-season paddy varieties, but more generally in collecting information about farmers' planting intentions and actual cropping pattern. This information was then used to fine-tune water releases from the Aswan High Dam. In addition to strengthening water resource management, APRP support to the Ministry of Foreign Trade (MFT) and to the private sector in creating the ACC led to a strong Rice Subcommittee. APRP also assisted MPE in privatizing public sector rice milling companies through ESAs and helped strengthen the management of ESA rice mills.

Market and Trade Liberalization. In the first tranche of APRP, there were two benchmarks concerned with completing liberalization of the domestic rice market. In tranches II and III, APRP had two successive benchmarks calling for reduction of the tariff on imported rice. The tranche I market reform benchmarks have largely been accomplished; the rice market has been liberalized, and there is a thriving private sector presence in paddy trading, rice milling, and rice

distribution. As noted above, however, there are periodic GOE announcements about export intentions and paddy prices that can destabilize the rice market at the margin. Private sector market shares are so large at this point that the GOE is not likely to undo market liberalization, which was largely completed under APCP. It can, however, make market conditions difficult for private participants and undermine their profitability in particular years through ill-timed interventions in the market (particularly in announcing paddy floor prices) and announcements (about anticipated export levels and subsidies).

Rice tariff reduction has not been achieved under APRP. This is an issue that ultimately requires the concurrence of the Ministry of Finance, which is not keen, during the current fiscal crisis, to see potential sources of revenue removed. Note, however, that the minuscule level of rice imports during most years (generally around 1,000 mt of high-priced specialty rices) does not make, through tariff revenue, a significant contribution to the GOE budget. Nevertheless, MALR alone does not have the authority to lower the tariff on imported rice. The Ministry of Foreign Trade, Ministry of Supply and Home Trade (MSHT), Ministry of Industry, and Ministry of Finance ultimately must concur. While rice tariff reduction proved impossible to achieve under the APRP umbrella, the issue remains an important one. A high tariff on imported rice, effectively 30%, protects domestic rice producers and millers. It contributes to higher-than-socially justified financial profitability of a heavy water-consuming crop. Farmers are able to plant a larger area to paddy than would be possible if rice could be imported, with no or low duties, for sale to poor urban and Upper Egyptian consumers. A larger crop translates into more paddy to be milled, which has contributed to excessive investment in rice milling. Some investors in private rice mills might have been deterred from making investments if cheaper imported rice were available on the domestic market.

Some MALR officials argue that Egyptian consumers will not buy foreign rice unless it is high-quality, medium- or short-grain rice. Foreign sources of this shorter-grain rice, deemed suitable for *mahshi*-style cuisine, are the United States, Australia, Italy, and China. All of the foreign rice is more expensive than Egyptian rice, except for Chinese medium-grain rice. Significant tonnage of Chinese rice was imported into Egypt during the summer 1999 rice crisis, when prices were unusually high following a disappointing 1998 harvest. The importing firms were not leading rice traders, and the Chinese rice was reported to be old stock that was not suitable for Egyptian consumption. A good part of this stock was later exported to Sudan, which is a less discriminating, more price-sensitive market for rice. The 1999 experience of importing Chinese rice was probably not a fair test of how Egyptian consumers would respond to a somewhat different imported rice. Poor urban consumers will probably buy the cheapest source of calories, even if foreign rice is not ideal for traditional Egyptian and Middle Eastern cuisine.

The scope for reducing the tariff on imported rice is unknown. It appears that there is significant political inertia blocking any future change. GOE officials are also apprehensive about how tariff reduction or elimination would affect domestic production levels and the financial health of the rice milling industry. Many GOE officials, particularly those in MALR and MWRI, would like to see less area cultivated to rice in Egypt, which would lead to significant water savings (for other crops and horizontal expansion schemes in Toshka and North Sinai). Others, particularly FIHC, MPE and Ministry of Industry officials, wish to see the ESA rice mills survive, and they perceive that foreign competition could only reduce the probability that the ESA mills can eventually pay off their purchase loans and achieve financial viability. There is also an underlying realization among many public officials that there has been excessive investment in private rice mills, and that cheap foreign imports could only hurt those mills, leading to lower capacity utilization and more closures. USAID and other donors should contemplate rice tariff reduction as part of a broader trade policy reform program; however, we recommend against making it the centerpiece of any future agricultural policy reform program.

Privatization of Public Rice Mills. After an initial failure (in tranche I), APRP was able to achieve the rice milling privatization benchmarks when MPE privatized the public mills using the ESA mechanism. The legal transfer of title did not automatically translate into an economically viable and well-functioning set of ESA milling companies. Four years after privatization, two or three of the ESA milling companies could probably survive without FIHC support and leadership; the other five or six continue to operate unprofitably (Maziad, 2002) and would likely collapse without FIHC subsidies and advantages, particularly guaranteed access to credit. APRP/Reform Design and Implementation (RDI) Unit managed and ran a series of workshops with the managers of the ESA mills from 1999 through 2001 to strengthen management, improve understanding of the ESA organizational structure, and further develop the ESA organizations. While useful exercises, these workshops are not a substitute for hard-headed economic decision-making on several vexing issues:

- How feasible will it be for ESAs to pay down debt and gain control of their boards and management?
- Should all of the ESA rice milling capacity remain in place or should some mills be closed down?
- At what point will the ESA mills be able to go into the credit market and obtain their own financing?

Conserving Water in Rice Cultivation. APRP's biggest success in the rice subsector came through working closely with MALR and MWRI to coordinate planting of high-yielding, short-season rice varieties in the late 1990s along particular irrigation canals by particular groups of farmers, and in generally strengthening water supply management. APRP served as a catalyst in working across two key ministries that had previously lacked a strong history of

collaboration. This alone is a critical achievement and an enduring part of the APRP legacy, going well beyond the rice subsector. The issue of conserving water used in cultivation of high water-consuming crops, rice and sugarcane, proved to be an excellent focal point for concentrating project and GOE efforts.

In coordinating planting of SSVs in certain irrigation command areas, APRP, MALR, and MWRI ensured that farmers would achieve higher yields and save water (in the aggregate) by synchronizing planting and early harvesting. Extension and monitoring efforts were timely and effective. Water savings were estimated at 13% with the coordinated growing, in pilot command areas, of selected SSVs (EPIQ Team, 1999). The initial focus on saving water in sugarcane and rice cultivation laid the basis for broader collaboration between MALR and MWRI on improved water supply management. As MALR shifted from a completely administered cropping pattern in the 1980s to an indicative cropping pattern for farmers in the 1990s, the risk of mismatching water deliveries with actual needs increased. This highlighted the need for MALR to provide timely input to MWRI on farmers' cropping intentions and actual plantings early in each major growing season. Here is where APRP/RDI Unit and EPIQ staff played a crucial coordinating and technical assistance role in getting MALR extension agents to provide timely data on cropping patterns, irrigation canal by irrigation canal, to MWRI officials, who could then process these data, interpret them at the central level, and pass instructions regarding the timing and volume of Aswan High Dam water releases upstream that would best meet irrigation requirements in the Delta about two weeks later. Benchmarks on improving water management at the directorate level and matching water supply and demand were also successfully implemented; thus water supply management improved, which indirectly benefited rice producers.

Policy Advocacy. A fourth set of APRP policy benchmarks, which cut across commodity subsectors, was the policy advocacy benchmarks. APRP guidance and support to MFT in establishing ACC were instrumental in getting private sector input into policy discussions with key GOE officials. The immediate past Minister (of Trade and Supply), Dr. Ahmed Goueli, and the current Minister of Foreign Trade, Dr. Youssef Boutros Ghaly, were highly supportive of the APRP objective of formalizing private sector input into trade policy debates. APRP provided largely technical and limited financial support to a number of ACC subcommittees, including the Subcommittee on Rice and Grains. Established in 1999, the Rice Subcommittee had superseded the Rice Branch of the Cereals Industry Chamber, based in Alexandria and operating under the umbrella of the Egyptian Federation of Industries[12], by 2001.

The Rice Subcommittee has broad membership, but the most influential members and advocates appear to be exporters. The Subcommittee played a critical role in convincing the Minister of Foreign Trade of the need to subsidize rice exports in 2000/01. The Minister took the brief prepared by the Subcommittee to the Cabinet and got it approved in late January 2001. A subsidy scheme was

implemented, and record export levels ensued (755,000 mt by the end of the marketing season). While the United States Agency for International Development (USAID) and other donors might oppose the use of export subsidies, this particular advocacy success story illustrates the point that empowering stakeholders to defend and promote their interests may not always lead to optimal policy outcomes. Nevertheless, the principle of strengthening policy advocacy by trade and business associations is correct and important.[13]

The Rice Subcommittee engaged in another policy advocacy effort in the spring of 2002. It was considering ways to stabilize paddy prices, which had fluctuated widely during the previous several years. Millers and exporters led this effort, hoping to make paddy input prices more predictable (millers) and milled rice output prices more stable and competitive over time (exporters). The Rice Subcommittee proposal for paddy procurement in 2002/03 by the Rice Marketing Cooperatives was not implemented, however. Implementation of this measure might not be the most efficient or lowest cost outcome, and it would certainly displace thousands of private sector paddy traders and hired workers. The Rice Subcommittee of ACC and the Rice Branch of the Cereals Chamber reportedly lobbied PBDAC for cheap credit to buy the 2002 paddy crop.

Indirect Impacts of APRP Policy Reforms (not Directly Related to Rice). Other policy benchmarks and implementation programs under APRP also affected the rice subsector in important ways. A significant body of work on cotton market liberalization helped cotton survive, although it appeared to be dropping out of the crop mix in 2000, with barely 500,000 feddans cultivated. APRP analysis and implementation activities redressed uneven rates and the extent of liberalization in the rice and cotton subsectors. Without APRP efforts, rice cultivation might have expanded even more, and cotton could have become a marginal crop. APRP helped restore Egyptian lint cotton exports in foreign markets where Egypt's reputation as a reliable supplier had suffered greatly, particularly in Western Europe. APRP benchmarks designed to increase competition in the domestic seed cotton market and increase market outlets for farmers helped make cotton cultivation more attractive to farmers in 2001 and 2002. We urge the GOE to complete cotton marketing reform to avoid excessive area planted to paddy and the re-emergence of large rice surpluses that require subsidies for disposal.

Although the rice subsector study uses a partial equilibrium approach, it is important to think in broader systems terms. Interactions between the cotton and rice subsectors are important. Widely divergent rates and completeness of liberalization can lead to undesirable outcomes. In this case, rapid and complete liberalization of the rice trade led farmers to shift out of cotton into rice cultivation, and it encouraged entry into paddy trading and later, rice milling. Since GOE attempts to privatize the public sector rice milling companies lagged liberalization by 5 years, rather than a more optimal 2–3 years, private investors responded to the opportunities presented by a liberalized rice trade and a withering public milling industry by establishing commercial rice mills. Nothing

comparable has taken place in the cotton subsector, as GOE liberalization has been slow and unconvincing to many private entrepreneurs, and cotton is still perceived widely as the Government's crop.

Future Monitoring and Applied Research Agenda

Although liberalization of the rice subsector is largely complete, there are a number of unresolved policy issues that should be monitored:

- GOE producer price policy, and returns to rice production compared to cotton and maize production
- The role of FIHC in managing and arranging finance for the ESA rice milling companies
- Rice tariff reduction

It is important to monitor developments in the rice subsector for several reasons, even if rice is not the subject of future benchmarks under a later policy reform program. First, the summer crop choice facing farmers is influenced heavily by conditions in different field crop commodity markets. In many areas, rice, cotton, and maize compete directly for the same scarce irrigated land and irrigation water. Farmers' perceptions of the alternative profitability of summer field crops (and rotations associated with those crops) are closely tied to pricing levels at planting time, GOE announcements of minimum producer prices, the range and convenience of alternative market outlets, and demand for particular varieties in trade (particularly in the export trade). Hence, any policy reform program that has cotton as a focal point needs to consider the impact of incentives to plant rice and how high levels of rice profitability (and area cultivated) can undercut any campaign to promote cotton production.

Second, rice is an important export crop (second to cotton among agricultural commodities) that generated over US$100 million per year in foreign exchange earnings from the 1995/96 marketing to 2000/01. Third, rice is a heavy user of water, and if high levels of rice are cultivated (over 1.5 million feddans) in future years, the paddy crop may draw increasingly scarce irrigation water away from new irrigation schemes outside the Nile valley.

Beyond monitoring of future policy decisions and their impact on the rice and cotton subsectors, further applied research and implementation activities are recommended. First, improving estimates of area cropped to paddy, as well as yield and production forecasts and estimates, will benefit all the participants in the subsector. Note that the MVE Unit offered suggestions on how MALR/EAS could improve estimates of area planted to major field crops (Morsy et al., 2002). If improved methods are applied, paddy (and other crop) area estimates will become far more accurate. If disseminated in a timely manner and to a wide audience, these area estimates would greatly benefit producers, traders, millers, and exporters (not to mention GOE officials).

Currently, production information is provided late or is erroneous, which has probably exacerbated market volatility and price swings. Once participants realize (belatedly) that paddy supply is not what they anticipated, their collective response can lead to rather abrupt market (price) adjustments. When into-mill paddy prices rise unexpectedly quickly, they can reach levels too high for millers and exporters to operate profitably. Large swings in export volume from year to year do not help Egypt's reputation as an exporter. This pendulum-swinging behavior, where Egypt is in and then out of markets from 1 year to the next, plagued the cotton subsector from the late 1980s through the mid-1990s; as a result, Egypt lost significant market share to US pima, which was supplied more reliably.

APRP efforts to develop a rice website with data on prices and exports were laudable, but late, and the site was transferred to MFT and not maintained.[14] Improving collection, processing, and reporting of paddy and rice prices is a secondary priority to upgrading paddy area and production forecasts. Timely, consistent price reporting is hard to do well and requires sustained focus and effort.

Another important set of priorities is to monitor irrigation rotations, cropping patterns, and how water savings are used. This is consistent with the GOE objective of making more efficient use of scarce irrigation water. Monitoring whether matching of water supply and demand continues to be implemented effectively in irrigation districts is an important priority. It is also important to determine how theoretical water savings, from short-season rice cultivation, are actually used. For example, do farmers plant a quick-maturing vegetable crop between the rice harvest and planting of the winter crops? Can an economic value be placed on this "saved" water? If the saved water is not used in the Delta where short-season rice is harvested early, can the water be diverted to other parts of the irrigation system (New Lands, North Sinai, Toshka) and used productively?

Policy Recommendations

Based on 5 years of work in monitoring and assessing the impact of policy reform on the rice subsector, we offer the following policy prescriptions:

- Administrative controls on area planted do not work and have rarely been enforced. They need to be dropped. This would help to complete the unfinished agenda of completely removing area and crop pattern controls on producers, an artifact of the 1980s that has no place in the post-APRP era.

- The tariff on rice should be lowered progressively, perhaps 5 percentage points per year over 3 to 4 years. As this occurs, the impact on tariff reduction on rice import levels, domestic rice prices, domestic rice production, and domestic rice milling activity should be monitored closely.

- The GOE should not use export subsidies, even as a one-off solution to a problem of excess supply in a particularly good crop year, if subsidies cannot be sustained in later years. Use of subsidies in one year can create the expectation that subsidies will be implemented in the following years, which has the potential to destabilize the market, as some observers claim happened in 2001/02.

- The GOE should not change the marketing system in a way that excludes private traders. Substituting rice marketing cooperatives or PBDAC for the private trade will likely lead to higher marketing costs, as well as eliminate significant employment opportunities in rural areas. Competition for paddy, rather than a guaranteed market for a particular agency, will lead to the best performance outcomes.

- The GOE and donors should discontinue support to the ESA rice mills, even in providing training workshops. As long as FIHC is managing the ESA mills, they are unlikely to benefit from such training. The FIHC will continue to guarantee ESA mills' access to bank credit, as well as to secure export contracts. The FIHC has proved to be relatively impenetrable to privatization, and barring a change in its leadership, USAID should not contemplate working with FIHC.

References

Brinkerhoff, Derick, John Holtzman, Nabil Habashi, and Adel Mostafa. *The Impact of APRP on the Roles of the Public and Private Sectors in Egyptian Agriculture.* MVE Unit – APRP, Impact Assessment Report No. 20. Abt Associates Inc. Cairo, Egypt. June, 2002.

CAPMAS. *Monthly Bulletin, Consumer Price Index.* Various issues. Cairo, Egypt.

CAPMAS. *Monthly Bulletin, Wholesale Prices Index.* Various issues. Cairo, Egypt.

CAPMAS. *Annual Bulletin of Foreign Trade.* Cairo, Egypt.

El Zanaty and Associates. *Knowledge, Attitudes and Practices of Egyptian Farmers Towards Water Resources.* EPIQ Water Policy Reform Program, Report No. 54. APRP, Cairo, Egypt. March 2002.

EPIQ Team. Keith, John E., Hussein Elwan, Ragab Abdel Azim, Elsayed Mahdy, Jeffrey Fredericks and Ramchand Oad. *Rice Water Use Policy Phase 1: Water Monitoring and Evaluation Program.* APRP – Water Policy Activity, Report No. 26. Water Policy Program: International Resources

Group, Winrock International, Nile Consultants. Cairo, Egypt. December 1999.

EPIQ Team. *Water Saving Through Utilization of Short Duration Rice Varieties: National Policy Package, 1999-2000.* APRP – Water Policy Activity, Report No. 19. Water Policy Program: International Resources Group, Winrock International, Nile Consultants. Cairo, Egypt. June 1999.

EPIQ Team. *Assessment of Egypt's Rice Policy and Strategy for Water Management.* APRP – Water Policy Activity, Report No. 6. Water Policy Program: International Resources Group, Winrock International, Nile Consultants. Cairo, Egypt. June 1998.

Holtzman, John, Gary Ender, Adel Mostafa, Ezz Eldin Abdel Kader, Nabil El Santricy, and Sherif Fayyad. *Effects of Policy Reform Under APRP: Progress Indicators, 1990-2001.* MVE Unit – APRP, Monitoring Report No.4. Abt Associates Inc. Cairo, Egypt. July 2002.

Holtzman, John, Abdel-Rahim Ismail and Samar Maziad. *The Impact of Policy Reform on the Rice Subsector in Egypt.* MVE Unit – APRP, Impact Assessment Report No. 25. Abt Associates Inc. Cairo, Egypt. July 2002.

Holtzman, John and Abdel-Rahim Ismail. *Impact of Policy Reform on the Rice Subsector*, presentation at APRP Impact Assessment Conference, "The Impact of the Agricultural Policy Reform Program in Egypt", 1-4 June 2002, MVE Unit – APRP and Government of Egypt. June 2002.

Holtzman, John and Abdel-Rahim Ismail with Samar Maziad and Sherif Fayyad. *Rice Subsector Baseline Update II.* MVE Unit – APRP, Impact Assessment Report No. 18. Abt Associates Inc. Cairo, Egypt. February 2002.

Holtzman, John. *Liberalization and Privatization of Key Subsectors in Egypt's Agricultural Economy: Progress & Challenges.* MVE Unit – APRP, Impact Assessment Report No. 14. Abt Associates Inc. Cairo, Egypt. November 2000.

Holtzman, John, in collaboration with Abdel-Rahim Ismail and Sherif Fayyad. *Rice Subsector Baseline Update.* MVE Unit – APRP, Impact Assessment Report No. 10. Abt Associates Inc. Cairo, Egypt. January 2000.

Holtzman, John, in collaboration with Charles Stathacos and Abdel-Rahim Ismail. *Rice Subsector Baseline Study.* MVE Unit – APRP, Impact Assessment Report No. 3. Abt Associates Inc. Cairo, Egypt. March 1999.

London Rice Brokers' Association. Various Monthly *Circulars,* 1999-2002. Farnham, Surrey, England.

Maziad, Samar. *Privatization Progress in the Rice and Cotton Subsectors.* MVE Unit – APRP, Impact Assessment Report No. 29. Abt Associates Inc. Cairo, Egypt. July 2002.

Ministry of Foreign Trade, Research and Development Sector. Rice and cotton statistics on www.egyptinc.com. 2003.

Ministry of Public Enterprise. *Privatization Achievements*. Cairo, Egypt. September 2001.

Morsy Ali Fawzy, Abdallah M. Zein El-Din, Mostafa Bedir, Ramzy Mubarak, Bayoumi Abdel Meguid Bayoumi, and Mahmoud Abdel Fattah. *Improving Crop Area Estimation in Egypt.* MVE Unit – APRP, Impact Assessment Report No. 31. Abt Associates Inc. Cairo, Egypt. August 2002.

Morsy Ali Fawzy, Mamadou Sidibe, and Osman Salama. *The Impact of APRP at the Farm Level.* MVE Unit – APRP, Impact Assessment Report No. 28. Abt Associates Inc. Cairo, Egypt. July 2002**.**

Morsy Aly Fawzy, Ahmed Qadery M. Bahloul, Mohamed A. Meselhi, Mohamed Sayed Saeed, and Usama Ahmed El Bahnasawi. *Producer Survey Results, APRP-Tranche I.* MVE Unit – APRP, Verification Report No. 6. Abt Associates Inc. Cairo, Egypt. December 1998.

MPWWR, Water Policy Reform Program, International Resources Group, Winrock International and Nile Consultants. *Assessment of Egypt's Rice Policy and Strategies for Water Management.* APRP-Water Policy Reform Activity. Report No. 6. Cairo, Egypt. June 1998.

MPWWR, Water Distribution Department, Water Management Research Institute, Irrigation Sector. *Water Resources Strategic Research Activity. Strategy of Rice Cultivation in Egypt.* WRSR Publication Series No. 8. Cairo, Egypt. 1996.

Ragaa El-Amir, Hamdi Salem, and Eric Wailes. *Analysis of Egypt's Rice Marketing System: Final Draft Report.* Contract No. 263-0255-C-00-5045-00. USAID/Cairo, DATEX Inc. Arlington, VA. March 1996.

Wailes, Eric et al. *Impacts of Agricultural Policy Reforms on Rice Production, Milling, Marketing, and Trade in Egypt.* Department of Agricultural Economics and Rural Sociology, University of Arkansas, Fayetteville. March 1995.

Zhongping Zhu, Mona El Kady, and David Molden. *Rice Irrigation and Water Saving.* Water Resources Strategic Research Activity, National Water Research Center, Ministry of Public Works and Water Resources. WRSR Publication Series No. 26. Cairo, Egypt. August 1996.

Endnotes

[1] Paddy area cultivated in 2002 was an estimated 1.6 million feddans.

[2] In the baseline study, Holtzman et al. estimated that there were about 2,150 paddy buyers, assuming that each buyer purchased 250 mt on average and that total marketed surplus in 1997/98 was 2,166,493 mt (or 40% of the crop). Surveys near the end of the project raised questions about the validity of those assumptions. First, the producer survey showed that marketed surplus was 81% of the 2000/01 rice crop. This was higher than expected. Hence, marketed surplus for the 2000/01 crop is calculated to be 4.878 million mt. Second, a survey of 31 paddy traders showed the average quantity purchased was 2,572 mt per trader. Dividing marketed surplus of 4.878 million mt by 2,572 mt per trader yields an estimate of 1,897 paddy buyers. Following a similar logic for 2001/02 yields an estimate of 2,323 paddy buyers. The estimate of the number of paddy traders (8,666) was probably too high for 1997/98, as the quantity of paddy traded per buyer was assumed to be far lower than what was later discovered empirically through the MVE Unit trader survey of spring 2002. In the baseline, paddy trading was assumed to be a quarter-time job, leading to an estimated 2,166 full-time equivalent jobs.

[3] Most rice is grown in six Delta governorates in Egypt. The Delta is a circumscribed area relative to all of Egypt and the very large (rainfed) producing areas over which staple crops are marketed in many developing countries.

[4] In the *Rice Subsector Baseline Study*, Holtzman et al. estimated that national milling capacity could handle 7.65 million mt of paddy per year operating at reasonably high levels of capacity utilization (221 days/year for ESA mills; 200 days/year for commercial mills; 120 days/yeaer for small village mills). The largest paddy crop on record was 6.0 million mt in summer 2000.

[5] Custom-milling of paddy for farmers and traders is a lower proportion of total milling done by commercial mills than it is for small village mills, which do little other than custom mill. Sample commercial mills did custom-milling on a low of 12% of the paddy they processed in 2000/01, and a high of 28% in 1999/00.

[6] Note, however, that of the 16 survey mills that were not operating in 2001/02, only two had capacity over 35 mt/day of paddy, and the mean capacity was 31.5 mt/day.

[7] Romania has a tariff on white rice imports of 35%, whereas the tariff on cargo is reportedly 20%. This has led two companies to put up their own rice (polishing) mills in Bucharest, which finish the processing of imported cargo.

[8] This same logic can be applied to the Egyptian tourist and construction industries, relatively free of GOE intervention, leading to booms in the second half of the 1990s. Many would argue, however, that there has been excessive, unprofitable investment in both industries and that shake-outs are inevitable with lingering excess capacity.

[9] *Sortex* is the English brand name for the most widely used sorting equipment. Japanese sorting machinery is also available on the international market, at lower prices than the English Sortex.

[10] In 1998/99, we estimated private sector milling capacity at slightly over 6 million mt (6.014 million mt) of paddy per year. Since then private sector capacity has expanded somewhat, perhaps 10%.

[11] According to MVE's 2001 producer survey, nine times as much labor is hired in cotton cultivation (62.6 days per feddan) as compared to own farm labor (7.7 days per feddan). In rice cultivation, total labor required per feddan is only 29.0 days/feddan, of which 19.6 days/feddan represent hired labor.

[12] During the 1990s, the Rice Branch was perceived as being too closely associated with the GOE, as it received EFI funding and its leader was a public sector rice miller. In recent elections (2001), private sector millers have replaced FIHC or public/ESA mill chairmen as the key leaders of the Rice Branch. Nevertheless, the Rice Branch is largely an organization of rice millers, while the Rice Subcommittee is dominated by large private exporters, whose political clout and access to senior GOE policymakers are considerable. The Rice Subcommittee of ACC appears to be a more powerful and influential organization than the Rice Branch at this point.

[13] See Brinkerhoff et al., 2002, Impact Assessment Report No. 19, for an in-depth treatment of this issue.

[14] Initially developed at www.agpolicy.com, the website was transferred to MFT's Research and Development Sector (now available at www.egyptinc.com; follow the link to Egypt Marketing Information System).

13 Cotton/Textile Subsector in Egypt: Impacts of Policy Reform

John S. Holtzman and Adel M. Mostafa

After 15 years of donor-supported work on liberalizing cotton marketing and privatizing public cotton/textile companies, significant progress has been made, but liberalization is not yet complete. During APRP the private sector has become well-established in seed cotton marketing, ginning, exporting, and spinning, with private market shares expanding in all these industries. Public sector market shares are still significant, though they are declining in most of these industries. Yet the role of the GOE in setting prices and quotas, allocating market shares, and determining which varieties are grown in which districts are still key features of Egypt's cotton economy and threaten to curtail further progress in market liberalization. The very gradual liberalization of the cotton/textile subsector over 15 years contrasts starkly with the rapid and decisive liberalization of the rice subsector over a much shorter period beginning in 1991/92. An indirect effect of differential rates of liberalization has been excessive allocation of scarce resources to rice production, milling, and export, to the detriment of the cotton subsector.

Nevertheless, policy reform in the cotton subsector has led to impressive achievements. APRP strengthened information, analysis, and policy debate on the cotton subsector. This analytical work challenged conventional wisdom that was often no longer valid. APRP analyses were useful in highlighting areas where cotton marketing costs could be reduced, and where lint and yarn quality could be improved. APRP served as a catalyst in strengthening market information on lint cotton exports, seed cotton deliveries to the gins, and domestic lint sales by working closely with ALCOTEXA and CATGO. APRP policy benchmarks facilitated lint imports, which were particularly important in years of domestic cotton production shortfalls. Although the GOE's privatization program stalled by 1999, APRP benchmarks provided incentive for the GOE to privatize some ginning and spinning companies up to 1999.

Across the cotton subsector, private sector companies and cooperatives had begun to advocate policy reform more effectively by the end of APRP. By 2001, ALCOTEXA was dominated and led by private sector exporters, whereas it had been managed by public sector companies for many years. One private ginning company had become an industry leader in adopting improved technology and management methods. Domestic seed cotton traders, represented by the Domestic Cotton Traders' Committee and the crop marketing cooperatives, were able to

protest some arbitrary decisions and rules made by the GOE's Cotton Supervisory Committee in 2000/01, but private sector influence in formulation of seed cotton marketing policy and regulations remained rather weak, representing an area for future improvement.

The cotton/textile subsector is the most important subsector in the agricultural sector in terms of value of output, employment generated, and export revenue. As a major source of foreign exchange, cotton lint earned an average of US$215.4 million per year from 1998/99 through 2001/02, while yarn earned an average of US$161.3 million per annum from 1999 to 2001. A more complete time series is shown in Table 13-1, comparing exports and their earnings for cotton lint, cotton yarn, and milled rice.

It is estimated that cotton production in Egypt employs up to 1 million farmworkers, many of them hired workers used in a labor-intensive production process (including hand-picking the crop). The ginning, cotton trading, and spinning industries together employed over 175,000 people in 2000/01.

APRP's Cotton Policy Reforms

Significant Resources Allocated to Cotton Subsector Reform. Both the Agricultural Production and Credit Project (APCP) and the Agricultural Policy Reform Program (APRP) devoted major resources to reforming cotton subsector policies. Under APCP there were 29 policy benchmarks focused on cotton, initially on removing mandatory cropping pattern restrictions and increasing producer prices (share of world market price), and later on beginning to liberalize seed cotton marketing, ginning, cotton lint export, and the domestic trade in cotton lint. By the time APRP began in 1996/97, significant strides had been made on liberalizing Egypt's cotton economy, but important work remained to be done in completing the liberalization of cotton marketing, privatizing state-owned ginning, trading, and spinning companies, and improving the competitiveness of Egyptian lint, yarn, and textile product exports in world markets. Under APRP there were 36 policy benchmarks directly focused on the cotton/textile subsector and 17 benchmarks indirectly related to it. During the first three tranches of APRP (1996/97 through 1998/99), cotton was a major part of the APRP portfolio.

APRP's cotton subsector benchmarks targeted the following areas (the number of benchmarks is shown in parentheses):

- Market liberalization (6)
- Privatization (12)
- Yarn tariffs and export pricing (5)
- Phytosanitary requirements for lint imports (4)
- Short-season, short-staple varieties (4)
- Pest management (5)

Table 13-1. VOLUME AND VALUE OF COTTON AND RICE SUBSECTOR EXPORTS, 1986/87 TO 2001/02

	Lint Exports			Domestic Lint Use		Yarn Exports		Milled Rice Exports	
Year	Exports (mt)	% of Total Supply	Value (mill. $)	Domestic Utilization (mt)	Use as % of Total Supply	Exports (mt)	Value (mill. $)	Exports (mt)	Value (mill. $)
1986/87	121,350	23.9%	$328.8	281,550	55.4%			105,038	
1987/88	87,781	20.7%	$329.2	270,550	63.7%			108,008	
1988/89	59,973	16.0%	$288.9	253,700	67.8%			31,805	
1989/90	42,962	13.1%	$221.2	247,650	75.3%	76,237	$301.8	85,344	
1990/91	18,005	5.6%	$87.6	277,800	86.2%	80,585	$273.9	136,022	
1991/92	16,644	5.1%	$52.8	266,150	80.8%	69,224	$273.2	176,590	
1992/93	18,072	4.5%	$45.8	284,050	71.3%	65,656	$222.4	133,180	
1993/94	117,006	21.4%	$221.0	271,200	49.5%	110,739	$384.7	256,200	$82.0
1994/95	66,714	16.1%	$146.4	203,050	49.0%	71,024	$326.7	155,608	$55.7
1995/96	18,799	6.4%	$78.1	205,400	69.6%	47,665	$214.4	355,230	$124.7
1996/97	46,438	10.9%	$122.6	201,250	47.3%	68,110	$290.8	166,163	$61.8
1997/98	69,524	13.3%	$160.8	231,100	44.3%	49,905	$227.8	409,118	$130.1
1998/99	108,482	24.8%	$242.5	186,700	42.6%	35,736	$140.0	308,221	$92.9
1999/00	107,146	28.3%	$244.4	144,100	38.1%	46,182	$168.5	337,916	$101.0
2000/01	68,311	22.0%	$164.7	135,381	43.7%	38,991	$145.5	755,434	$158.8
2001/02	102,503	27.8%	$210.1	104,765	29.5%	na	na	332,053	$72.7

Sources: ALCOTEXA, *The Egyptian Cotton Gazette*, various years, ALCOTEXA archives, and weekly ALCOTEXA export statistical updates. TCF *Quarterly Report*, different issues. GOEIC rice quantities and CAPMAS unit values for rice exports.

Notes:

1. The 2001/02 figures are provisional. Export data are commitments (not shipments) through 1 June 2002, but are probably close to final. Utilization data are through 6 June 2002.
2. Export value data are available from ALCOTEXA for the past four seasons. Before 1998/99, export values were calculated by multiplying the opening price x export volume for each variety, and then aggregating the estimated values by variety across varieties. The 2001/02 export value uses the value of export commitments; actual shipments ended up being 94.2% of commitments, so the export value figure is adjusted downward to reflect this differential.
3. Export values are in nominal dollar terms. The dollar, against which the Egyptian pound was pegged in the narrow range of 3.3-3.4 LE = US$1.00 from 1991/92 through 1998/99, was subject to low rates of inflation during that same period.
4. Yarn export data are from TCF for calendar years, where the export year (the second of the 2 years noted in the first column) does not correspond exactly with the cotton marketing year (September of earlier year through August of the next year).
5. GOEIC export volumes for 2001/02 are final through 15 September 2002. The CAPMAS unit value, used in calculating total dollar export revenues, is calculated only for the first 6 months of the 2001/02 marketing season (through March 2002).

Other benchmarks not specifically targeted to the cotton subsector included those designed to strengthen research and extension (5), market information (7), and export promotion efforts (5).

Mixed Level of Accomplishment of APRP Benchmarks. Although most APRP policy benchmarks designed to liberalize the cotton market were accomplished, not all APRP benchmarks were accomplished and not all achieved the desired

impact in the short term. APRP work on clarifying the Ministry of Agriculture and Land Reclamation's Central Administration for Plant Quarantine (MALR/CAPQ) phytosanitary rules regarding lint imports and encouraging importation of cheap foreign short- and medium-staple cotton lint led, with a lag, to expanded imports that provided some Egyptian spinners with cheaper raw material. APRP efforts to promote *hirsutum* cultivation met with some resistance from the Cotton Research Institute, but by 2000/01 it was clear that Egypt's short- to medium-term strategy for obtaining cheaper short-staple cotton should be to import (subsidized) foreign lint rather than to allocate scarce irrigated land to *hirsutum* production.

APRP's efforts to move the provision of cotton pest management services into the private sector were very successful. As discussed in detail in chapter 16, the GOE's role changed from one of actually providing this service directly to farmers to one where the Government developed pesticide use guidelines and standards, registered, licensed, and trained private pesticide companies, and enforced compliance with the new standards.

APRP support to the Ministry of Public Enterprise (MPE) and the textile holding companies on privatization had mixed results. As APRP began, two public ginning companies were privatized through stock market flotations, and groups of anchor investors[1] bought up controlling blocs of shares. One ginning company, Arab Ginning, became an industry leader in introducing new cleaning, ginning, and baling technology at its gins. Unlike the ginning industry success, APRP was unable to make any progress in privatizing public sector cotton trading companies, which continue to dominate seed cotton marketing (along with the Horticultural Services Unit, another public entity) and retain large export market shares. Vigorous APRP efforts to privatize spinning companies during the first three tranches supported MPE during the first half of APRP (1996-1999) in selling two companies via stock market flotations, arranging three long-term leases, considering the use of management contracts, and actually liquidating a handful of poorly performing textile companies. By 1999, however, textile and ginning industry privatization had completely stalled, and no additional progress was made under APRP. Benchmarks related to textile holding company debt reduction and improved textile inventory management, which were designed to reinforce the privatization process, were not accomplished, and questions were raised about MPE's resolve to privatize public spinning companies in the troubled textile industry.

APRP Implementation Activities

APRP, with support from the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)–funded Cotton Sector Promotion Programme (CSPP), helped to move market liberalization forward. APRP and CSPP worked closely together to make the process by which the cotton varietal map is determined more transparent and market-driven. In addition, APRP examined the cotton pricing system in Egypt in 1996/97 and proposed a deficiency payment scheme for

1997/9898 (Ariza-Nino et al., 1998) designed to increase private sector participation in seed cotton buying from virtually zero in 1996/97 while shifting the financial burden of the high producer support price to the GOE. APRP also analyzed cotton marketing costs and proposed ways to reduce them in an effort to make Egypt a more competitive exporter of cotton lint. Furthermore, APRP lobbied over the life of the entire policy program to increase private sector participation in seed cotton marketing, ginning, trading, export, and spinning. In promoting cotton lint exports, APRP tried to eliminate administered prices at different levels of the marketing system, to rationalize and simplify the cotton grading system, and to introduce HVI (high-volume instrument)[2] testing of all exported lint cotton bales. Significant APRP efforts went into strengthening cotton production and marketing information, including implementation activities designed to improve cotton yield and area estimates, information on seed cotton prices, and information on the spinning characteristics of exportable lint cotton. Finally, APRP assisted the MPE/Public Enterprise Office (PEO) to develop and use alternative privatization methods, including leases and management contracts.

In addition to many benchmarks affecting the cotton/textile subsector, APRP participated in a series of implementation activities that complemented, and in some cases went well beyond, the formal policy benchmarks. These implementation activities included the following:

- APRP lobbied the GOE to free cotton prices at different levels of the marketing system. At the same time, APRP advised the GOE to adopt a deficiency payment scheme in 1997/98 to cover the difference between the high domestic seed cotton price and the lower international lint export price. This was designed to provide an incentive for the private sector to participate in the cotton trade, despite GOE pricing and financial difficulties.

- APRP analyzed ways to reduce cotton marketing costs, advocating elimination of *farfarra*[3] in Alexandria, as well as pressing of lint cotton in universal density (UD) bales at the gins for direct export. This economy cut several cents per pound off of marketing costs between ginning and export (referred to as "fobbing costs" in Egypt).

- APRP lobbied the GOE for broader participation in seed cotton marketing, including buying by private traders at the Principal Bank for Development and Agricultural Credit (PBDAC) rings and outside those rings, as well as by cooperatives.

- APRP, with support from CSPP, lobbied the cotton varietal committee of MALR to make changes in the varietal map after the sudden cancellation of Giza 75 in 1998. Vigilant APRP intervention in 1999/00 led the committee to reconsider phasing out Giza 70, a high-yielding extra-long staple (ELS) variety, which was considered in "low demand" because carryover stocks had piled to high levels following marketing seasons during which the Alexandria

Cotton Exporters Association (ALCOTEXA) had set the Giza 70 price too high.

- APRP promoted lint cotton exports (by encouraging market-based pricing), simplified grading (and price differentials across grades based on market demand rather than fixed, administered intervals), HVI testing of export lots, and development of the Egyptian cotton logo. Promotion of the logo was passed to CSPP after an initial APRP push.

- APRP strengthened market information on the seed cotton market in several ways, which are discussed in detail later in this chapter.

- APRP's Monitoring, Verification and Evaluation (MVE) Unit worked closely with MALR/Economic Affairs Sector to develop an improved method for forecasting cotton yields (2000/01) during the growing season. This was actually implemented in 2001/02. The MVE Unit also showed MALR how to improve estimates of area planted to seed cotton and other field crops.

- APRP's Reform Design and Implementation (RDI) Unit assisted the MPE/PEO in developing privatization methods other than sales to anchor investors or stock market flotations. The most notable achievement was helping PEO develop and issue guidelines for leasing and management contracts in 1999.

APRP collaborated effectively with the MALR/GTZ CSSP in the following activities:

- Reviewing the cotton grading system and seed/lint cotton quality issues
- Annual reviews of the cotton marketing system decrees (the Optional System) and actions to ensure the broadest possible participation in seed cotton buying
- Review of the annual varietal map and proposed recommendations to expand area to promising varieties
- Developing the cotton logo and promoting its use under license to ALCOTEXA

The two programs complemented one another, with APRP focused more on policy and CSPP focused more on technical areas in cotton production. APRP concentrated on cotton market liberalization, trade policy reform (on both imports and exports), privatization, and promotion of private investment. CSPP technical advisors worked on issues such as the effectiveness of the extension service in promoting cotton production, cotton agronomy, pesticide use in cotton production, and expanded planting of delinted seed (particularly acid-delinted seed).

Implementation of various cotton subsector activities and work on developing policy benchmarks greatly improved the understanding of the cotton production, marketing, and processing system. In addition to being major consumers (and demanders) of cotton production and marketing information, APRP and CSPP

generated, analyzed, and synthesized far more detailed information than was previously available about cotton yields, production practices, seed cotton buying, lint cotton trading, domestic spinning, and the world market for fine cotton lint (long-staple and extra-long staple). Several methods were used to generate this information and analyze it in a way that improved the cotton subsector knowledge base:

- Sample surveys of cotton growers, traders, and spinners
- Periodic structured informal interviews with cotton trading companies, selected public, joint investment and private spinners, and holding company, the Cotton Arbitration and Testing General Organization (CATGO), the Textile Consolidation Fund (TCF), MALR officials, and other key informants
- Detailed economic and financial analysis of the competitiveness of yarn production of different counts by domestic spinners, using different types of raw material (different Egyptian lint varieties versus cheaper imported short-staple lint)
- Partial equilibrium modeling (1997) of the impact of export and seed cotton pricing policies on cotton output, domestic utilization, and lint export sales
- Linear programming optimization modeling of the best varietal mix in Egypt, using secondary cotton yield data and alternative pricing levels

Probably the greatest intellectual contribution of APRP was its frequent challenging of often- incorrect conventional wisdom; that is, it questioned unchallenged assumptions. For example, officials in public sector trading companies insisted that all cotton lint exporters were required to have *farfarra* done in Alexandria by the Alexandria Pressing Company, a public company, at relatively high cost. In some cases, foreign buyers prefer this *farfarra*, but in other cases they do not, and they reacted positively to the cost savings made possible by baling with UD presses at upcountry gins. In 1996/97, the ALCOTEXA Management Committee, led by public sector trading company chairmen, adamantly opposed introduction of UD baling, which actually was introduced late that marketing year on a trial basis. By 2000/01, probably over half of all export bales were pressed at the gins and exported directly, resulting in cost savings.

Another example of how outdated information and misleading conventional wisdom influenced cotton subsector policy is the holding company overestimates of domestic lint requirements. The conventional wisdom at the beginning of APRP was that domestic spinners required at least 4 million lint kentars (mlk) of Egyptian cotton. While domestic utilization was indeed 4 or more mlk per year from 1994/95 to 1997/98, it began to decrease steadily after that, dropping to an estimated 2.7 mlk in 2000/01.[4] The perception that 4.0 mlk were required by domestic spinners no longer reflected reality by the end of the 1990s, although the Holding Company (HC) insisted in 2000/01 that 4.0 mlk needed to be reserved for domestic use. This led the HC, the Ministry of Economy and Foreign Trade (now the MFT), and MALR to impose quotas on lint exports, particularly for long-staple varieties such as Gizas 85, 86, and 89. Exports in 2000/01 were lower than they could or should have been that season, because ALCOTEXA and the GOE

sent foreign buyers the wrong signals early in the export marketing season (fall 2000) about the strength of domestic demand for long-staple varieties and available levels of long-staple lint for export.

Although APRP's questioning and challenging of assumptions undoubtedly annoyed many GOE, HC, and public company officials, it did improve the quality and level of the policy debate on cotton. It also helped to stimulate a constructive dialogue between various GOE entities and private sector representatives (of several industries, including trading, ginning, and spinning). While APRP may have been perceived by some individuals in the public sector as championing the private sector, regardless of the consequences, most participants in the policy debates realized that APRP was a neutral broker that looked at the overall situation and worked for an improved and more competitive cotton marketing system, as well as a strengthened domestic spinning industry. It was not clear who would play this role after APRP ended; one hopeful sign of continued dialogue has been the cotton subsector strategy exercise involving the MALR, the High Cotton Council, and CSPP. This was completed in March 2003 with a workshop attended by 120 participants (CSPP, March 2003).

Assessing Effects of APRP Policy Benchmarks and Implementation Activities

Cotton Market Liberalization. After an uneven start to the liberalization process in the mid-1990s, and the virtual sidelining of the private sector from seed cotton buying and lint trading in 1996/97, considerable success was achieved in market liberalization by 2001/02. As noted earlier, strong economic analysis supported the market reform process throughout APRP. This raised the level of public discussion of key issues about needed reforms, their sequencing, and their probable impact. The APRP/RDI Unit and CSPP were not private sector ideologues; rather, they were sensitive to Egypt's need to proceed cautiously and gradually in liberalizing a subsector characterized by many controls and parochial interest groups.

Probably the greatest achievement of the policy benchmarks that were focused on market liberalization was support to private traders and cooperatives to set up their own seed cotton collection points. This broke the virtual monopoly of PBDAC and the Cotton Marketing Supervisory Committee, chaired by the head of PBDAC, in allocating cotton buying rights and locations. By 2001/02, the PBDAC ring system was still firmly entrenched, but there were record numbers of private "rings" and collection points. It is clear that CATGO is now committed to grading seed cotton at any buying point in Egypt that applies for CATGO grading services. As late as September 2000, during the 2000/01 marketing season, there was uncertainty over whether CATGO would provide seed cotton grading services at private rings or outside gins. Once Ministers Youssuf Wally and Youssef Boutros Ghaly publicly expressed their support for the right of private traders to establish their own buying centers and CATGO's obligation to grade their seed cotton in late September 2000, this principle has not been questioned. It is now GOE policy.

APRP and CSPP worked closely with private sector exporters to develop a strong counter force against the HCs and their affiliated cotton trading companies, which completely dominated seed cotton marketing in 1996/97. APRP economic analysis supported the advocacy efforts of these leading private trading companies (who supply both the domestic and export markets, though increasingly the latter). APRP and CSPP international market studies for lint and yarn improved private and public participants' understanding of world cotton markets and Egypt's high-end niches in those markets. Study tours, special studies, and visits by qualified technical consultants to Egypt provided leading private trading and ginning companies with better knowledge of ways to improve their technical efficiency (through better cleaning of seed cotton and reduction of contamination), their economic efficiency (by using UD bale presses at gins, which lowered marketing costs), and their competitiveness (by improving the quality of their fine cotton products) when faced with stiff international competition by lower-cost, yet lower-quality fiber, albeit generally with less contamination.

Improving Cotton Market Information. This proved to be a daunting task, as the GOE historically had not released cotton market information widely nor in a timely manner. Much work remains to be done in this area. Despite the unfinished task, APRP became a valuable source of market information and analysis, which was made available to anyone interested.

APRP became an excellent source of empirical information on the entire cotton/textile subsector—not just market information—assembling and analyzing a vast array of secondary data, much of which was (previously) unpublished. APRP also generated new knowledge through formal surveys of cotton producers, seed cotton traders, and private spinners, as well as structured informal interviews with many subsector participants, including managers of ginning, trading/exporting, and spinning companies. By the end of APRP, the MVE Unit had developed and refined an internally consistent set of key monitoring indicators on output/throughput, earnings, and employment on seed cotton trading, ginning, and lint/yarn exports that covered the period from 1990 through 2001. These indicators focus on aggregate output and export earnings, as well as on public and private shares.

APRP and CSPP used the empirical information from their formal surveys, informal interviews, and analysis of secondary data to raise the level of analysis and debate on cotton subsector issues to a much higher level. APRP introduced rigorous economic analysis of production and marketing costs, prices, and returns, subsector structure and performance, and Egypt's export performance and competitive advantage. Better information and economic analysis enabled APRP to challenge previously unquestioned assumptions about the Egyptian cotton subsector, to stimulate a constructive dialogue between the public and private sectors, and to serve as a neutral broker in policy debates involving various stakeholders. During this process, the private sector became better able to articulate its policy views and carry out advocacy efforts, and private sector

participants strengthened their understanding of world markets and technology options.

APRP also encouraged CATGO to publish its weekly bulletins of the cotton marketing situation. It also helped CATGO add data on HVI test results on export lots of lint cotton to its website (http://www.egyptcotton-catgo.org/index.html). APRP urged CATGO to expand its distribution of hardcopy bulletins to a wider audience, which it did in 2001/02. Still, fewer than 100 individuals receive copies of the bulletins; this group includes MALR and HC officials, heads of public trading and ginning companies, heads of larger private export companies, academics, and newspaper/magazine reporters. APRP advised CATGO to post as much data as possible from the weekly marketing reports on its website; during the 2002/03 marketing season, CATGO posted a lot of useful information on cotton marketing, prices, exports, domestic utilization, and stocks on its website.

Early in APRP, the RDI Unit worked closely with MALR/EAS to obtain international market information from leading websites (Food and Agriculture Organization of the United Nations [FAO], U.S. Department of Agriculture [USDA], International Cotton Advisory Council [ICAC]). This information was downloaded and included in quarterly situation and outlook reports. Unfortunately, MALR added little value to this world market information and made little attempt to link it to the domestic market situation.

The MVE Unit worked with MALR/EAS over two production seasons to develop a method for forecasting seed cotton yields during the growing season. As the improved methods to forecast yields were being implemented in the field, MALR shifted its attention to improving area estimates for key field crops, including cotton. The MVE Unit also assisted informally with this work.

ALCOTEXA established its website (http://www.welcome.to/alcotexa) in 1999/00, to which it has posted weekly market reports consisting of a series of spreadsheets that detail the volume of export sales for the week and for the season, by variety, exporter, export destination, and buyer. The estimated value of those export sales commitments (where shipments lag commitments during the marketing year) is also calculated per variety by exporter, based on official minimum export prices. APRP provided little impetus to this effort. ALCOTEXA actually began issuing hardcopies of several MS Excel tables each week in 1996/97. Putting this information on its website simplified distribution and lowered the cost. Whether more cotton market participants are able to access these data is not clear. Cotton traders would need electricity (widespread), a computer and modem (not so widespread outside Cairo and Alexandria), an internet service provider (ISP, typically based in Cairo and Alexandria and hence a long-distance call for traders outside those metropolitan areas), MS Excel software, the expertise to use all of the above, and the ability to read tables in English. ALCOTEXA does not keep count or detailed information about internet "hits" by user type, but it is likely that only a few small- to medium-size domestic cotton traders consult ALCOTEXA's website. Nevertheless, over time this will

change as computers and internet cafes become more widely used, even in Upper Egypt.

An internet-based innovation worth mentioning is APRP's attempt to develop a cotton website (initially on www.agpolicy.com), which was transferred to the Ministry of Foreign Trade's (MFT) Research and Development Sector (now available at www.egyptinc.com; follow the link to Egypt Marketing Information System). The commodities covered include cotton and rice (sub-sites developed by APRP) and melons, strawberries, grapes, and mangoes (developed by the Agricultural Technology Utilization and Transfer Project [ATUT]). The cotton sub-site covers export prices of Egyptian lint, compared to U.S. pima, production of Egyptian lint varieties and pima in the United States, and supply and use during 2001/02. Unfortunately, this website was not updated by MFT after spring 2002, so APRP's innovation has not been sustained. In contrast, the CATGO website has been significantly improved with CATGO's own resources. The lesson of this episode is that improvements in market information systems need to be strongly supported (and largely funded) by a government agency. Donors can provide support at the margin, as APRP did in advising CATGO on website design, what types of information to display on the web, and how to organize and display certain types of data. When a project or donor agency is the main impetus for a marketing information system (MIS) investment, and that investment takes place late in a project or program, its chances of being sustained are slim. This is what happened with the two APRP-funded and -developed websites.

The issue of sustainability of market information enhancements is a difficult one in the Egyptian government context, where salaries and work performance expectations are low. MALR's capacity to carry out economic analyses of production, market supply, price, and trade data is limited, and incentives to do timely, thorough analyses are lacking. Cotton policy has historically been made by the Minister of Agriculture and Land Reclamation in consultation with a small group of key decision-makers in MALR and the Agricultural Research Center (ARC); price levels at different points in the marketing chain have been set administratively. Although the group of decision-makers who set cotton marketing and price policies is wider than it was 10 years ago, it still appears that such decisions are the prerogative of a tight, inner circle who give low priority to economic analysis. The key question is whether senior GOE policymakers want and demand timely and accurate market information, and what they are willing to pay to obtain such information when needed.

As stated previously, dissemination of MALR data and reports is not wide enough. CATGO's weekly reports are issued on a timely basis, though distribution of hardcopy is limited. More and more information is being posted to the CATGO website, however. MALR, MPE, textile holding company, and PBDAC data are still treated as proprietary and often are released only after they are no longer of any trade value to the private sector. For example, cotton area estimates may not be made available until well after harvest, and even then they are considered preliminary and subject to ministerial review and adjustments. ALCOTEXA

export data are probably the most accessible, in part due to a well-functioning MIS Unit and website, which is updated in a timely manner. ALCOTEXA has sufficient funds to maintain and strengthen its website, as well as an apparent interest and commitment to doing so. The same cannot be said for MFT, whose website has not been sustained nor for MALR.

Facilitation of Lint Imports. Five benchmarks were devoted to this objective in tranches I through III of APRP. These benchmarks provided technical assistance for and pushed MALR/CAPQ to consolidate and clarify phytosanitary rules governing lint imports. After the conclusion of tranche III, these efforts still had not led to unqualified success. Costly double fumigation and flying MALR inspectors to shipping countries (and their ports of embarkation) appeared to be hard-and-fast requirements that added significant cost to importing cheaper lint. Actual imports of foreign lint were disappointingly low in 1996/97 through 1998/99, mainly because large Egyptian cotton crops and massive lint carryover led the HCs to discourage imports. The short cotton crops of 1999/00 and 2000/01 changed the domestic supply situation, however, and imports expanded quickly to fill domestic shortfalls. A prime consideration propelling imports was relative prices, however. Egyptian lint, already expensive raw material for domestic spinners who spun largely low- to medium-count yarn, became relatively more expensive than the shorter-staple cotton grown in Greece, Syria, Sudan, and the United States. The large price differentials meant there was a strong economic incentive to import cheap foreign lint. The HC became the main importer of, first, Greek medium-staple cotton in 1999/00 and, later, Syrian short-staple lint in 2000/01, although one large joint investment spinning company (Misr Amriya) successfully imported Greek lint, and several importers brought in medium-staple Sudanese *acala*. Double fumigation is still required for shipments from Greece and Syria, although it appears that Egyptian importers did not have to bear the full cost of flying MALR inspectors to the exporting country and all their expenses while they were in that country.

The groundwork laid by the five APRP benchmarks paid off in 1999/00 and 2000/01, although it is critical to recognize that economic necessity (shortfalls cotton crops) was probably a more important factor in facilitating lint imports. The increasing ease of importing short- and medium-staple lint made introduction of *hirsutum* cultivation in Egypt appear unnecessary. Some analysts argue that Egypt should not be allocating scarce irrigation water to growing inferior *hirsutum* cotton, when it can grow fine *barbadense*, particularly when the European Union (EU) (especially Greece) and the United States are willing to subsidize their domestic cotton producers and exports of upland cotton. Furthermore, low prices for Syrian and Sudanese lint led analysts to conclude that *hirsutum* cultivation in Egypt is a non-starter as long as world upland prices are low. Finally, the Cotton Research Institute (CRI) has never really supported *hirsutum* cultivation in Egypt. Ostensibly, the CRI is afraid of varietal mixing. When assured that no one is talking about *hirsutum* cultivation in the (old) Nile Valley, CRI resistance softens a bit, but the chief breeders have no interest in breeding or adapting inferior upland varieties to Egyptian growing conditions, which are ideal for *barbadense*.

Their strategy appears to be one of producing high-quality fine cotton as if lint quality alone has some absolute or intrinsic value. Economic considerations, as in rigorous cost-benefit analyses, do not appear to play a part in such thinking. Most non-Egyptian analysts view the world market niche and potential for *barbadense* as quite narrow; that view does not seem to affect the thinking of many CRI and MALR officials in Egypt.[5]

Privatization of Public Ginning and Textile Companies. Privatization of two public ginning companies was well under way by the time the APRP technical assistance teams arrived, although there was one ginning privatization benchmark in tranche I. At least one public ginning company was privatized before June 30, 1997, so the benchmark was accomplished and MPE action exceeded expectations. Following the fall 1996 privatization of the Arab Ginning Company and the spring 1997 privatization of the Nile Ginning Company—both through stock market flotations—progress in privatizing ginning companies stalled. Despite going diligently through the valuation, preparation, and advertising processes, the MPE was unable to privatize any of the three other public ginning companies. High valuations, driven by high land values, made privatization a costly proposition. Some private cotton trading companies expressed limited interest in buying selected gins in production zones with successful export varieties, but the MPE did not endorse or encourage this approach. By 1999, the entire agribusiness privatization program had slowed to a crawl. Public rice milling companies could be privatized only by offering them to employees as employee stakeholder associations (ESA).

Progress in the privatization of textile companies is somewhat more positive, though also disappointing, particularly since 1999. The 1996/97 and 1997/98 periods witnessed successful privatizations, through stock market flotations, of three public textile companies: Unirab, Alexandria Spinning and Weaving, and KABO. In 1998/99, one liquidation and two leases were completed. One of the lessees is reportedly struggling, while the other appears to be doing well. In 2001, three management contracts were terminated with foreign textile consulting and management companies.

It is important to note that during APRP, private investments were made in open-end spinning units, as well as one ring spinning operation specializing in producing high-count yarn. Another ring spinning start-up was supposed to begin operating in late 2002. These niche spinning investments are partially a response to economic opportunities created with the gradual liberalization of the cotton/textile subsector, but they are also a calculated effort to target niche market segments (open-end spinning of low counts; high-end ring spinning of fine counts) not well served by the public sector spinning companies.

Evaluation of General Progress in Cotton Subsector Liberalization During APRP

The following section outlines accomplishments in subsector liberalization during the APRP era, describes changes in subsector structure, conduct, and performance, and offers some observations on attribution to APRP.

Increased Private Sector Market Shares. The biggest achievement of cotton policy reform in Egypt has been the strengthening of the private sector in the seed cotton trade, ginning industry, lint export business, and spinning industry. Since 1994/95, private sector market shares have expanded significantly, with the exception of the trade in seed cotton, as shown in Table 13-2. Figure 13-1 is a graphical representation of changes in private shares, coupled with notes about the timing of major policy and regulatory events. By 2000/01, the private sector share had attained 36-51 percent in four key cotton industries, representing impressive progress. The exit of the private sector from the seed cotton market in 1996/97 was followed by a slow but steady re-entry of private traders since 1997/98. The

Table 13-2. CHANGES IN PRIVATE SECTOR MARKET SHARES OF OUTPUT/TRADE IN SELECTED INDUSTRIES OF COTTON SUBSECTOR, 1994/95 TO 2000/01 (%)

Industry	1994/95	1996/97	1998/99	2000/01
Seed cotton trade	30.8	0.1	19.6	36.2
Ginning	23.4	24.0	39.6	41.6
Lint export	4.3	8.8	27.3	51.4
Yarn output	14.3	24.9	35.9	40.1

Sources: Holtzman et al., 2002b. Krenz et al., 2001.
Notes:
1. 1994/95 is chosen as the base year because it was the first year of cotton market liberalization.
2. Shares for the seed cotton trade represent deliveries to the gins. Note that this is an underestimate of the share of seed cotton bought by private companies directly from farmers (so-called first purchases–both within PBDAC rings and outside the ring system, partly by private traders at private rings and partly by [multipurpose] cotton marketing cooperatives).
3. The ginning share for 1994/95 represents lint cotton output of (public) gins leased by private companies. There was no private ownership of gins until 1996/97, when Arab Ginning operated as a private ginning company and there continued to be some private leaseholds of public gins.
4. The private sector share of lint exports for 1994/95 is not available; the reported figure is actually for 1995/96.
5. Yarn output includes production of 100% cotton yarn (the vast majority) as well as cotton/synthetic blended yarn (mainly cotton/polyester). Note that yarn output is for GOE fiscal years (July to June) rather than cotton marketing years (September to August).

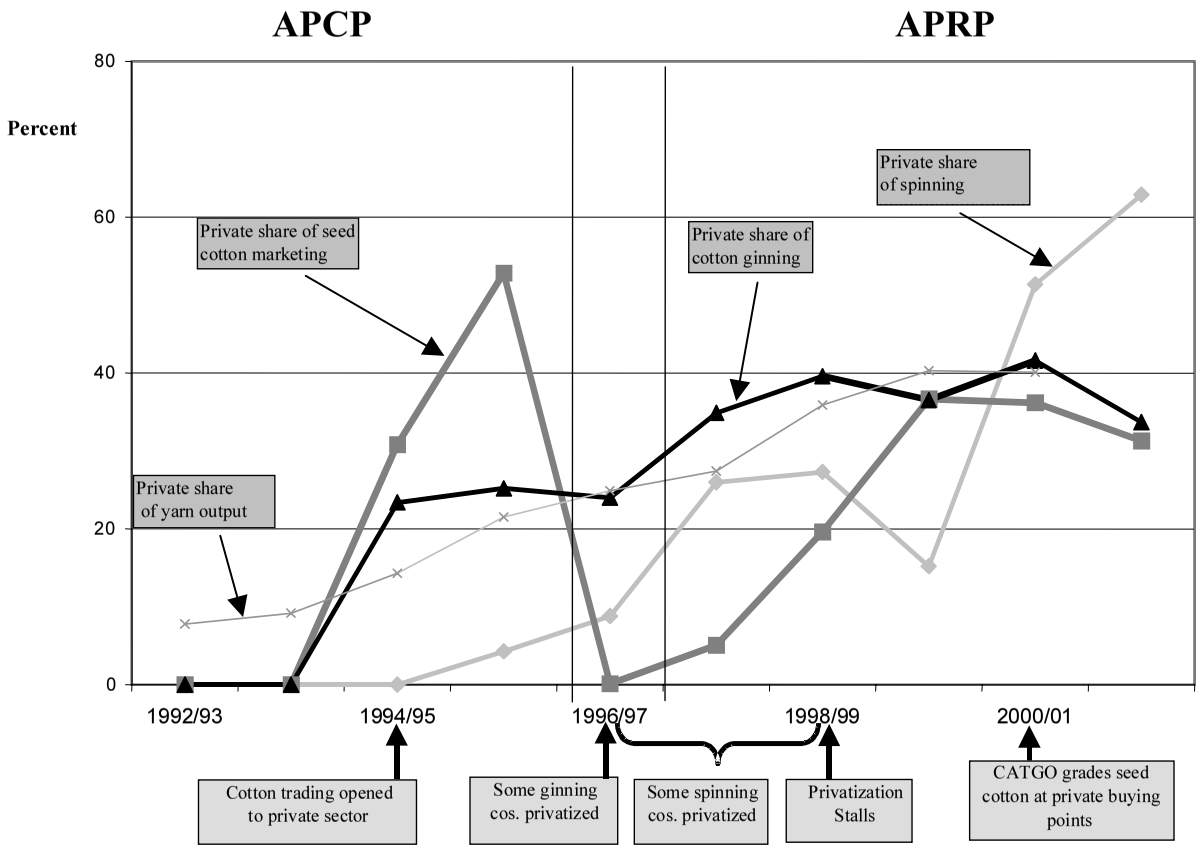

Figure 13-1. CHANGES IN PRIVATE SECTOR MARKET SHARES BEFORE AND DURING APRP

private sector share of seed cotton marketing was highest in 1995/96, when it was 52.8 percent. Between 2000/01 and 2001/02, private sector shares dropped slightly for the seed cotton trade (to 31.3%) and ginning (33.7%), while expanding for lint export (62.9% of export commitments) and probably for yarn output (though no figures are available).

By the end of APRP, the private sector share in ginning mirrored private ginners' share of capacity (38.1%). Another important change during liberalization was the decline in ginning capacity during APRP. The 72 gins and 4,354 ginning stands of 1996/97 decreased to 58 gins and 3,782 stands in 2001/02, a decline of 13.1 percent in ginning capacity. While gin closures led to some reduction in capacity, the industry was still plagued by excess capacity at the end of APRP, which undoubtedly deterred further privatization. Private investors were unwilling to buy excess capacity, and when they showed interest in individual gins in zones where export varieties were grown, the GOE expressed no interest or intent to sell individual gins.

It is important to note that increases in the private share of lint exports and yarn output have come, in part, at the expense of a declining public sector. Public cotton trading companies' export commitments, as of late July 2002, were as low (in absolute terms) as they had been since the poor export marketing year of 1995/96, when only 18,800 metric tons (mt) of extra-long staple (ELS) lint were shipped. The main reason for the poor export performance of the public trading companies in 2001/02 was aggressive pricing of lint exports by private exporters, who offered discounts of 5¢ to 20¢ per pound below ALCOTEXA's minimum export prices. Unable to offer discounts of this magnitude to foreign buyers, public trading companies had received commitments for only 37,571 mt, of a total of 102,961 mt as of late July. At the same time, unsold stocks of lint had piled up.

The major increase in the private sector share of yarn output is due in part to an impressive increase in estimated private sector production, from 25,212 mt in 1992/93 to 91,914 mt in 2000/01. Over that same period, output from public spinning companies decreased from 266,946 mt to 114,079 mt, a 57% drop. This led to an overall decrease in total yarn output to 29% from 324,369 mt in 1992/93 to 229,101 mt in 2000/01.

Other Changes in Cotton Subsector. Some important changes in key performance indicators between the early years of cotton subsector liberalization (the APCP era from 1987/88 to 1994/95) and the APRP period (1996/97 through 2001/02) were as follows:

- Area cultivated to seed cotton dropped from an average of over 1 million feddans per year during the 1980s to 821,500 feddans per year during the 1990s (and 708,600 feddans from 1997/98 to 2001/02).

- The number of ELS varieties cultivated decreased from four main varieties in 1995/96 to 1998/99 to two main varieties in 2000/01 and 2001/02.

- Domestic utilization of Egyptian lint as a percentage of total supply decreased from two-thirds or more of total lint supply from 1987/88 to 1992/93 to no higher than 47% of lint supply during APRP (see Table 13-1). This reflected an overall expansion in lint exports while domestic utilization declined.

- Domestic spinning of ELS lint decreased from 22% (1988/89 through 1994/95) to 9% (1995/96 to 2001/02) of total Egyptian cotton utilization. Use of both Delta long-staple (LS) lint and Upper Egypt LS lint increased. Decreased use of ELS by domestic spinners, who tended to produce coarse- to medium-count yarns, reflected a more rational use of Egypt's fine cotton lint.

- Domestic utilization of Egyptian lint decreased from over 5.3 mlk per year from 1986/87 to 1993/94 to less than 4.0 mlk from 1998/99 to 2001/02. This reflected a decline in the output of public spinning companies, due in part to the loss of the undiscriminating Soviet Union market and lower yarn exports. It also reflected the declining competitiveness of public spinning companies, while private entrepreneurs started to make selective investments and changes in privatized companies that increased productivity and captured market niches.

- The ratio of year-end lint stocks to use was less than 20% for each year from 1986/87 through 1991/92. Stocks or carryover ballooned in 1992/93 to 44%, but ended up being at least 40% in 6 of the subsequent 9 years. Opening stocks were highest at the beginning of 1997/98 (3.6 mlk) and 1998/99 (4.2 mlk), and then declined by nearly 1 mlk per year to 1.075 mlk in 2001/02—the lowest level since the early 1990s. Carryover returned to the relatively high level of 2.4 mlk by the beginning of 2002/03, equivalent to 119,092 mt. High levels of carryover stocks was a persistent problem during the APRP years, due to seed cotton overpricing and overproduction in some years, declining domestic utilization of lint, and the decreasing competitiveness of the product from Egyptian spinning companies (particularly public companies) in world markets. Such persistently high carryover is evidence of inefficient allocation of resources.

- Exports as a proportion of both production and total supply (including carryover) was higher during APRP (22–28% from 1998/99 to 2001/02) than during most of APCP (less than 20% in all years but one, 1993/94). This reflects a sustained effort by ALCOTEXA to win back lint markets that had been virtually lost to U.S. pima during the early 1990s, when exports averaged only 17,567 mt/yr.

- The volume of ELS exports exceeded LS exports from 1987/88 to 1992/93, while it fell short (often far short) of LS exports from 1996/97 to 2001/02 during APRP. This shift in the lint export mix followed world spinning industry trends and demand (to use less ELS than LS lint in producing less higher-count yarn).

- While the value of ELS lint exports ranged from 60% to 80% of the total value of Egyptian lint exports from 1987/88 to 1992/93, it never exceeded 50% during APRP. The average value of Egyptian cotton lint per pound was far higher in the late 1980s than during APRP, when it decreased from $1.20/pound in 1996/97 to $0.94/pound in 2001/02. ALCOTEXA adjusted opening lint export prices downward during several years of APRP in light of weaker international demand and lower world prices, albeit often with a lag and not as sharply as warranted by softer market conditions.

- The total value of Egyptian lint exports expanded from US$78.1 million in 1995/96 to US$242.5 million in 1998/99. The nominal dollar value of exports averaged US$195.7 million from 1997/98 to 2001/02.

- Leasing of public gins by private trading companies accounted for about 25% of ginned output in 1994/95 and 1995/96, the first 2 years of liberalization (under APCP). Following privatization of two ginning companies in 1996/97, ginned output from privately owned gins ranged from one-third to 41.6% of total output from 1997/98 on.

- The estimated private sector share of Egyptian yarn production increased from 8% in 1992/93 to 40% in 2000/01. Over this same period, the yarn output of joint investment companies hovered around 10%. Public companies' share of declining total yarn output fell from 82% in 1992/93 to 50% in 2000/01.

- Cotton and cotton-synthetic blended yarn exports decreased from 78,911 mt/year on average from 1990 through 1995 to 47,765 mt/year from 1996 through 2001. Yarn exports fell below 40,000 mt/year in 1999 and 2001 in response to foreign competition and inefficient, high-cost domestic (public) spinning companies.

Most of the changes noted above provide a mixed counterweight to the more positive picture of increasing private sector shares in seed cotton trading, ginning, lint export, and spinning under APRP. They give the reader a more realistic view of how gradual the reform of the cotton subsector has been since the late 1980s and how the subsector has adjusted, typically partially and with a lag, to changing market conditions. During some years, adjustments have been incomplete (often too incremental and slow), leading, for example, to lower levels of lint exports than might have been attained and continued high levels of lint stocks. Large inventories of unsold lint, yarn, fabric, and ready-made garments during many years of APRP are evidence that supply and demand were not well matched at each stage of the subsector, and that administered prices (for seed cotton, lint supplied to domestic mills, and export lint) continue to distort incentives and resource allocation in the subsector.

Changes in Cotton Subsector Structure, Conduct and Performance

Changes in Cotton Subsector Structure. As noted earlier, the most significant structural change in the cotton subsector during APRP was increasing private sector shares in the cotton trading, ginning, spinning, and exporting industries. Public sector companies still had more than one-half of the market share in seed cotton buying, ginning, selling of lint to spinning companies, and spinning,[6] however.

The expansion in private sector share in ginning was due to privatization of two public ginning companies in 1996/97, but ginning privatization had stalled by 1998/99. The increased private sector participation in seed cotton trading was due to entry of new firms into the trade between 1994/95 and 2001/02, including an expansion in private companies as ALCOTEXA members (2 to 17) and smaller private registered cotton traders and trading companies. Nevertheless, the GOE annual cotton marketing decree and its interpretation and implementation by the Cotton Supervisory Committee have favored the public sector cotton trading companies and the Horticultural Services Unit (HSU) during the past several cotton marketing seasons. As long as the rules of the cotton trade favor public buyers, expansion of private participation and market shares will be modest. Expansion in private spinning during APRP was due in large part to privatization from 1996 to 1998, but also to selected private investment in open-end spinning operations and a fine-count ring-spinning mill (see Holtzman et al., 2000 for details). As long as the GOE and the Holding Company for Spinning, Weaving and Ready-Made Clothes continue to subsidize the operations of public spinning companies, however, further private investments in spinning mills are unlikely.

One other structural change during APRP was the emergence of three conglomerates in the subsector that served as "marketing channel captains." One industry conglomerate, the Modern Nile group, owns the leading export company and the most progressive private ginning company (Arab Ginning), and works closely with a private spinning and weaving company (Giza Spinning and Weaving). The CEO of Modern Nile Cotton Company and Chairman of the Board of Arab Ginning, Amin Abaza, is the current President of ALCOTEXA's Management Committee. A second emerging conglomerate is led by NASSCO, a private cotton trading and export firm that is the second-largest private exporter, part of the Setcore group of companies, and a partner with Volcott, a Swiss cotton trading company. NASSCO has invested in UD bale presses at several gins owned by the public Delta Ginning Company, and it is launching a high-count spinning operation that will spin mainly Egyptian lint into 100% cotton yarn for export. A third conglomerate is operated by a prominent private spinner, weaver, and producer of ready-made garments (the Samir Riad group), which has also provided leadership in privatizing two large public textile companies and introducing organizational and technical changes that have shown that former public companies (KABO, Alexandria Spinning and Weaving) can thrive under private sector management that is attentive to steadily improving quality (e.g., spinning higher count yarn) as well as the bottom line. While these emerging

conglomerates may lead to some concentration of market power in the subsector, they will achieve economies of scale and scope that should give them the resources to make investments to increase productivity and quality and to lower costs.

Changes in Cotton Subsector Conduct. At the beginning of APRP in 1996/97, prices at different levels of the subsector and market shares were established almost entirely administratively by the HCs and their various committees. Private sector participation was minimal, and private firms had to play by the rules set by the public sector. By 2001/02, subsector conduct had changed in fundamental ways. While GOE committees still play an important role in allocating PBDAC rings to public and private buyers, in setting the cotton varietal mix, and in allocating lint owned by public cotton trading companies to public spinning companies, the old command-and-control system is breaking down in other ways. Administered prices, which were fixed producer, lint, and export prices in 1996/97, had become more indicative by 2001/02. Private seed cotton buyers paid premium prices to producers for certain varieties destined for export in 2000/01 and 2001/02, such as Gizas 70 and 86. Private exporters undercut so-called minimum lint export prices, set by ALCOTEXA's Management Committee, by a few cents per pound in 2000/01 and by a wide margin in 2001/02, despite protests by public cotton trading companies.

Administered market shares, whereby public cotton trading companies purchased nearly equal percentages of the cotton crop in 1996/97 and public cotton ginning companies ginned nearly equal shares of the seed cotton crop before APRP, had broken down by 2001/02, largely under competitive pressure by private firms. For example, public cotton trading companies bought all the seed cotton assembled by the Agrarian Reform and Land Reclamation Cooperatives before liberalization began, but large private trading companies captured most of this seed cotton by the end of APRP, paying slight premiums to the cooperatives. Although the five principal ginning companies (three public, two private) agreed nominally to a uniform ginning charge, they competed in practice for clients on the basis of quality of ginning services, additional services offered, agreements to share transport costs to the gins, and discounts below the fixed ginning charge. Hence, what had emerged by 2001/02 was a more open and competitive cotton marketing system. While the one remaining HC and its committees would like to have controlled the marketing system from seed cotton buying through domestic and foreign lint sales, the strength of private sector participation was too great, and the private sector was willing and able to exercise voice to protest arbitrary rules and decisions by certain GOE agencies, such as the Cotton Supervisory Committee.

Changes in Cotton Subsector Performance. Increasing private sector participation in seed cotton trading, ginning, and export had significant performance consequences. Expanding private sector shares stimulated increased competition, which in turn spurred a search for ways to increase productivity, lower marketing costs, introduce improved technology and management practices, and upgrade quality. From those standpoints, the cotton/textile subsector was

clearly better off by the end of APRP than at its outset, when the marketing year 1996/97 was characterized by heavy-handed public sector dominance. APRP and CSPP helped to catalyze this gradual transformation, although there were a number of marketing channel captains who also helped drive the process. At the same time, falling trade barriers and the gradual opening of the Egyptian economy to international market forces will encourage greater competition in the Egyptian cotton subsector.

By 2001/02, private sector industry leaders had introduced a number of innovations that reduced costs and improved cotton quality, such as:

- Investment in better cleaning equipment and additional workers to clean seed cotton before ginning at many private sector gins
- Purchase of new roller ginning equipment from Indian manufacturers to replace old, outmoded English equipment at selected private gins
- Discarding of costly *farfarra* in Alexandria at the public sector pressing company in favor of UD baling at upcountry gins, which reduced costs and contamination
- Improved handling of lint, particularly lint destined for export
- Using Egyptian lint to spin higher-count yarn, which is largely exported, in privatized spinning companies

During APRP, Egyptian lint exports increased from a mere 18,800 mt in 1995/96 to over 100,000 mt/year in 1998/99, 1999/00, and 2001/02.[7] Exports as a percentage of total lint supply (production plus carryover) increased from 6.4% in 1995/96 to 22-28% in 1998/99 to 2001/02. Domestic utilization declined from over 200,000 mt/year through 1997/98 to less than 150,000 mt/year in 1999/00 through 2001/02. Although this decrease paralleled the financial decline of many public sector spinning companies, it led to better allocation of high-quality, expensive Egyptian lint, with less going to domestic spinners who underspin it and more going to foreign spinners capable of using the fine cotton input to spin high counts of yarn. Hence, the health of the public spinning companies, which benefited from excessive investment during the 1960s through the 1980s, continued to decline during APRP. The GOE has been slow to adjust to the long-term decline in the public spinning industry, seeming to prefer stagnation and continued employment of underutilized workers to necessary closures and downsizing. Further adjustments will ultimately have to be made.

Attribution to APRP. There was steady expansion in the private sector's market share of the cotton subsector during APRP from a low base in 1996/97, but that expansion did not reattain the high water mark of 53% in 1995/96 under APCP. APCP started cotton policy reform, and the private sector participated in seed cotton buying, ginning, and lint export for two full marketing seasons before APRP began. Those changes were reinforced by positive changes in the macroeconomic environment in Egypt and by a World Bank structural adjustment loan (SAL) in the early 1990s, which included fiscal stringency and better

balancing of the GOE budget, exchange rate adjustment, freeing up of administered prices in many parts of the economy, phasing out of some subsidies in agriculture and elsewhere, and an initial commitment to a privatization program. Reported GDP growth rates of 4–6 percent during much of the 1990s in Egypt strengthened the overall economic and investment climate, although growth rates in certain industries, such as construction, cement manufacturing, tourism, and computer and financial services, outpaced growth in the agricultural sector.

Despite these broad trends and factors contributing to economic growth, APRP did continue to provide momentum to agricultural sector policy reform efforts initiated under APCP with a strengthened and more focused technical assistance team.[8] Between APRP and CSPP, there were at least five full-time-equivalent analysts working on cotton issues, as well as numerous short-term consultants and key research managers, who provided intellectual guidance and support. APRP's tenacity in supporting cotton market liberalization contributed, over a 6-year period, to broader private sector participation and greater private sector shares. Benchmarks and implementation activities designed to eliminate marketing rules and pricing practices that discriminated against the private sector eventually did have a positive impact, although progress was not always linear or as rapid as hoped. High-quality, well-delivered, incisive, and convincing economic analysis influenced stakeholders, although initially not all of them were willing to accept the logical policy conclusions and recommendations that came from these analyses.

Over the course of APRP, the private sector gradually grew stronger and developed its own voice and advocacy skills. APRP provided analytical support to ALCOTEXA and to private cotton trading companies, as well as some coaching in effective advocacy techniques. A very important development at ALCOTEXA in January 2001 was the election of three private sector managers to the four officer positions on ALCOTEXA's board of directors, the Management Committee. Private members also enjoyed numerical superiority on this committee.

Although APRP contributed to agribusiness system privatization at the margin, its role and significance in the GOE's privatization program, supported by several USAID-funded projects, was limited. Privatizations during the early stages of APRP, such as the sale to private investors of a majority of the shares of the two ginning companies (Arab and Nile Ginning) and of three textile companies (KABO, Alexandria Spinning and Weaving, and Unirab), cannot really be attributed to APRP. It can be argued, however, that specific benchmarks and, hence, cash transfers tied to achieving APRP privatization benchmarks provided the GOE with an extra incentive to meet the targets. Nevertheless, the background preparation, valuation, and advertising for bids took place either before APRP's technical assistance teams arrived or shortly thereafter. APRP work on developing improved leasing and management guidelines were useful to MPE/PEO, although the two largest leases of spinning mills to private entrepreneurs (DIP-Egypt [of ESCO] and Menia al Kamh [of Sharkeya Spinning

and Weaving]) were negotiated before these guidelines were finalized, approved by the PEO, and widely disseminated.

Outside the scope of APRP, devaluations of the Egyptian pound against the U.S. dollar in August 2000 and December 2001, well into APRP, had positive effects.[9] ALCOTEXA lowered its opening (of the marketing season) minimum export prices, quoted in cents per pound, between 2000/01 and 2001/02 by 6% for Giza 70, 11% for Giza 86, and 13% for Giza 89. Export revenues, once converted from dollars to Egyptian pounds at the official exchange rate, were higher in LE terms in 2001/02 than in 2000/01 for Giza 70, as the devaluation was about 8%. When converting at the higher informal market exchange rate of LE 4.8 = US$1 or higher, LE returns from exporting Gizas 86 and 89 were also higher in 2001/02 than in 2000/01 in LE terms.[10]

Private lint exporters benefited from being allowed to convert dollars earned on exports to Egyptian pounds at an open market exchange rate. In contrast, public cotton trading companies were required to convert their foreign exchange earnings into pounds at the official rate. The effect of an increasingly strong dollar was to decrease domestic seed cotton prices in dollar terms. This allowed exporters, particularly private companies, to reap windfall gains on exports of lint or to discount the prices of lint exports deeply, which enabled them to capture significantly greater market share in both 2000/01 and 2001/02. Public trading companies, bound by Central Audit Authority accounting rules and forbidden by the HC and MPE to sell any lint at a loss, could not offer deep discounts. As a result, private exporters captured 63.5 percent of the exported lint market share in 2001/02.

The devaluations also provided some support to the ailing Egyptian spinning industry. Not only did cotton yarn exports expand in 2000 relative to 1999, but some spinners reported that yarn imports from competing producers (India, Pakistan) declined because these imports were more costly in LE terms after the devaluations. Evidently, some private sector Egyptian weavers, knitters, and ready-made garment manufacturers found domestic yarn, mainly spun to medium counts from long-staple Egyptian lint, more attractive relative to imported lower-count yarn spun from shorter-staple lint. The extent to which this translated into a significant decline in the overall volume of yarn imports is unknown.

The fact that the Egyptian pound was pegged to the dollar for a period of over 8 years[11] ended up penalizing Egyptian exports, particularly after 1997. As the real value of the pound fell over this period, while the exchange rate was virtually fixed to an increasingly strong dollar, Egyptian exports became less competitive in world markets. Following the Asian financial crisis of 1997, the yarn and other textile exports of many Asian countries became cheaper in dollar (and other foreign exchange) terms. This hurt Egyptian exports to a number of high-income country markets in Asia (particularly Japan) and in Europe. Egyptian yarn exports dropped from 68,110 mt in 1997 to 49,905 mt in 1998 and 35,736 mt in 1999, largely due to the devaluation-driven competitiveness of Asian yarn exports. In

the final analysis, it is important to remember that the overvaluation of the Egyptian pound during the second half of the 1990s hurt the competitiveness of many Egyptian agricultural and agribusiness exports, including cotton lint, yarn, fabric, knits, and ready-made garments.

As noted earlier, CSPP also contributed resources, including technical assistance, to improve the cotton subsector. CSPP's contributions are partly responsible for the gains in cotton productivity since the mid-1990s. CSPP worked closely with MALR to improve farmers' production practices through use of delinted cotton seed, integrated pest management (IPM), more appropriate and better-targeted use of pesticides on cotton, and better extension messages and supervision regarding cotton agronomy (Hannover, 2002). APRP did little or no work on cotton production practices, although it did analyze trends in yields by variety during the 1980s and 1990s (see Ariza et al., 2000) and provided annual input into the cotton variety map from 1998 until the end of the program.

An indirect, but important, benefit of APRP's heavy emphasis on the cotton subsector was the fact that cotton did not disappear from the summer crop mix in Delta governorates where rice is grown. By 1999 and 2000, paddy area exceeded by a wide margin the combined cotton and maize area in the six major Delta governorates where rice is grown plus the Fayoum governorate.[12] APRP's persistence in working on cotton eventually paid off; cotton area returned to more normal levels, relative to rice area, in 2001 and 2002 (over 700,000 feddans nationwide in both years).

General Lessons of Cotton Policy Reform in Egypt

A general lesson from APRP's experience in trying to promote cotton subsector reform is that it is difficult to reach a consensus among subsector participants with such divergent interests. This situation led at times to slow and uneven progress on some policy reform fronts, and has threatened at times to undermine the longer-term liberalization process. Furthermore, making piecemeal reforms can lead to modest incremental improvements, but there is a need for a more comprehensive strategic vision. CSPP worked closely with MALR in 2002 to develop such a vision and long-term program for implementing the selected strategy. In addition, granting special favors to particular entities, such as the HSU's exclusive rights to buy nearly 20 percent of the seed cotton crop, can be counterproductive and discourage private sector participation in the marketing system.

Another policy reform process lesson from APRP is that a mix of specific policy reform benchmarks and discrete, feasible implementation activities is a good way to keep liberalization moving forward. During some periods policy reform benchmarks may not have been fully accomplished, or, in some instances, they were struck down in the policy reform design process because one or more key stakeholders did not support particular measures. APRP played an effective role in considering the optimal time to introduce policy benchmarks, while shifting to implementation activities and quietly building behind-the-scenes consensus for

reforms when the time was not ripe for proposing benchmarks. At times, simply getting some policy issues on the reform agenda proved to be significant achievements, despite initial rejection of the new ideas. Raising the issue, marshaling industry support for reform, identifying a technocrat in the GOE or a leading industry figure who would champion the reform, and providing him with sound economic analysis could lead, over time, to successful reform efforts.

Another lesson from APRP's work on cotton market information is that MIS development efforts need to be programmed early into a policy or market development project so that they are well enough established in a government agency or trade association to be sustained after the project ends. Dissemination of printed bulletins by ALCOTEXA, CATGO, and MALR/EAS was never broad enough, which provided an impetus for developing websites. Such websites are a good idea in principle, but not everyone in Egypt has a computer, access to the internet, and the ability to read and interpret material in English (on the ALCOTEXA and CATGO websites). In follow-up agricultural policy and marketing projects in Egypt, the project team and collaborating GOE agencies should develop communication strategies early in project implementation and develop a mix of media to reach the widest possible audience. GOE agencies also need to contribute their own funds and provide their own staff to make new market information initiatives work because initiatives supported and driven exclusively by donors rarely succeed.

At the close of the 2001/02 marketing season, the Egyptian cotton/textile subsector was at a critical crossroads. Substantial progress had been made in liberalizing cotton marketing and export, but the privatization process had faltered and stalled. Public cotton trading companies continued to dominate seed cotton marketing (through the PBDAC-controlled sales rings), public ginners ginned 58–67 percent of the seed cotton crop (from 1997/98 to 2001/02), and public and joint investment spinners produced 60 percent of total cotton yarn output, although private sector shares had expanded in all three industries during APRP. Further progress may hinge on the GOE's willingness to privatize the remaining public cotton trading, ginning, and spinning companies, despite the political risks involved in tackling thorny issues such as redundant labor, overly high valuations of public companies' assets, and liquidating excess capacity, either idled or outmoded. In addition, the GOE's willingness to abandon the remaining administrative allocation and pricing systems, which still largely determine which cotton varieties are grown (and ginned) in different production zones, the level of prices at most levels of the marketing system, market shares in assembling seed cotton, allocations to gins (and ginning charges levied), and allocations to public spinning companies (and lint prices paid by spinners), is critical to ensuring the long-term success of the liberalization process.

In conclusion, by the end of APRP, the GOE had made significant progress in reforming the cotton subsector in Egypt. Liberalization is not yet complete, however, and the GOE needs to avoid back-sliding or loss of inertia that will undercut future reform. We recommend strongly that USAID and other donors,

notably GTZ, keep cotton policy reform on the agricultural policy reform agenda in any future policy and market reform programs in Egypt.

Threats to Liberalization of Cotton Subsector

Power of GOE's Cotton Market Supervisory Committee. Cotton/textile subsector reform measures were gradual and incremental during the 1990s, although a slightly too rapid early market liberalization in 1994/95 and 1995/96, coupled with rapid world market price increases, led to some volatility and disorder in the Egyptian cotton market. The GOE declared high seed cotton floor prices months before the 1996/97 marketing season, which was followed by a sharp decline in world prices that made it unprofitable for the private sector to participate in the seed and lint cotton trade in 1996/97. GOE rules and administered prices, which change from marketing season to marketing season, have the effect of including or excluding private sector participants from the cotton market.

Public sector officials in ministries, research institutes, HCs and their affiliates, and other agencies and organizations view cotton subsector reform with skepticism. They often accuse the private sector of anti-competitive practices, chiseling on quality, and destabilizing and disorderly market conduct. Many private sector participants view some of the GOE agents as being more interested in protecting their positions, authority, and market shares in the cotton subsector than in genuine reform. Throughout most of APRP, this tension between the public and private sectors helped to discipline the market, though at times one side or the other would gain the upper hand. Two examples are noteworthy and discussed below: 1) the power struggle between the Cotton Marketing Supervisory Committee, which sought to impose arbitrary rules, and private cotton traders, who protested these rules; and 2) shifts in control of ALCOTEXA and the setting of lint export prices to benefit private exporters at the expense of public exporters.

In 2000/01 and 2001/02, the Cotton Marketing Supervisory Committee, comprised largely of public sector representatives, took on greater authority than in the past and appeared less interested in consulting the private sector and accepting its input in making key decisions involving the allocation of PBDAC rings. Only two private sector representatives, not chosen by the private sector, sat on the inner committee that made the important decisions about which companies received PBDAC rings and the how the annual Optional Marketing System decree, issued in August and signed by four ministers, was implemented. In effect, the Supervisory Committee set the rules of the marketing system in a more authoritarian manner than from the beginning of APRP to 1999/00, when the Cotton and International Trade Holding Committee, in consultation with the Domestic Cotton Traders' Committee, allocated PBDAC rings.

As of 2000/01, the Cotton Trader Committee's input was no longer sought. The Supervisory Committee made a number of decisions that antagonized the private cotton trade. First, it gave private traders only 4 days, over a weekend, to apply

for PBDAC rings and to deposit LE 5,000 per ring. Private traders protested, arguing that the time for applying was too short and that LE 5,000 per ring was too high a sum, which tied up traders' funds and gave PBDAC an interest-free loan for months. Second, public trading, ginning, and spinning companies were not required to pay any deposits to reserve rings. Third, the Supervisory Committee told larger trading companies that they could buy from cooperatives, but that any quantity purchased from the cooperatives and delivered to the gins would count against their "quota," the quantity estimated based on the number of PBDAC rings they were allocated. Fourth, private traders reported that the Supervisory Committee threatened to instruct CATGO not to grade any seed cotton delivered to the gins that had first not been graded at a PBDAC ring (and hence bought through the PBDAC ring system). This rankled a number of large traders, who got around this restriction by pre-financing smaller buyers who had PBDAC rings, who in effect became commission agents that supplied them (i.e., the large traders) with seed cotton.

This series of arbitrary decisions and actions undertaken by the Supervisory Committee in August-September 2000 unleashed a wave of vehement protests from private traders, who sent faxes to ministers, published letters in newspapers, and complained bitterly to PBDAC and the Supervisory Committee. This strong and vocal advocacy effort led Ministers Wally and Boutros-Ghaly to publish an announcement in all the major newspapers in late September 2000 stating that the cotton marketing system was open and free to all buyers. This announcement implied that it was acceptable for private traders to buy outside the PBDAC ring system and that CATGO would grade seed cotton at the ring. This announcement undercut the power of the Supervisory Committee and was a victory for the private traders and their advocacy efforts. It was also a sign that there would be more transparency in implementation of cotton marketing decrees. The outcome was that private sector deliveries to the gins equaled 36.2 percent of the seed cotton crop, nearly as high as the 36.7 percent of 1999/00.

Disproportionate Market Share of HSU. The private sector share might have been larger had the Horticultural Services Unit, formerly directed by the official who served as Acting Chairman of PBDAC and head of the Supervisory Committee, been granted little or no market share in 2000/01. HSU's market share was in fact large: 26 percent of the seed cotton crop, up from zero in 1999/00. This share was allocated entirely administratively by the Supervisory Committee on the grounds that HSU was the appropriate agency to manage the purchasing of seed cotton used to produce certified seed (used in the following year's planting). The fact that HSU bought nearly 1 million seed kentars of cotton in order to acquire sufficient seed for the following crop was clearly an abuse of the Supervisory Committee's license to implement the optional marketing system decree, as well as an exaggerated quantity well beyond what was actually needed. HSU took title to the cotton lint coming out of the gins, which it sold at a premium in 2000/01 to cotton exporters, mainly public trading companies. Note that HSU was allocated a disproportionately large share of the Giza 70 crop, probably because Giza 70 was the export variety in highest demand. This fact did not go

unnoticed by the private traders, who complained bitterly of parochialism and favoritism toward HSU, which is a quasi-governmental organization. In 2001/02, HSU again collected nearly 1 million seed kentars, representing a lower percentage (18.9%) of a larger seed cotton crop than in 2000/01, but still unjustifiably large.[13] Technically qualified observers state that only a fraction of this quantity, probably no more than 200,000 seed kentars, is adequate for obtaining sufficient certified seed.

ALCOTEXA's Practice of Setting Minimum Lint Export Prices to Penalize Public Trading Companies. Another potential threat to cotton market liberalization is ALCOTEXA's practice of setting minimum export prices. In 2001/02, this system clearly discriminated against public sector trading companies, as they had to play by the rules and offer lint for export at prices no lower than the specified minimum export prices, while private exporters were able to sell their lint at highly discounted prices. The predictable result was that the private sector share of exports was nearly two-thirds, well above that of any earlier year. While strong private sector performance is laudable, using the minimum export price system, which public trading companies must abide by, to make it difficult for public trading companies to export ended up being a clever, though anti-competitive, measure. The obvious policy recommendation is to do away with minimum export prices, though public traders, HC officials, and other GOE representatives argue that such a system is required to monitor effectively and audit the public companies. Unfortunately, this is a case of accounting and auditing driving how business is done (rather than vice versa), and evidence of how distorted the incentives are in public companies and HCs. These entities focus entirely on costs and on building in elaborate checks and balances; the entire public enterprise system is built on mistrust and the need to police company managers. The overall business emphasis of public companies is to capture market share at whatever cost and whatever the profitability, rather than on earning profits.

Most of the increased private export market share in 2001/02 went to two leading firms, whose combined share was 42.5 percent. There is a danger that cotton lint trading, both the domestic trade and lint export, will become more concentrated over time, despite the fact that 2001/02 witnessed a record number of exporters (17).[14] The leading firm is vertically integrated into ginning, cotton trading, and spinning (through a partner firm); the number two firm has a special arrangement with a public ginning company and is establishing a high-count spinning factory; and other larger private exporters have contemplated investments in gins. Increasing concentration and vertical integration are inevitable in a subsector where inter-annual supply variability and government-induced policy uncertainty increase the risks of doing business. Some observers point out that a US$200 million/year business, which is the value of lint exports from Egypt, is probably not a large enough market to attract high levels of participation. Broader private sector participation is more suitable for the seed cotton trade, where collectors in rural areas can assemble from a large number of dispersed growers. The export trade will likely become more concentrated over time, as smaller and weaker

competitors drop out of the business. Without preferential access to public bank loans, downsizing of their labor force, and reduction of debt, the long-term viability of public cotton trading companies is also questionable.

Chronic Problem of Excessive Carryover Stocks. Large carryover stocks, a recurrent problem in the cotton marketing system, threatens its viability. After the carryover was reduced from 4.2 mlk at the beginning of 1998/99 to about 1.0 mlk at the start of 2001/02 (in increments of about 1.0 mlk per year), it increased again during 2001/02. Figures through August 11, 2002, were: stocks of 2.46 mlk, with export commitments at that time of 2.11 mlk and domestic utilization of 2.77 mlk. Stocks were highest for Giza 86 at 927,000 lk and Giza 89 at 658,000 lk; together they accounted for 64.6 percent of total stocks.

The carryover issue is important because someone or some agency must bear storage and finance costs. At the end of each marketing season, the public cotton trading companies no longer own the cotton lint they bought; it belongs to the GOE. Such a system, which provides incentives for public trading companies to buy as much seed cotton as possible, whether or not they can move the resulting lint into domestic and foreign markets, is flawed. No one takes responsibility for accumulating these massive stocks, though ultimately the GOE must pay for them. The willingness of the public sector banks to finance overbuying by public trading companies and the accumulation of stocks that cannot be moved has been called increasingly into question.

Even if the banks continue to fund assembly of large volumes of seed cotton by public trading companies, the large carryover stocks going into 2002/03 are evidence of a serious misallocation of resources. The carryover problem is a result of several factors:

- Overproduction of certain varieties relative to domestic and apparent foreign demand.
- Inappropriate pricing of certain varieties, leading to slow sales in foreign markets relative to competitors, mainly pima.
- Varietal map that does not adequately reflect market realities and private sector input. LS and ELS production have been emphasized, while production of a medium-staple variety (like *ashmouni* for many years) would satisfy much of the domestic spinning industry's needs at lower cost.
- Declining domestic and foreign demand for ELS and certain types of LS.
- Egypt's continued international reputation for contaminated lint, and unfair arbitration (through ALCOTEXA) that favors Egyptian exporters and discriminates against foreign buyers.

Until these issues are addressed, the prospects for eliminating or reducing carryover are poor. High levels of cotton stocks during a period of fiscal tightness and stringency, overall economic weakness, and mounting banking system problems underscore the need for orderly disposal and resolution of this problem.

Future Directions in Cotton Subsector Liberalization

While private sector shares increased from 1997/98 through 2000/01, progress stalled in 2001/02 and 2002/03. Public cotton trading companies and the HSU continued to dominate seed cotton buying; the PBDAC ring system was dominated by public buyers, and the Cotton Supervisory Committee continued to adhere to the principle of one buyer per ring. While private traders were buying more seed cotton from cooperatives and at private rings, their market share held steady overall. The share of private ginning decreased from a high of 41.6 percent in 2000/01 to 33.7 percent in 2001/02, with allegations that public sector buyers of seed cotton were instructed to use only public ginning companies, not private ginners. Domestic sales of lint cotton by public trading companies appeared to be destined primarily for public spinning companies and not private spinners. While public sector lint export shares dropped to their lowest level in 2001/02, they bounced back in 2002/03.

The fact that increases in private sector market shares have stalled implies that the GOE intends to maintain a mixed public/private sector marketing system with a structure of production that has significant private sector participation, but not private sector dominance. This may not be an explicit or conscious strategy. Rather, it might reflect the GOE's inertia on privatization, which stalled by 1999 and shows no signs of reviving. The GOE appears unwilling to restart the privatization process in agribusiness, as it would likely involve putting more public sector employees out of work, selling off or scrapping significant state assets (without the same high level of returns that characterized earlier privatizations), and opening the MPE up to criticism of selling off public assets at low prices to private sector "fat cats." Despite the continual money-losing performance of many state-owned companies and low levels of capacity utilization of others (especially public spinning companies), there are no indications that the GOE feels pressure to move beyond this impasse anytime soon. The cotton/textile subsector could remain characterized by a mixed public/private system for much of this decade, as long as the GOE continues to subsidize overstaffed and unprofitable public sector companies.

One or more of the following events could break the logjam within the GOE, however, and might lead to further transformation of the subsector:

- Declining tariffs under the 1995 GATT agreement, to which Egypt is a signatory, that will further weaken public companies, increase the GOE's cost of subsidizing their operations, and force many of the poorly performing public companies out of business
- Generally increasing GOE budgetary costs of sustaining so many money-losing public companies, leading to hastened closures and liquidations
- Decreased donor funding and budgetary support to the GOE
- Change in political leadership and/or renewed commitment to privatization

An important factor that could forestall change is steady depreciation of the Egyptian pound, which will enhance the competitiveness of Egyptian exports in world markets and increase the cost of competing imports (of lint, yarn, fabric, clothes). This same dynamic, however, may lead to declining investment in improved handling and processing equipment, to the extent that most of this equipment is produced outside Egypt and imported, and its cost will rise in local currency terms.

Further progress in cotton subsector liberalization requires, therefore, a renewed GOE commitment to privatization and a willingness to turn over increased market share and marketing functions to the emerging private sector. Such a commitment would imply recognition by the GOE that a hybrid, mixed system of economic organization will *not* bring about fast enough or complete enough changes in economic organization, management, and technology to realize productivity and quality gains that allow the Egyptian cotton trading, ginning, exporting, and spinning industries to strengthen their competitive position in domestic and foreign markets. Hence, further transformation of the Egyptian cotton subsector depends on the GOE's economic vision and strategic choices associated with that vision.

References

ALCOTEXA. *The Egyptian Cotton Gazette.* Journal of the Alexandria Cotton Exporters' Association, nos. 103-118. 1994-2002.

Ariza-Nino, Edgar, Ibrahim Siddik, El Sayed Dahmoush, Mohamed Abdel Salam, and Samir Moustafa. *Problems Selecting a Cotton Variety Mix for Egypt.* APRP/RDI Report No. 93. January 2000.

Ariza-Nino, Edgar, Ibrahim Siddik, and Kenneth Swanberg. *A Deficiency Payment Mechanism for Supporting Cotton Floor Prices, 1997/98 Crop Season.* APRP/RDI Report No. 13. January 1998.

Ariza-Nino, Edgar, Ibrahim Siddik, and Kenneth Swanberg. *Floor Price Impact on Cotton Export Volume and Price Policy.* APRP/RDI Report No. 12. 1997.

Cotton Outlook. *Week in Brief.* Various issues**.** United Kingdom. 1997–2002.

CSPP and High Cotton Council. *Egyptian Cotton Sector Strategy.* Cairo, Egypt. March 2003.

Dahmoush, El Sayed, Edgar Ariza-Nino, and Ibrahim Siddik. *Competitive Marketing Strategy for Egyptian Cotton and Textiles.* Egyptian-German Cotton Sector Promotion Program (CSPP). Report No. 103. Dokki, Cairo. December 2001.

Dahmoush, El Sayed, Edgar Ariza-Nino, Ibrahim Siddik, and Jane Gleason. *Cost of Production and Competitiveness of Spinning Yarns in Egypt.* APRP/RDI Report No. 147. September 2001.

Hannover, Wolfgang. *Summary of Results and Economic Assessments on Cotton On-Farm Trials and Impact Studies Carried Out in the Years 1997 to 2001.* Egyptian-German Cotton Sector Promotion Program (CSPP). Report No. 102. Dokki, Cairo. March 2002.

Holtzman, John and Adel Mostafa. *The Cotton/Textile Subsector in Egypt: Impacts of Policy Reform.* MVE Unit – APRP, Impact Assessment Report No. 26. Abt Associates Inc. Cairo, Egypt. July 2002.

Holtzman, John, Gary Ender, Adel Mostafa, Sherif Fayyad, Samar Maziad, Ezz Eldin Abdel Kader, and Nabil El Santricy. *Intermediate Effects of Policy Reform Under APRP: Progress Indicators, 1990-2001.* MVE Unit – APRP, Monitoring Report No.4. Abt Associates Inc. Cairo, Egypt. July 2002.

Holtzman, John. *Liberalization and Privatization of Key Subsectors in Egypt's Agricultural Economy: Progress & Challenges.* MVE Unit – APRP, Impact Assessment Report No. 14. Abt Associates Inc. Cairo, Egypt. November 2000.

Holtzman, John, in collaboration with Adel Mostafa. *Cotton Subsector Baseline Study.* MVE Unit – APRP, Impact Assessment Report No. 5. Abt Associates Inc. Cairo, Egypt. December 1998.

Krenz, Ronald, John Holtzman, Adel Mostafa, and Mohammed Abu El Wafa. *Policy Lessons from the 2000/01 Cotton Marketing Season in Egypt.* MVE Unit – APRP, Impact Assessment Report No. 17 and CSPP Report No. 96. Abt Associates Inc. and Cotton Sector Promotion Programme (GTZ/MALR). Cairo, Egypt. July 2001.

Krenz, Ronald D. and Adel Mostafa. *The Impacts of Privatization on the Cotton Ginning Industry in Egypt.* MVE Unit – APRP, Special Study No. 3. Abt Associates Inc. Cairo, Egypt. May 2000.

Krenz, Ronald, William Breginc, Galal El-Rifai, Adel Mostafa, Nabil El-Sentrecy, and Mohammed Meselhi. *The Quality and Grading of Egyptian Cotton.* MVE Unit – APRP, Special Study No. 1 and CSPP Study No. 61. Abt Associates Inc. Cairo, Egypt. February 1999.

Morsy Ali Fawzy, Mamadou Sidibe, and Osman Salama. *The Impact of APRP at the Farm Level.* MVE Unit – APRP, Impact Assessment Report No. 28. Abt Associates Inc. Cairo, Egypt. July 2002.

Selzer, Thomas. *Results of the 1997 Farm Survey in Dakhaleya and Beni-Suef.* Project Report No. 58. Egyptian-German Cotton Sector Promotion Program (CSPP). c/o GTZ-Pas, 4d, El-Gezira St., Zamalek, Cairo. September 1988.

Textile Consolidation Fund. *Quarterly Report.* Several issues. 1996–2002.

Endnotes

[1] Anchor investors are private companies (already in the same industry as a company to be privatized) that buy a controlling bloc of shares of a privatized firm. Such investors may be foreign firms (as in the case of Coca-Cola in the privatization of Al Ahram Beverages) or prominent domestic companies (as in the case of the Riad Group in the privatizations of KABO and Alexandria Spinning and Weaving).

[2] High-volume instrument testing is done on samples of cotton lint and yields accurate measures for various lint performance characteristics, including fiber length, micronaire and strength.

[3] *Farfarra* is a manual process of cleaning lint before export and preparing homogeneous lots for export, which involves blending of cleaned cotton. The Egyptian Cotton Pressing Company's charge, which covered *farfarra* and pressing of lint into large bales, was considered high by private exporters, and many wished to use bale presses at upcountry gins to produce universal density (UD) bales that could be directly exported. Cleaning, blending, and baling lint at gins reduced marketing costs for private exporters. By 2000/01, over half of the bales exported from Egypt had been prepared at gins upcountry as UD bales.

[4] Note that an estimated 575,000 lk were imported in 2000/01 for use by domestic spinners. Added to 2.7 mlk of Egyptian lint, domestic utilization that year was actually closer to 3.3 mlk.

[5] CRI officials acknowledge that medium-staple varieties would be more suitable for most yarn spun in Egypt. There appears to be some (though probably limited) interest in developing a new medium staple for the Egyptian spinning industry to replace *ashmouni*, which was phased out during the early 1980s.

[6] The public sector share of spinning industry output (cotton and mixed cotton yarn) was actually just under 50% in 1999/00 (at 49.0%) and 2000/01 (at 49.8%), if the two large joint investment spinning companies (Misr Amriya and Miratex) are considered as a separate category.

[7] 2000/01 was the only year since 1997/98 that exports did not exceed 100,000 mt; they attained 68,311 mt. This sub-par export performance was due to GOE restrictions on long staple cotton exports. 2000/01 was an anomalous marketing year characterized by exceptionally tight domestic lint supplies, Holding Company allocation of long staple varieties to domestic spinners, and hence unusually low exports. Note that export commitments had reached 177,678 mt for 2002/03 as of the end of May 2003, with actual shipments at 110,379 mt.

[8] APRP technical assistance was more focused on agricultural marketing reforms and particularly on the downstream agribusiness system than APCP; APCP concentrated more on production agriculture. A large part of the APCP technical assistance effort was directed to strengthening the management and financial services of PBDAC, a GOE agricultural lending institution.

[9] It is important to note that the USAID-funded DEPRA (Development Policy Reform Assistance) project strongly advocated exchange rate adjustment. APRP policy advisors also called for allowing

the Egyptian pound to float or for devaluation, though not quite as vocally and without the same access as DEPRA to the Ministry of Economy and the Ministry of Foreign Trade.

[10] The fact that most private exporters deeply discounted lint export prices in 2001/02 undermines the validity of this argument. The disparity between the official exchange rate after mid-December 2001 and the parallel rate, reportedly as high as US$1 = LE 5.1–5.2 at times in 2002, offered an opportunity for a windfall gain, but exporters' deep discounting of export prices offset this advantage to a large extent.

[11] The exchange rate to the dollar was LE 3.222 in May 1991. In November 1994, it reached LE 3.394 = US$1, after which it stayed within the narrow range of LE 3.388 to LE 3.341, attained in January 2000.

[12] Paddy area in the seven major rice-producing governorates covered 1,476,985 feddans in 1999, 23% more area than the combined area of cotton (545,089 feddans) and maize (654,450 feddans). In 2000, the margin was even greater, 62%, as paddy area of 1,517,573 feddans exceeded cotton (386,090 feddans) plus maize (548,645 feddans) area. In that summer cropping season, paddy area was nearly quadruple cotton area in the seven major rice-producing governorates.

[13] HSU's market share remained a high 16.8% in 2002/03, although its quantity of seed cotton assembled had dropped 200,000 sk to 748,093 from 2001/02.

[14] In 2002/03, 20 companies (including 14 private ones) have exported lint.

IV Cross-Cutting Studies of Impact

Overview

The previous section examined the impacts of APRP in key subsectors of the Egyptian food and fiber system. This section takes a broader view and looks at different dimensions of APRP's impacts. The authors discuss APRP's impact on agricultural data systems, how policy reform is perceived and felt at the farm level, and in what ways APRP brought about changes in the roles of the public and private sectors during the liberalization process. Chapter 14 discusses important improvements in the information system, which were not included specifically in the scope of work of the program. The need for these changes became clear during implementation, and work proceeded with support from both the GOE and USAID. Chapter 15 deals with changes at the farm level. Such changes were, of course, anticipated in the program design, but the perceptions of farmers about when reform actually occurred and their awareness or lack of awareness of reform and its parameters will be of interest to policymakers. Chapter 16 discusses the process of policy reform that is required to achieve the desired technical outcomes. It points out the methods that APRP used successfully to garner support for reforms and for their implementation. The examples span the GOE's withdrawal from cotton pest management, its promotion of trade associations, its efforts to reduce the mismatch between irrigation water supply and demand, and private sector participation in policy dialogue.

14 Impacts of APRP on the Egyptian Agricultural Information System

Rollo Ehrich and Morsy Ali Fawzy

In collaboration with MALR, APRP experts developed a series of activities, both direct and indirect, to improve data quality, collection and processing of information, and its availability to end-users. APRP strengthened the agricultural information system in several important areas. APRP assessed the quality of basic farm-level data for both "old" and "new" lands and made recommendations for improvements. It improved yield forecasting for cotton and wheat, and now this information is accurate, produced on time, and summarized in a useful format. The MVE Unit provided informal input to MALR/EAS to introduce a new, scientifically based method for estimating field crop area for the major summer and winter crops. The RDI Unit helped MALR to create a set of accurate and representative statistics related to farm costs and returns. The RDI Unit, EPIQ, and CSPP together provided technical assistance to MALR and MWRI to develop a Matching Irrigation Supply with Demand (MISD) system to predict the demand for water. MISD uses MALR extension agents to provide estimates of cropping intentions 15 days before planting to MWRI District Units, where a sophisticated model is applied to forecast the demand for water. APRP also helped ALCOTEXA and CATGO to produce better and more timely market news, with special attention to cotton.

Indirectly, APRP also benefited the agricultural information system through numerous studies carried out to create baselines and endlines against which to measure the impact of policy reforms. Most of these studies generated new data, synthesized and interpreted typically hard-to-access data in new and innovative ways, and performed analyses that added significant value to the data. These studies will remain an important resource for policy analysis far into the future.

The impact of APRP on data quality and data coverage was significant. It was highly positive, both adding critical datasets and improving the accuracy of existing data. The following weaknesses remain: (1) limited capacity of MALR to analyze the data to support policy decisions and (2) limited production and dissemination of market news and extension materials containing economic analysis for use by farmers, traders, and processors.

The Agricultural Policy Reform Program (APRP) assisted the Government of Egypt (GOE) in its efforts to transform the agricultural economy from a centrally managed, controlled system to an open-market system with minimal governmental

intervention. In an open-market system, farmers, private businessmen, and consumers collectively and individually allocate their resources by basing their choices on knowledge (based on reliable information) of expected outcomes. Market economies are thus far more information-driven than centrally planned and controlled economies. The more complete and accurate the information, the more efficient will be the choices; efficient choices add up to maximizing economic welfare.

In making such a transformation, from a centrally controlled to an open-market economy, not only must the information system become better and more comprehensive, it also must differ qualitatively from the information system used by central planners. Where a planner requires an inventory of resources and a set of social targets, individual farmers and enterprises require detailed knowledge of their own cost structure, prevailing market prices, and expected prices. Where a planner transmits a system of quotas down the line to producers, based on collective estimates of needs, the individual farmer and marketing enterprises in a market system allocate resources among enterprises based on market signals.

A market economy requires different types of data, more data, and better-quality data. In this transformation process, the government's role shifts from that of directing and controlling to that of providing service to the market economy, although the government retains responsibility for rules to regulate food safety and health, as well as trade practices and non-competitive behavior. One fundamental service of the government must involve the generation and dissemination of accurate and comprehensive market information.

APRP directly and indirectly affected the agricultural information system as it carried out its mandate to assist the GOE in transforming its agricultural economy. APRP provided direct technical assistance to improve specific datasets or to add new data-generating activities. Indirectly, the process of policy analysis uncovered gaps in existing data, generated new data, and synthesized often difficult-to-access datasets in comprehensive or innovative ways. If identifying the need for a policy reform were hampered by lack of information, policymakers in the GOE would also be hampered in the future as they continue to monitor and refine policies. A broad range of data requirements was revealed by APRP activities—data required by policymakers, private firms, and producers.

This chapter describes and analyzes the impact of APRP on specific data systems, assesses improvements in the organization of data systems and data collection procedures, identifies remaining gaps, and develops recommendations for actions needed for further refinements. It also describes improvements in the agricultural data system that were brought about by key APRP interventions. Finally, it provides an analysis of the impact of data improvements, applying measures of quality and availability, assessing the GOE's role, and assessing institutional progress and future requirements.

APRP Interventions

Direct interventions were of three related types: (1) assessments of data quality and availability, (2) technical assistance to improve specific datasets, and (3) technical assistance to create new data and information. Related to this were a number of policy benchmarks that directly addressed data and information issues.

Assessments of Data Quality and Availability. The Monitoring, Verification and Evaluation (MVE) Unit of APRP conducted formal, in-depth assessments that focused largely on area, yield, production, income, and costs at the farm level. The assessments were carried out for both Old Lands and New Lands, as it was clear that data availability and quality differed widely for the two regions. Data generation, processing, and dissemination were much less developed for the New Lands than for the Old Lands, and that difference remains.

With respect to the Old Lands (Morsy et al., December 1998), three fundamental conclusions were drawn: (1) area, yield, and production data at the village level were fairly good, (2) the farther up the aggregation chain, the less reliable were the data, and (3) all data other than area, yield, and production, such as income, price and cost estimates, were of very low quality or non-existent. Data coverage and quality for the basic measures were good at the village level, but became distorted as they were aggregated at the district, governorate, and national levels. There was some evidence that the data may have been modified at the higher levels, perhaps to show better output performance than was actually the case. A related conclusion is that much good information is available at the village level, but it is not properly processed and aggregated. The study recommended that these village-level data be used more extensively in the effort to improve the information system, which could be done at a fairly low cost.

Other findings of the assessment were: (1) the time lag between generation and publication of data was inordinately long; (2) data generated by extension agents must be supplemented by data from sample surveys and other objective methods; (3) serious gaps exist in the basic data, especially for farm income–related measures such as costs, prices, input/output coefficients, and wage rates; and (4) a comprehensive training and equipping program is required at all levels of the system.

The fundamental conclusion of the assessment of New Lands data (Zalla and Morsy, 2000) was that data are incomplete and seriously biased. Information on large and important segments of the farm population was totally lacking, and there was no information at all about squatters or about a large percentage of large and small investors. The data are also biased because no statistically sound sampling techniques were used. Thus, APRP, to carry out its mandate to measure the impact of policy reforms on key economic indicators, conducted primary sample surveys to generate the required information. At the same time, technical assistance efforts by APRP began to build an acceptable data-generating and dissemination capability for the New Lands that is intended to endure beyond the

tenure of this United States Agency for International Development (USAID) program. That effort, combined with similar programs being carried out in the Old Lands, includes objective yield estimation, income, cost and price information, yield forecasting, and area estimates that are to be used in allocating water supplies in collaboration with the Ministry of Water Resources and Irrigation (MWRI).

In summary, the major findings of the assessment of data quality and availability for the New Lands included: (1) lack of a precise definition of New Lands, (2) poorly articulated structure of governmental organizations responsible for serving New Lands farmers, (3) poor incentives for extension agents and lack of resources and training, (4) lack of scientifically sound methods of estimation, and (5) inadequate processing and presentation of data. Key recommendations of the assessment, primarily for the Ministry of Agriculture and Land Reclamation (MALR), were to: (1) include information on the class of holder in the agricultural census, (2) establish a national sampling frame, (3) expand the duties of the Sampling Directorate to include collection of area, yield, and production cost data in the New Lands, (4) integrate data on the Graduates program into regular MALR data-collection and dissemination programs, and (5) upgrade the skills of all personnel engaged in collecting and processing information on the New Lands.

Follow-up by APRP, MALR, and Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) included the "New Lands Statistics Program," currently under way in selected governorates. The program aims to generate, on an annual basis, a full range of data on production, area, yield, income and costs, and yield forecasting. In other words, it is hoped that through the intervention and assistance of APRP, data of the scope and quality already realized in the Old Lands will be produced for the New Lands.

Yield Forecasting. Early-season forecasting of yields for cotton benefited from MVE Unit assistance in four governorates in 1998/99. The Cotton Sector Promotion Program (CSPP) took over the cotton yield forecasting assistance in 1999 and has continued it since. Two broad-gauged assessments carried out by the MVE Unit, and the specific recommendations that resulted, for both cotton (Morsy et al., 2000) and wheat (Morsy et al., 2001) covered survey methods, sample selection procedures, timing of surveys, options for forecasting models, and institutional capacity-building. The findings and recommendations of these assessments amounted to a true blueprint for improving (or initiating) a proper yield forecasting system. For each crop, MALR staff followed the recommendations closely and produced technically reliable forecasts. These forecasts covered 37 districts in 11 governorates by June 2001 for cotton, and improved the wheat yield forecasting process in 26 districts in 13 governorates by January 2001.

Crop Area Estimates. Yield forecasts have their highest value if they are linked to accurate estimates of the area planted to that crop. The MVE Unit provided informal assistance to MALR to introduce a new, scientifically based method for

estimating area. This method was applied, on a trial basis, for wheat in 2001/02. The Unit recommended that MALR use sampling methods and advanced measuring instruments to measure area directly. Particularly interesting is the application of a sampling method that uses "inter-penetrating sub-samples," which promises to greatly reduce sampling bias. This involves enumerators' revisiting a sub-sample to double-check initial field measurements. This method, which is being introduced to improve area estimates, can complement estimates of planting intentions, and the information in turn can be used to project the demand for water.

Gender-Disaggregated Data. Market liberalization could be affecting women in agriculture differently than it affects men. For example, land tenure laws may work to the disadvantage of women relative to men. The interaction of women farmers and traders with the male-dominated marketing system may be problematic. There is also some evidence that privatization has led to more loss of employment among women than among men.

Seeking to test the above propositions, the Reform Design and Implementation (RDI) Unit of APRP carried out two gender-related studies in 1999 (Nagat et al., 1999a and 1999b). One outcome of the study was articulation of a benchmark that required the GOE to publish and implement a policy that calls for the Agricultural Economic Research Institute (AERI) of MALR and the Economic Affairs Sector (EAS) of MALR to collect and analyze gender-disaggregated data in order to assess the impact of liberalization and privatization on employment and incomes of women. This benchmark was accomplished.

Planting Intentions: Matching Supply and Demand for Water. Development of a data system to gauge farmers' planting intentions was a policy benchmark that received a significant amount of APRP technical assistance. The RDI Unit, the Environmental Policy and Institutional Strengthening IQC (EPIQ) Unit, MALR, MWRI, and CSPP were all engaged in a coordinated effort to put an information system in place that would enable more precise determination of water requirements and more timely delivery of water to water users. Water allocation was a relatively simple matter when the GOE dictated the cropping pattern—water was provided according to a detailed cropping plan. With the gradual liberalization of the sector over the last 15 years, farmers are now free to choose which crop to plant. Hence, there is a need to estimate planting intentions at least 2 weeks prior to the time water is actually required. It takes about 15 days for water released at the High Dam to reach the last irrigation command area in the Delta.

The program, which basically attempts to estimate planting intentions, was originally carried out on a pilot basis in five water command districts in three governorates: Beni Suef, Beheira, and Sharqeya (King et al., 2000). The pilot program was expanded to include all water districts in these governorates, and 11 more governorates were added in 2002/03, making a total of 64 districts. Data also must be collected during the growing season to reflect the changing water

requirements when fertilizer is applied, during different stages of plant growth, and at harvest time. MALR extension agents collect data from farmers using the basic irrigation unit (*hod*). Irrigation district offices aggregate the information to the branch canal level, and from that data the governorate statistical offices develop area maps that are forwarded to the national level.

Computers and modeling programs are used at the irrigation command level to estimate water requirements, based on the estimated planting intentions. The effort requires a high degree of technical sophistication and cross-institutional coordination and management. Extension agents and MWRI "guides" all require basic training in methods of enumeration and data handling; according to many seasoned observers, they should continue to be given financial incentives to ensure careful implementation of this added task. Computers that will enable rapid processing of the raw data at the district level in the future were requested and are being delivered.

Both technical and institutional issues remain to be resolved before this critical information-generating activity, which is now national policy, will be able to efficiently allocate water among competing regions and crops. The main issue, still unresolved at the top of each ministry, is MALR's insistence that data should go to high-level governorate offices to be refined before being forwarded to the responsible MWRI district office.

Farm Income Data. Following about 3 years of effort, primarily by the RDI Unit (Gleason and Hussein, 1999), this vital information-generating effort covers 15 governorates, more than half of the country, and almost all of the main agricultural governorates. Cost and income data are more difficult to collect than area, yield, and production data, and they are essential for estimating economic returns to different farm enterprises and farmer income. Extension agents must be trained to administer a complex questionnaire, and trained economists and statisticians at the national and governorate levels must back them. This process is progressing well, but perhaps should be accelerated.

This activity appears to be technically and institutionally sound; two major problems are apparent. First, there has been no attempt made to extend the results of the surveys back to the farmers, and the data have been distributed to only a few officials. MALR should be urged to provide extension materials in the governorates that are already being covered by the farm income surveys. Likewise, publishing data for covered governorates will provide analysts with data for analysis and may in fact help improve the data-collection process itself, as analysts may discover gaps or inconsistencies that can be corrected in future efforts.

The second major problem is price information, which has emerged as the most serious gap in market information. Knowledge of farm-level prices and local market prices is vital for farmers (to make their planting and marketing decisions) and for local traders, regional traders, exporters, and processors. Official

"support" or floor prices and other interventions still interfere with markets for many important crops, including wheat, cotton, rice, and maize, so one might be tempted to suppose that collection of market prices is not a useful enterprise. However, there is some room for prices to vary from official prices, and the markets are gradually becoming free from such interventions. In the future, MALR should make an effort to install a system for collecting and disseminating price information to farmers and traders.

Market Information. The status on progress toward developing a market information service revealed that the market information system is not functioning well. The situation and outlook (S&O) reports of MALR, designed to disseminate world price and trade information for cotton, wheat, rice, and fertilizer, use data from the internet and do not attempt to analyze the data or draw inferences to the Egyptian situation. These S&O reports are supposed to be published weekly and quarterly, though none were published during the last 2 years of APRP.

More important, the S&O reports do not contain information on domestic prices and trade, or on domestic stocks, and the reports are not properly "packaged" for use by extension agents and farmers. Proper packaging would involve analytical content that is appropriately simplified into tabular material, with examples from markets that are familiar to the average farmer or small trader in a particular region.

The GOE made no attempt to collect and disseminate weekly domestic price and quantity data to farmers, nor were such reports provided to analysts and decision-makers. Implicit in this joint decision was the assumption that domestic market prices have little meaning, as the floor price became the "fixed" price. Furthermore, GTZ concluded that, in any case, the informal market news system, centered on the cooperatives, seemed to be providing market news sufficient for the farmers' needs.

Cotton Market Information. The information system for cotton is perhaps the most developed of any field crop, with respect to breadth of coverage. Combined technical assistance efforts of APRP (Schrader, 1998; Adoum, 2001) and GTZ (GTZ, 1997; Hannover, 2000), working directly with the Alexandria Cotton Exporters Association (ALCOTEXA) and the Cotton Arbitration and Testing General Organization (CATGO), developed and disseminated weekly reports on international markets that were comprehensive and timely. However, the CATGO bulletins are available only to ALCOTEXA members (27 exporters) and a list of another 50–60 GOE officials, journalists, and academics. No domestic price information is collected.

One important development, due in part to the efforts of APRP, is that the export volume and price information distributed by ALCOTEXA reflects free-market forces more than in the past. As of 2000, ALCOTEXA's Information Service has posted weekly statistics on the ALCOTEXA website, which can be downloaded

by anyone accessing the site. The report is comprehensive, containing detailed prices by type and grade, commitments, shipments, and supply and demand data.

CATGO, a semi-autonomous government organization supervised by the Ministry of Supply and Home Trade (MSHT), issues a weekly bulletin that contains mostly technical information and some economic information on the cotton marketing season. Data are detailed, and specify seed cotton deliveries to gins by company and variety, HVI test results, lint cotton out-turn by variety and grade, lint cotton deliveries to spinners, some export data (obtained from ALCOTEXA), and a breakdown of domestic sales of lint cotton by ALCOTEXA member companies. No domestic price data are included. APRP assisted CATGO in improving its website, which will improve dissemination of this highly valuable information. During the 2002/03 cotton marketing season, CATGO posted on its website some of the information contained in its bulletin on domestic cotton marketing and ginning.

APRP Assessments and Special Policy Studies. Most of the assessments and special studies required generating primary data through special surveys and structured interviews, as there was little information in published form about the agricultural sector readily available. Baseline studies were designed to identify policy barriers to economic efficiency and to provide current measures of industry structure, conduct, and performance, against which to gauge the impact of policy reforms carried out under APRP. The baseline studies of 1997/98 and 1998/99 were followed by endline studies in 2001/02.

Structural measures included the number of firms, the importance of the private sector, market shares in processing and trade; the role and scale of government enterprises, and policy barriers to free and open competition. Conduct variables included the degree of competition, technical efficiency, ease of entry, behavior of public enterprises, and trends in export shares. Performance measures included market efficiency and international competitiveness. A full range of agricultural policy issues were addressed.

The survey of producers (Morsy et al., March 1998) generated useful baseline information against which to judge the impact of policy reforms. The study was somewhat limited in coverage, however, as it addressed only nine tranche I policy benchmarks that were directly related to producers. The study included 181 questionnaires, administered in eight governorates. Among the responses relevant to the information system, farmers observed that technical information provided by extension agents was of limited value. They stated that what they really needed was market information and information on the relative profitability of crops.

Impact of Four APRP Activities on Agricultural Information System

Four APRP interventions, which were carried out with the explicit purpose of developing agricultural information, are analyzed in this section. In addition, the overall impact of improved data on policy analysis and economic performance in

the sector is addressed. The four specific interventions were (1) farm income data, (2) forecasting yields, (3) crop planting intentions (area estimates) for forecasting water requirements, and (4) market news.

These activities were selected for more in-depth analysis concerning their impact because the datasets are critical to the proper functioning of a free-market agricultural economy, and APRP invested significant resources developing the information. The criteria used to judge the degree of success achieved in each of the interventions include:

- Technical—Coverage, accuracy, and analytical content
- Usefulness to End-Users—Form and availability/scope of distribution
- Institutional Capacity—Collaboration, structure, and processes

Farm Income Data. The biggest gap in official MALR statistics was in the area of farm income, and filling this gap was a high priority for APRP. Beginning with a pilot effort in three districts in two governorates (Gleason and Hussein, 1999), the activity, with the full policy backing of the GOE, was expanded to 15 governorates (including much of the New Lands) during the 2001/02 cropping season.

Generating farm income data has obvious benefits. Farmers, in a liberal agricultural economy, must understand the relative profitability of alternative farm enterprises and then make planting decisions based on this information. Hence, current price/cost information, especially at harvest time and just before planting season, is an essential ingredient of the farmer's decision matrix, as is good information on cross-seasonal price movements in recent crop marketing years.

A systematic analysis of the income- and cost-generating activity is summarized in Table 14-1. Several conclusions can be drawn in terms of the three criteria used to judge the impact of APRP. First, enterprise production cost and return data will now be available in 15 governorates, where no accurate information was collected before. The new data are of good quality, are accurate, and are unbiased because they are based on a scientifically designed sample and processed by computer. Second, while the data are in theory available to decision-makers and policy analysts, in practice MALR/EAS and AERI are not yet able to provide decision-makers with actual estimates of farm income. Furthermore, the information was not fed back to private decision-makers—farmers, traders, and other marketing agents—through the extension system. Third, income and cost estimates, and gross returns by crop enterprise and crop rotation, are potentially useful and helpful to both farmers and policymakers, and should increase the efficiency of resource allocation in agriculture under the liberalized market system. Fourth, the institutional capacity for collecting and processing the information is in place, from the farm (village) to district to governorate to national level. Within 1 or 2 years, all the governorates could be covered, and usable national statistics on income and costs could be readily available for use by policymakers and researchers. The institutional arrangements for producing the data are therefore in

place. Fifth, the new system collects information on asset values, providing a much-needed new variable for analysts to use in classifying farms.

Four gaps remain in the institutional structure: (1) inability to produce estimates of farm income; (2) inadequate capacity to analyze data to produce policy recommendations; (3) a distribution system that would make the data available to a wider range of users, including private traders, university researchers, and government officials, and make the data user-friendly, such as through a website or on CD-ROM (hardcopy distribution to only about 600 users after a delay of at least 6 months is not a very high level of performance); and (4) there is no capacity to provide useful information on costs and returns to the farmers themselves, who under the liberalized market economy are the key decision-makers (this would require developing a training program for extension agents,

Table 14-1. APRP'S IMPACT ON FARM INCOME DATA

Criteria and Sub-Criteria	Impact
Technical: ▪ Coverage	Income and cost data are now available for 15 governorates.
▪ Accuracy	Data are of the highest possible quality, based on scientifically sound methods.
▪ Analytical Content	In addition to costs of production, MALR now collects data on asset values and gross revenue, and generates budget analyses. Analytical capacity is still weak.
Usefulness to end-users: ▪ Availability	Data are available to officials and analysts. MALR, with a small additional effort, could extend the results back to farmers.
▪ Form	Is maintained up the line and comparability is assured over space and time. However, data are not available in a form usable by farmers.
Institutional capacity: ▪ Structure ▪ Collaboration ▪ Process	Institutional capacity for data collection is adequate. Units of MALR at different levels work well together. The process for collecting data is accepted, but the process for disseminating data is inadequate.

engaging the Agricultural Policy Analysis Unit (APAU) of EAS, strengthening the Marketing Extension Unit, and forging links among these entities).

Policymakers also have a vital need for such data if they are to monitor the impact of liberalization of markets on the welfare of farmers, detect the existence of non-competitive conditions in Egyptian agriculture, propose technical and economic remedies for such situations, and provide sound advice to farmers. Analysis of this important database by MALR/EAS has been slow to develop, ostensibly because the data are still incomplete in terms of geographic coverage. There is,

however, no clear reason to delay such analysis. Good economic information that would assist policymakers can surely be generated using the data already available for 15 of the 26 governorates. This information will become even more valuable when a time series of such data is available for all major agricultural governorates. Use of the data for economic extension packages, to be delivered to farmers, should receive immediate priority by MALR. Farmers need data showing the geographic and temporal variance in costs and returns, not simply one "cost of production" or one "farm income."

Yield Forecasting. Yield forecasts are made before the harvest and give policymakers, producers, marketing agents, and extension agents an idea of what yield levels are likely to be. Yield estimates are made after harvest and are typically based on sample field measurements and crop cuts. Within-season yield forecasts have been added to the data generation capability of MALR/EAS through APRP activities for cotton and wheat (Morsy et al., 2000 and 2001). MALR has been estimating yields for the full range of crops through application of crop-cutting techniques and sampling methods since 1955. In addition to these sampling methods, extension agents make subjective estimates, and both sets of results are reported to national MALR headquarters. At that point, high-level officials make a judgment as to which estimate is the most accurate. This dual system is costly and contributes to confusion about the official yield estimates. It would probably be best to use only the sampling estimates, with appropriate effort to minimize sampling error and non-sampling error, which would greatly reduce the amount of resources devoted to the subjective yield estimates carried out by the extension agents. If this were not politically feasible, then extension agents should receive more training on how to make objective yield estimates.

The impacts of improved yield forecasts under APRP are noted in Table 14-2. Good data travel up from the farm to national decision-makers in a timely manner. However, the data do not travel back down to traders and processors in a form that they can use to make their buying and storage decisions. With improved yield forecasts (and own estimates of crop size), traders, processors, and agencies like the General Authority for Supply Commodities (GASC) can develop buying strategies in advance of the harvest. Traders, processors, and policymakers can also use timely yield estimates to do early planning of processing capacity needs, projected import requirements and export possibilities, as well as the need for possible releases from storage (with reference to the geographic distribution of supplies). Farmers also could use yield forecasts to develop strategies for marketing and storage of soon-to-be harvested crops. In addition, the association of yield with certain cultivation practices should provide useful information for extension materials.

The recommendations of the wheat and cotton yield forecasting assessments and technical assistance by the MVE Unit starting in 1999 and continued by CSPP succeeded in encouraging MALR to make important adjustments in both yield

Table 14-2. APRP'S IMPACT ON COTTON AND WHEAT YIELD FORECASTING

Criteria & Sub-Criteria	Impact
Technical: ▪ Coverage	Within-season yield forecasts were added for cotton and wheat and cover the entire country.
▪ Accuracy	MALR improved the calibration of the estimating models, introduced a manual to improve consistency, and now applies accurate data in making the yield forecast.
▪ Analytical Content	Accurate field measurements are entered into the model, and yield forecasts are improved.
Institutional Capacity: ▪ Structure	The process has been institutionalized, but some training will be necessary to sustain the new approach.
▪ Process	Data are collected on time; timely execution of tasks and dissemination of results.
▪ Collaboration	There is now better coordination from field to forecast, and good vertical coordination among MALR units. Excellent example of successful donor coordination.
Usefulness to End Users: ▪ Form ▪ Availability	Good data travel up the institutional chain from farm to national-level decision-makers. However, the data are not readily available to traders and farmers.
▪ Scope of Distribution	There could be a powerful impact on pre-harvest planning for imports, exports, and procurement planning, if the scope of distribution were increased.

forecasting methods and yield estimating procedures. The recommendations were:

- Integrate crop-cutting (objective yield measures) and forecasting techniques, thereby improving the reliability of both.
- Adopt sampling as the method of preference, replacing subjective estimates based on observations by extension agents.
- Install forecasting procedures for wheat, where they did not exist previously.
- Streamline the use of crop cutting in making yield estimates, with yield forecasting method leading to a reduction in the sample size used to generate final yield estimates.
- Shift the timing of forecast yield estimates to approximately 1 month earlier than was the procedure prior to the MVE Unit's involvement.
- Significantly advance the timing of the release of yield estimates, from several months after harvest, to 2–3 months prior to harvest, adding value to yield estimates from the point of view of policymakers and private businessmen.
- Stimulate a rapid geographic expansion of cotton yield forecasting.
- Disseminate yield forecasts broadly to public and private users on a timely basis.

This program is an excellent example of successful donor coordination and delivery of technical assistance to the field in a scientifically sound and collaborative mode. APRP, GTZ, and MALR cooperated successfully for several years and managed to create a service that produces accurate and timely information that is useful to MALR policymakers, traders, and the donors themselves. The process was institutionalized to the point where outside assistance is no longer necessary. APRP's continued involvement in providing training of enumerators, sample surveyors, and analysts, helped improve statistics in agriculture across the board, not only in the instance of yield forecasting.

Use of Planting Intentions Information to Forecast Water Requirements. Establishing a Matching Irrigation Supply with Demand (MISD) system, as described in chapter 9 of this volume, involved close coordination between MALR and MWRI and two units of APRP, RDI and EPIQ. GTZ began collaborating with the program in 2001/02, and has provided further technical assistance under its new project. It has completed an initial pilot phase and is moving at a deliberate pace toward the goal of covering all governorates. Technically, all sampling and modeling requirements are in place. However, expansion into additional governorates is apparently straining the system at the *hod* level. Supervision and training of enumerators will require even better cooperation between the two ministries to succeed, once all irrigation command areas are covered in the next several years. Institutional arrangements will be stretched to their limits because, not only are area estimates required at the time of planting, but also water requirements must be estimated for different seasons and stages of crop growth. The samples and modeling estimates must be timely, and water requirements must be estimated, approved, and acted upon rapidly in order to meet the 15-day time requirement for water releases to reach end canals in the Delta.

The necessity for re-estimating water requirements during the growing season, as various cultural practices and stages of plant growth unfold, means that MALR extension agents and their MWRI counterparts (guides) operate in a "rapid reconnaissance" mode throughout the crop season. They should be fully, technically capable of collecting the basic area data, which is later used by MWRI to estimate crop water requirements accurately. There is preliminary evidence that such precision and time sensitivity is taxing field personnel, and that it is perhaps time to provide more training, more and closer supervision, and a better system of incentives to stimulate field agents to accept this added, more demanding work load. The weak link in the system may be the ability of field agents to obtain precise area estimates on time, which are needed to allow MWRI to accurately forecast water requirements throughout the season. This potential weakness is related to the technical and managerial capability of field agents, as well as to the management burden placed on them to do multiple tasks with minimal resources. We recommend a comprehensive program of continued technical assistance, institutional development, and training, especially at the village/secondary canal level.

Two policy and institutional issues that may be interfering with the proper functioning of the water demand estimating system are: (1) MALR's policy that the agricultural crop area data must go to high-level governorate officials to be "refined" before they are forwarded to MWRI district offices for computerized forecasting of water demand, and (2) a policy issue associated with the estimation of rice area. The policy of governorate-level review of data could reduce the effectiveness of the whole process, as timing is inevitably thrown off and error may be introduced into the data. This issue is important enough to warrant high-priority negotiations between the two ministries. Regarding estimation of rice area, extension agents tend to report only the officially allotted rice area, although it is well known that in many areas much more rice is grown than is allowed by the GOE. This practice, if widespread, could have serious consequences for the accuracy of water demand projections.

Table 14-3. APRP'S IMPACT ON FORECASTING WATER REQUIREMENTS

Criteria and Sub-Criteria	Impact
Technical: ▪ Accuracy and Analytical	Accurate area estimates and reliable modeling of water requirements now exist.
▪ Coverage	Water is released in a timely fashion to each major canal system, and no shortages occurred at tail-end tertiary canals, according to results of the pilot activity. A total of 14 governorates are now covered by program.
User-friendliness: ▪ Form and Availability	The pilot proved that meeting water requirements is feasible with the system, as designed.
▪ Scope of Distribution	There is potentially a significant positive effect on crop production, if water supplies are better allocated. Thus, rapid expansion of the system to all governorates is needed.
Institutional Capacity: ▪ Structure and Process	Incentives, training, and equipment are needed to sustain the process and install an appropriate organizational structure. The practice of reviewing the area estimates at the governorate level, by MALR, should be reviewed.
▪ Collaboration	Coordination among ministries and within various levels of each ministry is currently good, but may need to be assisted with outside management inputs, especially as the program is expanded to include the whole country.

Market News. APRP succeeded in helping the GOE (MALR, CATGO) and a private entity (ALCOTEXA) improve the availability of international price and marketing data, as well as some useful technical information on cotton. The effort was, however, limited in three respects: (1) for the most part the reports of MALR and ALCOTEXA contain international data only, (2) news was disseminated to only a few officials and large enterprises, and (3) the websites created have yet to reach a large number of users.

Consequently, this section focuses on the needs of farmers, while recognizing the importance of marketing agents such as traders and processors as decision-makers in the liberalized agricultural economy. Moreover, it focuses on the lack of effort, either by APRP or MALR, to collect, process, and disseminate domestic market price information. Except for market price data for four fruit and vegetable wholesale markets generated by the USAID-funded Market Information Project (MIP),[1] the farmers' source of market information is his or her neighbor, sometimes traders, and in some instances, the local extension agent. The Agricultural Technology Utilization and Transfer Project (ATUT)[2] generated good international market data, but provided it only to a few, large growers/exporters. ATUT and the Horticulture Export Improvement Association (HEIA) have not served the vast majority of farmers, nor do they collect local market data. This is a serious gap in service to the liberalized farm economy and should be filled as soon as possible, and it should be filled by MALR, the only institution capable of mounting such an undertaking, given that market information is a public good.

The results of the present assessment strongly suggest that the extension agent, adequately trained and provided with appropriate incentives, should be the focal point for collecting and disseminating local market news, including price and sales data. Extension agents are a ready resource in rural areas, and they are already recruited to perform many data-related tasks, in addition to their normal responsibilities. However, using extension agents as collectors and disseminators of market news will strain MALR's technical and institutional capability, as they have little experience in collecting marketing information, and even less experience in delivering economic advice to farmers. Regarding the latter, it is especially important that farm income and cost data, appropriately processed by analytical units in EAS, be distributed to farmers by extension agents who have received training in the fundamentals of farm budgeting.

District, governorate, and national statistics units and national economic analysis units need to be involved in producing analysis suitable for market news releases, but they will require technical training, organization, and management assistance to carry out data processing, analysis, and packaging for dissemination of usable information to farmers and extension agents. The package of farmer-oriented market news must also include information on international markets, suitably presented for ready understanding by small farmers.

The Agricultural Policy Analysis Unit (APAU)[3] of MALR and the Marketing Extension Unit[4] need modified mandates and upgraded skills for handling the analytical demands of a domestic market news service and farm-level economic information service. Analytical requirements include interpreting price trends, doing sensitivity analysis of the implications of changes in costs and returns, and analyzing market performance (economic efficiency). Moreover, these units must collaborate with the statistical units at all levels in preparing timely releases of market information in a form usable by extension agents, farmers, and marketing agents.

Cotton market information received a lot of attention from APRP because of the cotton subsector's importance to the economy and because information and its dissemination are highly complex in this subsector. ALCOTEXA and CATGO were the principal clients for this activity, with ALCOTEXA being primarily responsible for generating price data based on international price relationships, and CATGO having responsibility for grading and certifying cotton and disseminating technical data. ALCOTEXA is an association of cotton exporters, largely private, and CATGO is a semi-autonomous public sector entity. The two organizations seem to have an effective working relationship, and they complement one another in the process of generating market information. Generally, there is no effective mechanism for disseminating market information outside of the exporters' association and a limited number of high-level GOE officials.

Both GTZ and APRP carried out studies of the market information needs of the cotton subsector, and both concluded that collecting domestic price information would not be worthwhile because domestic prices reflect the official floor price. There is, however, emerging evidence that price variation above the floor price is occurring, at least for some of the finer export grades. Also, the private sector is playing an increasing role in the market, as the GOE is gradually relaxing the rather restrictive rules for allocating market shares.

APRP activities had a significant impact on cotton market information in several specific instances. The RDI Unit assisted three major players—MALR, ALCOTEXA, and CATGO—to establish websites that are comprehensive in coverage of international market data as well as technical data on the domestic crop. This information is accessible to key participants in the Egyptian cotton trade. The amount and quality of the technical information was greatly expanded by CATGO, with technical assistance from APRP. CATGO's website promises to greatly facilitate the ability of traders and processors to locate the type and grade of cotton needed. Weekly publications have also been expanded in both coverage and scope of dissemination, which should enhance the efficiency of the cotton marketing process.

Both ALCOTEXA and CATGO have a high level of capacity to collect and distribute market information, although both institutions seem reluctant to collect and disseminate domestic market information. Thus, MALR, at least in the near future, will probably have to be responsible for that side of the structure. Following the further liberalization of the cotton market, there will be a need to develop a link between MALR and these institutions concerning domestic price and sales information, and its dissemination to farmers in an extension package. At this time, there does not seem to be a close relationship between MALR and the specialized institutions, so there is work to be done to foster collaboration in the area of domestic market news. For example, cotton yield forecasting is potentially of great value to almost every facet of the cotton industry, but traders expressed doubt that it is very useful at present because the area estimates made by MALR are considered to contain gross errors. Hopefully, the new area

estimating methods being introduced in 2001/02 and 2002/03, with informal assistance from the MVE Unit in 2001/02, will solve this problem.

Table 14-4. APRP'S IMPACT ON MARKET NEWS

Criteria	Impact
Technical: ▪ Coverage	APRP assisted MALR in adding situation and outlook reports, but confined itself to international market data. There is still limited dissemination of even the international data.
▪ Accuracy and ▪ Analytical Content	APRP helped improve the accuracy of the data and added some analysis.
Usefulness to end users: ▪ Availability/ Scope of Distribution	Limited number of officials and large traders have better access to international data, in a usable form, especially in the cotton subsector. There was no significant increase in market news available to farmers and smaller traders.
Institutional capacity: ▪ Collaboration, Structure, and Process	No significant institutional capacity to collect domestic market information and disseminate it to farmers and small traders was developed. There was, however, a significantly improved capacity in the private sector (ALCOTEXA) to disseminate international market news to public and private sector decision-makers.

Conclusions and Recommendations

Conclusions. Timely, high-quality data, including farm income, yield forecasts, and market information, were collected scientifically with technical assistance efforts provided under APRP and, in many instances, with cooperation from GTZ. Area estimates are likely to improve when the results of area measurement pilot activities are applied. These activities greatly improved the scope, precision, efficiency of generation, and usefulness of basic agricultural data. The extraordinary development of a number of important institutional linkages between ministries and donors, should be highlighted as another significant achievement. *Overall, these achievements constitute a true success story, especially considering the fact that data generation was not an explicit part of the APRP program design.*

Specific achievements during APRP include the following:

- Accurate farm income data are now available for 15 governorates, and the remaining governorates will be covered within a short time.
- Early-season forecasts of yield for cotton and wheat are firmly part of MALR's information-generating process, and the DT2 project has provided training in yield forecasting for citrus. Data are high quality, timely, and useful to a broad range of institutions in the agricultural sector.

- MALR and MWRI have developed the capability for predicting the demand for water, based on estimates of planting intentions. The program is now being implemented in 14 governorates and the GOE intends to expand it to the entire country.
- Good data on the New Lands are now being generated.
- Progress is being made on improving crop area estimates, in particular by introducing new methods and measuring techniques.
- There was progress in developing market information for cotton. Weekly international market data are produced, along with much-improved technical data on the domestic cotton market. Data are available to public and private decision-makers in both electronic and hardcopy formats.
- Numerous assessments, special studies, and verification efforts, carried out by all APRP units, added immensely to the stock of useful agricultural and agribusiness system information.

While there was progress on many fronts to improve the availability of data to users, including improving timeliness of distribution and widening the coverage of data dissemination, these efforts showed less progress in achieving what might be termed improvements in information, as opposed to improvements in data quality. Reports are not widely distributed and are not generally adequate to the needs of users. Much of the data are still held too close and for too long by high-level government officials, and there is not a high priority to providing information in usable format for private traders, processors, and exporters. Issues that should be addressed that are related to agricultural information include:

- MALR, CATGO, and ALCOTEXA should include domestic market information in their periodic reports.
- There is a lack of analysis of the data.
- Extension materials lack economic information.
- There is a weak link between extension and MALR/EAS.
- Geographic coverage and coverage of major crops are incomplete.
- Generation of data for the New Lands still lags behind the standard set for the Old Lands.
- Area estimates are much improved, but the program is just getting under way.

APRP's impact on information for farmers and local traders, the primary decision units in agriculture, was not significant. The GOE apparently did not take seriously farmers' and marketing agents' need for economic intelligence to make their decisions. APRP was unable to find an effective means for creating the political will, the institutional capacity, and the development mode needed to create a farmer-friendly information system. After 5 years of largely successful interventions in information generation in general under APRP, Egypt still does not have a domestic market news service or economic extension packages for farmers and traders.

Economic efficiency in agriculture depends to a large degree on the quality of information for farmers and traders. This information should include domestic price and sales information on a weekly basis, extension materials on costs and returns, forecasts of yield, area/water requirements, and technical recommendations on farm practices. All crop, livestock, and farm inputs should be covered, as well as international prices. These conclusions suggest the need for a major effort to build a farmer-oriented information system for Egypt's agricultural sector. Such an effort would indeed require a major allocation of human and financial resources, but it would undoubtedly have a high payoff in terms of efficiency gains, greater growth, and greater employment in the agricultural sector.

Recommendations. Recommendations related to agricultural information efforts in Egypt include the following:

- *Institutionalization*—Technical and institutional aspects of basic data-collection and processing activities of MALR and MWRI were positively affected by APRP activities during the last 5 years, and are much improved and can be counted as success stories. However, full institutionalization of the system is not complete. It is therefore recommended that technical and managerial assistance be continued.

- *Price and Sales Information*—All market information systems should add domestic prices and sales information to the international data currently being collected and reported.

- *Dissemination of ALCOTEXA and CATGO Information*—ALCOTEXA and CATGO should add a broad range of recipients to their distribution lists for cotton information, including smaller, private sector traders and ginners. They should also add information on domestic sales, prices, and stocks. In addition, smaller cotton traders and farmers should be kept in mind when these two organizations are preparing and disseminating information.

- *Extension Element of Crop Yield Forecasting*—Yield forecasts could be useful to farmers, indirectly by forming the basis for extension materials, as well as to traders, processors, and exporters. Therefore, the forecasting activity should add an extension information component to provide timely feedback to farmers on yield forecasts. Meanwhile, MALR should adopt a liberal policy toward disseminating the forecasts, immediately after they become available, to a broad range of public and private traders and processors. Improved area estimates will also greatly enhance the value of yield projections.

- *Resources for Estimating Water Requirements*—As farmers learn to deal with free-market conditions, and as the last vestiges of price and marketing controls are eliminated, it is expected that there will be increased volatility in changes in cropping patterns and prices. This is sure to put more pressure on

the technical and institutional capacity of MALR and MWRI to forecast water requirements. Adequate GOE resources should be applied to improve and expand the process, and donor-funded technical assistance should be continued for this activity. GTZ fully intends to step up its level of assistance for this activity, but this critical task could also benefit from continued USAID assistance.

- *Market News Services*—MALR should complete its preparations for a comprehensive market news service aimed at guiding farmer-decision-makers in this newly liberalized agricultural economy.

- *Reviewing Cropping Intentions Estimates at Governorate Level*—The GOE should put high priority on finding a solution to the policy issue inherent in MALR's decision to review basic cropping intention estimates at the governorate level. This is being done ostensibly to refine the estimate, but the system for forecasting water demand could be compromised, as the timeline is interrupted and errors might be introduced.

- *Needs Assessment for Capacity Building*—USAID should consider funding a comprehensive assessment of the technical and institutional capacity-building actions necessary to develop a farmer-friendly market information system, building on the successes of the agricultural information activities completed to date.

References

Adoum, Djime. *Egypt Cotton and Rice Market Information System*. RDI Unit – APRP, Report No. 131. February 2001.

ALCOTEXA. *The Egyptian Cotton Gazette*. Journal of the Alexandria Cotton Exporters' Association, no 116. April 2001.

ALCOTEXA. *Weekly Reports* and website.

Ariza-Nino, Edgar. *The Wheat Sector in Egypt.* Policy Brief. RDI Unit – APRP. 1998.

Ariza-Nino, Edgar et al. *Retrospective Assessment of the 1997/98 Cotton Marketing System*. RDI Unit – APRP, Report No. 28. 1998.

Ariza-Nino, Edgar and Ibrahim Siddik. *Assessment of Market Information Needs of An Open and Competitive Marketing System.* RDI Unit – APRP, Report No. 23. December 1997.

CATGO. *Weekly Reports* and website.

CATGO. *Technical Gazette.* July 2000.

Gleason, Jane and Sayed Hussein. *Study on Cost of Production and Farm Income Data for the 1997/98 Agricultural Season, Volume I.* MALR/RDI Unit – APRP, Report No. 89. December 1999.

Goetz, Stephan J. *Assessment of 1997 Egypt Integrated Household Survey Data for Use in Constructing a Producer Level Baseline*. MVE Unit – APRP, Impact Assessment Report No. 8. Abt Associates Inc. Cairo, Egypt. December 1999.

GTZ. *Preparation of a Pilot Market Information Service for Cotton Marketing on Goverorate Level.* July 1997.

Hannover, Wolfgang. *On-Farm Water Saving Methods.* GTZ. July 2001.

Holtzman, John, in collaboration with Adel Mostafa. *Cotton Subsector Baseline Study.* MVE Unit – APRP, Impact Assessment Report No. 5. Abt Associates Inc. Cairo, Egypt. December 1998.

Holtzman, John, in collaboration with Charles Stathacos and Abdel-Rahim Ismail. *Rice Subsector Baseline Study.* MVE Unit – APRP, Impact Assessment Report No. 3. Abt Associates Inc. Cairo, Egypt. March 1999.

King, Larry G. et al. *Reducing Mismatch of Irrigation Deliveries, Phase I: Pilot Program.* EPIQ Report No. 33. December 2000.

Krenz, Ronald D. and Adel Mostafa. *Seed Cotton Marketing in Egypt, 1999-2000.* MVE Unit – APRP, Impact Assessment Report No. 11. Abt Associates Inc. Cairo, Egypt. May 2000.

Krenz, Ronald D., John S. Holtzman, Adel Mostafa, and Mohamed Abu El Wafa. *Policy Lessons from the 2000/2001 Cotton Marketing Season in Egypt.* Cairo: APRP/MVE Unit, Impact Assessment Report No. 17, July 2001.

MALR/EAS. *Situation and Outlook Reports.* Various. 1997/98 through 2000/01.

MALR/EAS. *Agricultural Statistics.* Various semi-annual reports.

Morsy Ali Fawzy, Byram, T. J., Ramzi Mubarak, and Abdel Salam Gomaa. *Short-Term Wheat Yield Forecasting in Egypt: An Assessment*. MVE

Unit – APRP, Impact Assessment Report No. 16. Abt Associates Inc. Cairo, Egypt. April 2001.

Morsy A. Fawzy, Larry Pope, Rabie Amer, Ramzi Mubarak, and Mohamed E. Abdel Salam. *Short-Term Cotton Forecasting in Egypt.* MVE Unit – APRP, Impact Assessment Report No. 13. Abt Associates Inc. Cairo, Egypt. July 2000.

Morsy A. Fawzy, Larry Pope, Yehia M. El-Din, and Ghazal Amer. *Availability and Quality of Agricultural Data in Egypt*. MVE Unit – APRP Impact Assessment Report No. 4. Cairo, Egypt. December 1998.

Morsy Ali Fawzy, Ahmed Qadery M. Bahloul, Mohamed A. Meselhi, Mohamed Sayed Saeed, and Usama Ahmed El Bahnasawi. *Producer Survey Results, APRP-Tranche I.* MVE Unit – APRP, Verification Report No. 6. Abt Associates Inc. Cairo, Egypt. March 1998.

Nagat El Sanbary, Kamla Mansour, Effat Abdel Hamid, Azza El Bindari, Nihad Hassan, amd Kamal Nasser. *The Impact of Liberalization and Privatization on Women in Agriculture in Egypt.* RDI Unit – APRP, Report No. 51. 1999a.

Nagat El Sanbary, Kamla Mansour, Lamie El Fattal, Bagie Sherchand, Amani El Fiki, and Nihad Hassan. *Gender Issues in Privatization and Liberalization of the Agricultural Economy in Egypt.* RDI Unit – APRP, Report No. 75. August 1999b.

Schrader, Lee. *Market Information for Situation and Outlook Reporting.* RDI Unit – APRP, Report No. 40. March 1998.

Tyner, Wallace, B. Adair Morse, Ragaa El-Amir, Adel Mostafa, and Sherin Sherif. *Wheat Subsector Baseline Study.* MVE Unit – APRP, Impact Assessment Report No. 6. Abt Associates Inc. Cairo, Egypt. May 1999.

Zalla, Tom and Abdel-Hamid Youssef Saad. *Fertilizer Production and Marketing in Egypt: Baseline Study.* MVE Unit – APRP, Impact Assessment Report No. 2. Abt Associates Inc. Cairo, Egypt. December 1998.

Zalla, Tom, Morsy A. Fawzy, Abdel Hamid Y. Saad, Yeldez Ishak, Mahmoud Riad, and Hussein M. El Noubi. *Availability and Quality of Agricultural Data for the New Lands in Egypt.* MVE Unit – APRP, Impact Assessment Report No. 12. Abt Associates Inc. Cairo, Egypt. June 2000.

Zalla, Tom, Stephan Goetz, John Holtzman, Abdel-Hamid Youssef Saad, Morsy Aly Fawzy, Abdel-Rahim Ismail, and Robert Young. *Plan for Assessing*

the Impact of Egypt's Agricultural Policy Reform Program. MVE Unit – APRP, Impact Assessment Report No. 1. Abt Associates Inc. Cairo, Egypt. March 1998.

Endnotes

[1] The MIP, originally financed by USAID and implemented by ACDI/VOCA, collects price information from four wholesale markets for fruits and vegetables and disseminates the information daily. It continues under MALR funding and management. Reports are distributed daily to the media, providing farmers and traders with information, but no market analysis is carried out. Prices are simply reported widely through the media, using standard methods for collecting, processing, and tabulating the data.

[2] This USAID-funded project collects and analyzes data for fruits and vegetables for target export markets in the EU and elsewhere. It carries out sophisticated market analysis and distributes results directly to a list of exporting producers, most of whom are medium to large growers in reclaimed desert land. Reports are quite narrowly limited to the members of HEIA and contain little information on domestic prices and markets. There is no formal linkage between the MIP and ATUT and there is no plan to link these programs in the interests of serving a wider farm population.

[3] APAU was established by MALR/EAS in 1998 (as a benchmark of tranche II of APRP). The APAU was provided technical assistance, largely confined to the cotton subsector, by GTZ.

[4] MALR, in 2000, organized this department inside the Extension Services Sector to produce marketing information for farmers. It has already established a track record, primarily in rice market information. The department has established 164 extension centers that are devoted to carrying production and marketing information to farmers, primarily through a series of field days.

15 Farm Level Impacts of APRP[1]

Morsy Ali Fawzy, Mamadou Sidibe, Osman Salama, and Gary Ender

This analysis is based on the results of a nationally representative survey of Egyptian farmers and related surveys of other key individuals and institutions, all conducted in 2001. The chapter reveals the nature and timing of reform at the farm level and produces new evidence of farmers' own awareness of policy reform.

APRP policy benchmarks promoted increased participation of the private sector in the input distribution systems for nitrogenous fertilizer and cotton pesticides. Growers of all crops said that they are totally free to buy fertilizer from any supplier. For growers of wheat, maize, and rice, traders are the best source of fertilizer. By 2001, private traders dominated the market for nitrogenous, phosphatic, and potassic fertilizers. This significant emergence of the private sector corroborates the positive impact of policy reforms begun under APCP and solidified under APRP. Under APRP the GOE changed its role from supplying pesticide products and services to cotton growers to guaranteeing quality and safety, while allowing the private sector to enter into sales and service provision; at the time of the survey, this change had not been completed. Thus it is not surprising that farmers still prefer cooperatives for cotton pesticides. One would expect farmers' opinions to move in the direction of preferring the private sector as the full effects of the new system become felt.

Through APCP and APRP the GOE attempted to liberalize the markets for cotton and rice. All the rice producers said that they were free to market their output, whereas in the case of cotton, only 40% of the respondents believed they had such freedom. PBDAC rings, private rings, and cooperative collection centers represent the main marketing channels for cotton for 47%, 30%, and 13% of the respondents, respectively. These results are consistent with the pattern and timing of reforms under APCP and APRP. Liberalization of rice and cotton marketing began under APCP and continued during APRP, especially for cotton. Where there is the least remaining intervention by the Government (namely, in the three crops other than cotton), the private sector is now the preferred buyer. Private buyers are most likely to compete with each other and, therefore, to bargain with farmers over the price paid. The complicated seed cotton marketing system, with its limited competition, leads farmers to look at eventual security of payment as a virtue, rather than providing the farmer with true competition for his crop. Reforms to this system, including those under APRP, are slowly leading to more competition, but these results confirm that there is still some distance to go.

In attempting to rationalize water use, APRP's rice program involved coordinated planting of higher-yielding, short-season varieties, combined with shortening of the irrigation cycle. Almost all the farmers surveyed in the rice-growing governorates were aware of the short-season rice varieties; 85 percent have adopted them. Overall the observed dramatic increase in rice area is a response to several factors, including higher yields, attractive prices, and a liberalized market, in which producers get paid immediately and often sell at the farm gate. Cotton price controls were partially liberalized during APCP, and a floor price system was set up during APRP. It was intended under APRP that minimum export prices be only indicative, but this was not implemented. APRP also tried to institute a market information system to increase farmers' bargaining power. Although 77% of the farmers surveyed were aware of the floor price of cotton, only 5% knew the export price.

This study assesses the impacts of the Agricultural Policy Reform Program (APRP) on the agricultural system in general and on farmers in particular. To achieve this objective, three types of data were used:

- Formal farm survey centered on farmers (producers) in the major agricultural zones
- Complementary survey with focus on the main institutions dealing with farmers
- Secondary data, aimed primarily at establishing a baseline

The questions asked in the surveys were focused on APRP policy reforms. The quantitative as well as the qualitative aspects of these policy reforms were investigated. The overall policy reform goal categories and the major policy benchmarks relevant at the farm level are summarized in Table 15-1.

Table 15-1. APRP Policy Reform Goal Categories and Key Benchmarks Expected to Have Impact at Farm Level

Goal Categories	Key Policy Benchmarks
Agricultural Sector Support Services	Horticultural Exports Market Information New Role for Extension
Agricultural Land and Water Resource Investments, Utilization and Sustainability	Liberalize Cropping Patterns Matching Irrigation Supply and Demand Land and Water Plans (matching) Optimal Use of Water: Short Season Rice Varieties Optimal Use of Water: New Sugarcane Irrigation Systems
Prices, Markets, and Trades	Freedom to Market Cotton Liberalize Fertilizer Distribution Liberalize Rice Market
Private Investment and Privatization in Agribusiness	Privatize and Promote Cotton Sector (ginning, spinning) Privatization of Rice Mills Privatize Cotton Pest Control

The questions on the producer survey are divided into five major categories: (1) production of crops; (2) farm input markets; (3) farm output markets; (4) farmers' opinions about policy reform impacts, and (5) the institutions and organizations involved. The complementary survey was designed to bring together farmers' opinions regarding policy changes and the perceptions of the other actors in the agribusiness community on the same questions. This innovation allows us to follow the links and to highlight the major points of agreement and disagreement between farmers and the other major participants in the agricultural system. This two-sided vision provides us with a more complete picture of APRP's impact.

Survey Methods and Sampling

The method used to collect the data for this study was structured formal interviews. A list of key questions related to the studied issues was prepared by the study team for use in the interviews, and the interviewers posed these questions to the farmer in an appropriate way to: (1) give the farmer the chance to add more information about related issues, (2) give the interviewer an opportunity to develop additional questions and take notes as needed, and (3) allow the interviewer to record the quantitative data on the questionnaire. The interviews were conducted by local experts. The main criteria used to select these experts were: (1) practical experience in similar activities, (2) being unbiased and not affiliated with any of the implementing organizations, and (3) ability to write a comprehensive report.

Producers were sampled from those in the main producing governorates for the main field crops, namely rice, cotton, wheat, and maize. The sampling technique used was close to stratified multi-stage cluster random sampling. The procedure included stratifying the governorates according to the dominant cropping pattern, different geographical locations, and some special issues (like sugarcane improved irrigation technique and extension and research coordination to increase the exports of horticulture crops). The first stage of the procedure was to select from each stratum a representative sample of the governorates, which grow major field crops, where the primary sample unit is each governorate. Ten governorates were selected: Beheira, Kafr El Sheikh, Sharqeya, Daqahleya, Gharbeya, Beni Suef, Minya, Assiut, Ismaileya, and Qena. The second stage was to select districts from each governorate; 31 districts were selected. The third stage was choosing villages within each district; 62 villages were included in the sample. The fourth stage was selecting farmers. For this stage, a list frame was used.

In addition to the sampling stratification by cropping pattern and geographical areas, a post-sampling stratification was carried out in which farmers in each village were classified into size-of-holding groups. Taking into consideration the results of the latest available agricultural census (1990), five groups of different size of holding were specified (less than 1, 1–3, 3–5, 5–10, and 10 or more feddans).

With respect to sample size determination, two main constraints were taken into account: time and budget. After considering these factors, the sample size was set at 745 farms. While this size is too small to make it a nationally representative sample, it is large enough to indicate whether the effects of the policy reforms called for in the benchmarks were apparent at the producer level. Note also that the producer survey was not the primary form of assessment of the impact of APRP on, for example, rice marketing and fertilizer distribution. In these areas, the complementary surveys carried out by this team and other analyses conducted by the Monitoring, Verification and Evaluation (MVE) Unit (see, for example, chapters 8 and 12) were the key sources of information and analysis. For these issues the producer survey is, however, a valuable source of complementary information.

The survey started in the second half of October 2001. This ensured that all farmers who grew cotton and rice had already harvested it; hence, for example, questions concerning the comparison between the current cotton season and last year's could be answered. The data collection process was completed before the beginning of Ramadan (mid-November, 2001).

General Features of Sampled Farms

The survey results show that the number of farmers who completely own their own farms ranged from about 54% in Beheira to about 94% in Ismaileya, with an overall average of about 81%. Pure tenant farmers were concentrated in Beni Suef, Qena, and Beheira, and they were all in the small farmer group. Most of the farmers in the sample who were both tenants and owners, that is, those who owned only part of their farm and rented the other part, were concentrated in Beheira, Gharbeya, Assiut, Qena, and Minya (33%,16%,14%, 12%, and 10%, respectively). About 47% of the sampled farmers operate farms of less than 3 feddans, 20% operate farms of 3 to 5 feddans, and about 33% operate farms of more than 5 feddans. Table 15-2 shows the prevalence of the main crop rotations; wheat, maize, berseem, cotton, and rice are the main field crops found in these rotations.

Impacts of APRP

Cropping Patterns. One of the early goals in the policy reform process was the elimination of mandatory cropping patterns, when not dictated by technical constraints. This section examines the impact of policy changes on farmers' freedom to choose their cropping patterns. There is special focus on the reasons why farmers' alter their crop mix. More than 97% of the sampled farmers believe they are free to choose the cropping patterns. Only farmers in Ismaileya and Kafr El Sheikh showed rates below 90%. These two governorates are more specialized in horticultural crops. Although farmers feel strongly that they are free to choose the cropping patterns, they do not do it unilaterally. For about 76% of the sampled farmers, cropping patterns are determined by consulting with other farmers, with

neighbors, or with family members. Extension agents play a modest role in helping farmers choose cropping patterns.

Table 15-2. MAIN CROP ROTATIONS (percent)

Crop Rotation	Distribution of Farmers	Area Planted
Wheat + Maize	18.5	18.5
Short-season berseem + Cotton	15.6	17.1
Wheat + Rice	11.7	15.1
Long-season berseem + Maize	13.2	10.4
Long-season berseem + Rice	11.2	9.7
Sugar Beets + Rice	1.7	3.7
Fava Beans + Cotton	2.8	3.2
Wheat + Cotton	2.3	1.8
Potatoes + Rice	0.6	1.7
Wheat + Sorghum	1.2	1.4
Potatoes + Maize	0.5	1.0
Other	20.7	15.6
Total	100	100

Source: MVE Endline Producer Survey, 2001.

If farmers are free to choose their cropping pattern, do they effectively exercise this new right? Overall, 57% of the interviewed farmers did not change their cropping patterns during the 2000/01 season compared to 1997/98. However, this behavior is not uniform among all governorates. In Sharqeya, Daqahleya, and Assiut, farmers did change their cropping patterns more than they did in 1997/98. Informal discussions with farmers suggest that technical constraints related to the crop rotations are largely associated with the lack of changes in the cropping patterns.

Technical constraints may to some extent dictate cropping patterns, but farmers may also have other reasons for their choices. Regarding cotton, for example, crop profitability dominates all the other factors, with 62% of the responses; it is followed by crop rotation as the second most frequent response. For rice, the combination of home consumption, crop profitability, and better market opportunities is the predominant reason for changing the cropping pattern (21% of the respondents). Crop profitability in association with home consumption was second in importance in explaining why farmers changed their cropping pattern. Regarding wheat, the dominant factor explaining farmers' desires to change their cropping patterns is crop profitability. The next contributing factors are crop rotation and home consumption. Concerning maize, the most common factor explaining farmers' reasons to change their cropping patterns is crop profitability, with 18% of the respondents in that category. The next contributing factor is home consumption in association with animal feeding. For sugarcane, sugar beet, and the horticultural crops, profitability is the dominant factor explaining farmers' need to change the cropping patterns, for 100%, 88%, and 64% of the respondents,

respectively. For fodder crops, animal feeding and crop rotation are the dominant explanatory factors associated with farmers' changing the cropping pattern. Overall, crop profitability within crop rotations, and other combinations of reasons including crop profitability, are by far the leading factors explaining why farmers are changing their cropping patterns.

Returning to the question of the freedom to choose the cropping patterns, Table 15-3 shows that more than 56% of the farmers started exercising the freedom to choose their cropping patterns between 1996 and 1999; this period corresponds to the period of APRP. From 1990 through 1995, corresponding to most of the Agricultural Production and Credit Project (APCP) policy reform period, a cumulative 37% of the sampled farmers started choosing their cropping pattern. Prior to 1990, only 8% of farmers felt they were free to choose their cropping pattern. Since there were no new cropping pattern–related reforms under APRP, it appears there was a lagged impact of policy reform on farmers, similar to the diffusion process of a new technology. The momentum of policy reform during APRP may have contributed, however, to farmers' perceptions about their ability to choose their cropping patterns.

Table 15-3. STARTING DATES FOR CHOOSING CROPPING PATTERNS

Year	Number of Farmers	Percent
Before 1990	55	7.6
1990	20	2.8
1991	1	0.2
1992	40	5.5
1993	76	10.5
1994	40	5.5
1995	89	12.3
1996	205	28.4
1997	157	21.8
1998	36	5
1999	3	0.4
Total	722	100

Source: APRP/MVE Endline Producer Survey, November 2001.

What actual changes in cultivation occurred during APRP? Table 15-4 shows the area cultivated by surveyed farmers for the major crops during 2000/01 compared to 1996/97 (data from Morsy et al., 1998). For the winter season, the cropped area decreased by 3% for wheat, 5% for fava beans, and 1% for short-season berseem; it increased by 5% for long-season berseem. During the summer season, the cropped area decreased by 12% for cotton and 5% for maize, and increased by 10% for rice. Cotton, for the summer season, is losing popularity among farmers to the benefit of rice because the increasing adoption of short-season rice varieties promoted by APRP not only reduces water needs but also improves rice yield. Partial liberalization of seed cotton marketing compared with more or less full liberalization of paddy marketing also has made rice a more attractive option.

Table 15-4. SHARES OF AREA CULTIVATED TO MAJOR CROPS (percent)

Winter Crops			Summer Crops		
	Seasons			Seasons	
Crops	1996/97	2000/01	Crops	1996/97	2000/01
Wheat	40	37	Cotton	39	28
Fava bean	16	11	Rice	25	34
Long-season berseem	17	22	Maize	29	24
Short-season berseem	18	17	Sorghum	4	3
Other	9	13	Other	3	11
Total	100	100	Total	100	100

Source: MVE Endline Producer Survey, November 2001.

Input Markets. Policy reforms under and prior to APRP emphasized the liberalization of input markets and greater participation of the private sector. The fertilizer market suffered a reversal during the 1995-96 "crisis," and recent policy changes during the 2001/02 season may again be threatening the private sector's role in this input market.[2] At the time of our survey, however, cotton, wheat, maize, and rice farmers told us that they were virtually free to buy fertilizer from any supplier, with private traders and cooperatives leading the fertilizer market in terms of popularity. Private traders were the preferred fertilizer suppliers for farmers growing the major field crops, except cotton (growers of which preferred the cooperatives). Overall, the private suppliers and the cooperatives controlled more than 95% of the total supply of fertilizer (Table 15-5). Comparing farmers' preferences for fertilizer supplier in 1997 (Morsy et al., 1998) to their preferences in 2001, we find that the share of farmers preferring the private sector jumped from 16% to 43%, whereas the share preferring cooperatives was relatively stable (46 and 42 percent, respectively). This significant emergence of the private sector in the fertilizer market corroborates the positive impact of policy reforms under APRP on maintaining the increasing role of the private sector in fertilizer distribution.

Table 15-5. MARKET SHARES OF FERTILIZER FOR VARIOUS SOURCES (percent)

	Source				
Fertilizer	PBDAC	Cooperatives	Traders	Others	Total
N 46.6%	0.9	33.8	65.1	0.2	100
N 33.5%	4.1	39.2	49.4	7.3	100
N 20.6%	2.9	26.6	69.8	0.7	100
N 15%	0	62.3	37.7	0	100
P 46.5%	5.1	45.8	49.1	0	100
P 15.5%	2	33.2	64.2	0.6	100
K 48%	0	17.1	82.9	0	100

Source: APRP/MVE Endline Producer Survey, November 2001.

Turning to our second input, seed, we find that wheat, maize, and rice farmers feel that they were totally free to buy their seeds from any supplier. Cotton is the only crop for which the majority of farmers (73%) felt they were not free to choose their seed dealer. This is because the GOE closely controls the production and

sale of cottonseed. Overall, the cooperatives are the preferred seed suppliers by producers of all the major field crops considered, followed by the private traders (Table 15-6). For producers of cotton, cooperatives are by far the best source of seed (83% of respondents).

Table 15-6. BEST SOURCES OF SEEDS, MAJOR CROPS (percent)

Supplier	Cotton	Wheat	Maize	Rice
PBDAC	1.8	1.4	1.6	1.9
Cooperatives	83.4	62.1	60.6	52.8
Traders	4.5	26.2	27.1	34.5
Own	0.3	1.2	1.4	1.4
Central Agent	1.2	0.6	0.6	0.9
Other	8.8	8.5	8.7	8.5
Total	100.0	100.0	100.0	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

In the case of pesticides, all of the wheat, maize, rice, and sugarcane farmers felt they were free to buy them from any supplier. For producers of these crops, private traders were the best source of pesticides in about 50% of the cases, followed by the cooperatives in about one-third of the cases. Even for cotton, 95% of the farmers said they had the freedom to choose their pesticide suppliers. Regarding cotton, the cooperatives and the traders were the best source of pesticides, 68% and 22% of the cases, respectively. Thus, private traders and cooperatives currently dominate the pesticide market. The Ministry of Agriculture and Land Reclamation (MALR) had strong control over cotton pest control before and during most of APRP. Under major APRP reforms, MALR withdrew from supplying cotton pest control services and agreed to let cooperatives and private agents provide pesticides and related services. MALR will maintain its role in regulating pesticide registration, sale, and use to ensure safety and to protect the environment. By the end of APRP, MALR had allowed private traders and service providers to take part in all aspects of cotton pest control, but the effects of this significant change in policy are not yet evident in these data.

For inputs as a whole, the survey results reveal that farmers choose traders as their preferred source because of the availability of the products and their better facilities. Farmers buy inputs from cooperatives because of their higher quality. Cooperatives were the preferred source for seed, and cotton inputs were largely controlled by the cooperatives, while private traders dominated the supply of inputs for wheat, maize, and rice.

Output Markets. In trying to assess the impact of APRP on output markets, key indicators include the extent of commercialization, the freedom to market output, and the degree of competition among traders. Here we focus on the commodities involved in the benchmarks of APRP, namely, cotton, rice, wheat, maize, and horticulture.

Do Egyptian farmers still produce for home consumption? To what extent have they become more market-oriented? To answer these questions, we compared the share of production sold in 1997 and in 2001 (Table 15-7). In 2001 this share was 66% for rice and 81% for wheat, compared to 97% for cotton and 99% for horticulture. The share sold in 2001 was higher than that in 1997 for all crops. The increase was 13 percentage points for rice, 22 for wheat, 9 for maize, and 9 for horticulture; the increase is particularly dramatic for the main staple food, wheat. Overall, Egyptian farmers have continued to become more commercial during APRP, as well as making their cropping patterns based more on comparative advantage and price signals. These changes are consistent with APRP's goals.

TABLE 15-7. SHARE OF PRODUCTION SOLD IN MARKETS (percent)

Crop	1997	2001
Wheat	59	81
Rice	53	66
Maize	62	71
Cotton	97	97
Sorghum	45	89
Ground nut	99	99
Sesame	86	99
Orange	98	100
Mango	73	100
Guava	100	97
Lupines	97	100
Winter Potatoes	79	100

Sources: APRP/MVE Endline Producer Survey, 2002; Assessment of 1997 Egypt Integrated Household Survey Data for Use in Constructing a Producer-Level Baseline, MVE Unit APRP, 1999.

Under its agricultural policy reform program the GOE is establishing a free-market system for crop production and marketing. For wheat and maize the compulsory delivery quota was canceled in1987. The liberalization of the rice market started in 1991/92. Liberalization of the cotton market began in 1993/94; during the following two seasons, the private sector bought 31% and 57% of cotton production, respectively. Since then, many private companies and traders have begun to compete with public trading companies in the marketing of farm output.

We asked farmers questions about the following topics to get an idea of how far output market liberalization had proceeded:

- Freedom to market output
- Best marketing channel
- Extent of competition
- Changes in buyers' market shares
- Freedom to negotiate output prices
- Payment methods

Are producers free to market their production? The survey results indicate that all sampled producers in Daqahleya, Kafr El Sheikh, and Assiut believed that the cotton market was not free, while all sampled producers in Beheira and Beni Suef believed that it was. For the entire sample, 157 of 391 cotton producers, representing about 40% of the producers, felt that they were free to market their products, compared to 2% in 1997 in the baseline producer survey (Morsy et al., 1998). The farmers gave two main reasons for their belief in 1997. First, about 70 percent of the farmers reported that there was only one buyer (compared to different buyers with high competition for getting cotton production in the previous year). Second, cotton traders in that year were in fact brokers: they bought cotton from farmers at lower prices and sold it in the official marketing rings at the floor prices. It should be mentioned that in 1996/97, the Government set the floor price for seed cotton at a level higher than the world price; under this condition, the private sector generally refused to trade cotton. Farmers in each village generally found only one buyer (usually the public trading company); only a few local traders were available, who offered low prices for cotton and whose weights the producers often suspected of being inaccurate. Thus, in 1997 farmers felt that they were not free to market their seed cotton.

For wheat, rice, and maize, all of the sampled producers believed that there was freedom of marketing. Farmers could sell their products to different buyers and there was competition among them. Grain commodities can be stored for some time; so if the buyers do not offer fair prices, farmers can wait until they get fair prices and benefit from competition among buyers. The producers who believed that they were free to market their products were asked about the starting date of freedom; 84% of the cotton producers thought that freedom started under APRP, compared to 16% who thought it started under APCP. For wheat, about 2 % of the producers thought freedom started before APCP, compared to 57% under APCP and 41% under APRP. The same result was found for rice and maize, where the majority of producers felt that the freedom started under APCP.

The Principal Bank for Development and Agricultural Credit (PBDAC), the "private rings" (collection points), and the cooperative centers represent the main marketing channels for cotton. Of the surveyed producers, 47% prefer the PBDAC ring, 30% prefer the cooperative centers, and 13% prefer private rings, while only 4% prefer traders at the farmgate. These figures point out that PBDAC and cooperative centers still represent the preferable marketing channels for cotton, because farmers believe that they can get fair prices and the weighing is done accurately. At the end of APRP, the GOE ensured that farmers selling cotton at private rings received the same impartial weighing services as those selling at the official PBDAC rings, so farmers' preferences may change in the future if this excellent service is maintained by the Cotton Arbitration and Testing General Organization (CATGO).

For wheat, rice, and maize, the best marketing channel was local traders at the farmgate because they pay cash on the spot. The second reason was that they

offer the best price. Some farmers preferred private traders because they pay cash on the spot and provide inputs on credit.

We examined the extent of competition in output markets by identifying the number of traders who operate in the village and who are based inside and outside the village. It should be pointed out that private traders rarely come to the farmgate; this occurred only in one village, Meet Sohael, in Sharqeya governorate. Most cotton production is marketed through PBDAC, cooperatives, and private rings. More than 90% of cotton producers said there were no local traders of cotton based inside the village (Table 15-8), whereas there were significant numbers of such traders for the other major field crops. The number of traders based inside the village reflects a high degree of competition in trading grain and also indicates that there is no restriction on transportation and trading of grain among the different governorates. Although there is still less competition in cotton trading, it has improved compared to before the liberalization program, especially through the efforts during APRP to allow trading outside PBDAC rings.

Table 15-8. FARMERS' ESTIMATES OF NUMBER OF TRADERS INSIDE VILLAGE (percent)

	0	1-3	4-6	>6
Cotton	95	3	2	-
Rice	-	41	46	13
Wheat	-	40	36	24
Maize	-	48	30	22

Source: APRP/MVE Endline Producer Survey, 2001

We also asked producers' opinions about their freedom to negotiate output prices. More than 90% of cotton, wheat, and maize producers say they cannot bargain at PBDAC rings, cooperative centers, or with factory agents, because the prices are fixed according to the grade and quality of the product. In the case of selling to local traders, grain producers and 53% of cotton producers bargain over the output price with buyers, as there are several buyers and they compete with each other. The data also show that 93% of the cotton producers started bargaining under APRP. For wheat, rice, and maize, 58%–68% of producers started bargaining under APCP and continued under APRP. Again, the results for cotton are consistent with the continuing efforts made under APRP to liberalize the pricing and marketing of seed cotton.

Farmers' Awareness of Reforms. The rationalization of irrigation water use was a central theme to the policy reforms introduced under APRP. The introduction of short-season rice varieties (SSVs) and improved sugarcane irrigation systems were the main crop-related changes. In both these areas, APRP made a major effort to reach stakeholders and involve them in the process of change.

Our survey found that, in the rice-growing governorates, 99% of the farmers know about SSVs. Only Ismaileya governorate has a relatively low awareness rate of 50%, and that is because of its horticultural crop orientation. About 85% of those

who are aware of the SSVs plant them. Among the governorates, the adoption of these varieties is best established in Daqahleya, and farmers in Daqahleya are the most committed to continuing use of these varieties. Among those who plant these rice varieties, 96% intend to continue doing so. What motivates farmers to choose SSVs? One major reason that farmers intend to plant these SSVs again is higher productivity (28% of the respondents). The combined category "higher productivity + water rationality + shorter cycle" is the overall first choice (39%). The observed significant increase in rice area in recent years may be associated with the productivity gains obtained by adopting the SSVs. When did farmers start using the SSVs? Table 15-9 shows that in 89% of the cases, farmers started using the SSVs from 1996 to 2001. Adoption of the SSVs started before APRP, but the project has provided a big push for their promotion. In 2002 the GOE decided that all rice irrigation will end by August 31, instead of the usual September 30. In fact, much progress was made toward that goal in 2001. It was this shift that allowed the Ministry of Water Resources and Irrigation (MWRI) to consolidate water savings from the use of SSVs.

Table 15-9. STARTING DATES FOR PLANTING SHORT-SEASON VARIETIES OF RICE (percent)

Starting Date	Total
Before 1996	11.0
1996	17.6
1997	32.8
1998	21.8
1999	14.1
2000	1.7
2001	1.1
Total	100

Source: APRP/MVE Endline Producer Survey, November 2001.

In Qena governorate, 94% of the sampled farmers were aware of improved sugarcane irrigation systems. Qena was chosen for this question because it was the location of the APRP pilot sugarcane program; the villages sampled included pilot and non-pilot areas. Of the farmers in Qena aware of these new irrigation systems, 34% of the respondents use them. Of the farmers using an irrigation system 75% own an improved, non-portable system, while the remaining 25% operate a portable system. The non-portable system was tested first under the pilot program, but in the end the portable system was found to be cheaper and was the final recommendation of the APRP team. While 31% of the respondents associate the gains of using the improved systems with increasing productivity and saving irrigation water, 90% of the respondents said that the lack of subsidies constrains farmers' use of these improved systems, or, in other words, that the cost was high relative to the farmers' resources.

The use of delinted cottonseed was supported indirectly by APRP. It is considered here because of its linkages with the policy reforms introduced relative to cotton production. Overall, 83% of the sampled farmers use delinted cottonseed in the

cotton-growing governorates. In the case of Daqahleya, the rate of use of delinted seed is under 30%. On average, 85% of the farmers agreed that they received enough delinted seed. The rate of sufficiency reached a perfect score of 100% in the governorates of Sharqeya, Gharbeya, and Beni Suef. The lowest rate of seed sufficiency of 48% was found in Beheira governorate. Of those respondents not receiving enough seed 60% believed that the total quantity of delinted seed was just not enough to cover all the needs. The second reason mentioned by the respondents was that the soil structure favored the use of more seed than is recommended, and the third reason was farmers' tendency to use more seed than necessary to guarantee germination. This risk-reducing strategy lowers the delinted seed sufficiency rate. Does using delinted seed have any impact on cotton production? Sixty-eight percent of the respondents believe that the impact of delinted seed on cotton production is high, while 21% of the respondents think that the effect is moderate, and only 11% of the farmers believe that delinted cottonseed has a low impact on cotton production. When did farmers start using delinted cottonseed? Our results show that 80% of the respondents started using delinted seed between 1996 and 2001 (i.e., during APRP). While it is not likely that APRP had a strong impact on the adoption of delinted cottonseed, this result shows the success of the program promoted by MALR with assistance from Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ).

Cotton price controls were weakened during APCP, and a floor price was set during APRP, to protect farm income. As a complementary measure, APRP suggested that only an indicative export price be announced weekly. Our survey found that 77% of the sampled farmers are aware of the floor prices for seed cotton, but only 5% of them are aware of the export price (for lint). Among the surveyed governorates, farmers in Beni Suef reveal the strongest rate of awareness about the floor price of cotton, while those in Gharbeya are the least informed. When during the season do farmers learn of the floor price of cotton? Table 15-10 shows that in 2001, 31% of the respondents had heard about the floor price before planting and 47% after harvesting. This may be a positive new trend, as the GOE generally used to announce seed cotton floor prices just before the harvest. There was no specific policy benchmark requiring this change in the timing of the price announcement, but the change is consistent with other cotton-related policies promoted by APRP.

Table 15-10. TIMING OF FARMERS' KNOWLEDGE ABOUT FLOOR PRICE OF COTTON

Timing	Farmers' Knowledge (%)
Before Planting	31.1
During Planting	10.6
Before Harvesting	11.7
After Harvesting	46.5
Total	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

Results of Complementary Surveys. This section reports the results of parallel surveys of institutions revolving around the agricultural producer, complementing the data reported by farmers.

Like many other farmers, village leaders are aware of the SSVs; 84% said that they know about them. What do the village leaders think of the liberalization policies? Table 15-11 shows that village leaders see the liberalization policies as giving them the freedom to determine their cropping pattern, to market their output, and to choose their input suppliers.

Table 15-11. VILLAGE LEADERS' OPINIONS OF POSITIVE IMPACTS OF LIBERALIZATION POLICIES (percent)

Governorate	Free to Choose Cropping Pattern	Free to Sell Crops	Better Prices	Free to Buy Inputs	Other	Total
Sharqeya	62.5	25.0	0.0	0.0	12.5	100.0
Daqahleya	36.4	54.5	9.1	0.0	0.0	100.0
Kafr El Sheikh	55.6	11.1	0.0	22.2	11.1	100.0
Beheira	42.9	35.7	0.0	21.4	0.7	100.0
Ismaileya	71.4	14.3	14.3	0.0	0.0	100.0
Gharbeya	14.3	57.1	14.3	0.0	14.3	100.0
Beni Suef	41.7	41.7	0.0	8.3	6.3	100.0
Minya	25.0	33.3	8.3	16.7	16.7	100.0
Assiut	27.3	18.2	0.0	18.2	36.3	100.0
Qena	16.7	50.0	0.0	16.7	16.6	100.0
Total	39.2	34.0	4.1	11.3	11.4	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

Do farmers consult extension agents when choosing their cropping pattern? Seventy-six percent of the extension agents said that they are consulted by farmers during this process. This conflicts with farmers' opinions, probably because the agents would like to inflate their own importance. The answers of the agents, however, were dramatically different by governorate. Are extension agents familiar with the different inputs available in the market in order to advise farmers properly? Eighty-one percent of the extension agents think they have an acceptable level of understanding of the farm inputs to advise farmers adequately.

Similarly, 90% of the cooperative respondents believe they provide farmers with information when they decide their crop mix. In the case of input procurement decisions, 93% think they give advice to farmers. For output sales decisions, the share is 76%. Regarding cropping patterns, the farmer survey revealed that farmers consult mainly with other farmers, with neighbors, and with family members. Thus, it is surprising that cooperative members think that they advise farmers on cropping pattern decisions. This may be an idea held over from previous times.

Overall, traders said that they are more involved in fertilizer and pesticide distribution than in seed or fodder. This is consistent with the results of the

producer survey, where the findings were that private traders dominated the fertilizer and the pesticide markets, while the cooperatives were the primary source of seed. Eighty-eight percent of the traders believe that they sell farm inputs without any restriction; 45% believe that the market is somewhat competitive; and 35% of them think that the market is competitive (Table 15-12). This result is consistent with the market share analysis based on the responses of the producers, 80% of whom believed the market fell in one of these two categories.

Table 15-12. TRADERS' OPINIONS OF DEGREE OF COMPETITION IN INPUT MARKETS (percent)

Governorate	High	Medium	Low	Total
Sharqeya	100.0	0.0	0.0	100.0
Daqahleya	60.0	40.0	0.0	100.0
Kafr El Sheikh	0.0	75.0	25.0	100.0
Beheira	12.5	75.0	12.5	100.0
Ismaileya	0.0	50.0	50.0	100.0
Gharbeya	20.0	40.0	40.0	100.0
Beni Suef	80.0	20.0	0.0	100.0
Minya	0.0	33.3	66.7	100.0
Assiut	33.3	66.7	0.0	100.0
Qena	50.0	50.0	0.0	100.0
Total	35.3	45.1	19.6	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

Results on the level of competitiveness among cotton traders were somewhat surprising; 57% of the traders believe that the level of competition is moderate, while the remaining 43% think that the level of competition is low. One might expect private traders to always reply that competition was significant, but these results seem to be consistent with the actual state of competition for seed cotton, which is still limited by the presence of only one buyer at each PBDAC ring and the presence in the market of the public cotton trading companies, which do not have hard budget constraints. While APRP devoted a significant amount of effort to rice, it is interesting to note that 50% of the grain handled by cereal traders is wheat; maize and rice count for 34% and 16% of the transactions, respectively (Table 15-13).

Changes in Gross Margins, 1997 to 2001. To assess the impact of policy reforms (or any other set of factors) on gross margins, one needs a set of baseline and endline data. These would permit a before-after comparison, which, while not ideal, might be sufficient for current purposes. The following is a description of the attempt by the MVE Unit to collect or otherwise obtain both endline data on household or farm income for use in such an analysis.

In the early stages of APRP, the MVE Unit was extremely busy with the task of benchmark verification. It carried out a small farm-level survey in 1997 to verify certain benchmarks. The Unit did not have time in 1997/98, however, to conduct

Table 15-13. COMPOSITION OF TRADERS' TRANSACTIONS, BY CEREAL (percent)

Governorate	Wheat	Maize	Rice	Total
Sharqeya	34.3	13.7	52.0	100
Daqahleya	19.5	0.0	80.5	100
Beheira	29.3	1.4	69.3	100
Ismaileya	43.3	49.2	7.5	100
Gharbeya	23.2	23.2	53.6	100
Beni Suef	50.0	50.0	0.0	100
Minya	55.6	44.4	0.0	100
Assiut	57.9	42.1	0.0	100
Qena	67.6	32.4	0.0	100
Total	49.5	34.3	16.2	100

Source: APRP/MVE Endline Producer Survey, November 2001.

a full farm-level survey, one that would collect data sufficiently carefully and in sufficient detail to make credible estimates of farm income or gross margins for major crops. Moreover, the Unit felt this largely unnecessary, as there were plans for the Food Security Research (FSR) Unit of APRP (staffed by the International Food Policy Research Institute [IFPRI]) to conduct a survey that might serve the same purposes.

The FSR Unit planned to carry out a nationally representative household survey, primarily to conduct demand analysis and derive food security implications. However, the survey instrument included many questions about farm inputs and outputs. Thus it was hoped that, using IFPRI surveys of household income and expenditures, changes in farm household welfare during APRP could be (1) assessed and (2) linked to the cultivation of various crops and the effects of APRP policies on them. Within the sample of about 2,500 households, about one-quarter were considered farm households. The first survey was conducted in 1997; a second survey was proposed, but it was not carried out.

Thus the MVE Unit was left to rely on other sources of data for a baseline if it wished to assess the impact of policy reforms on farm income/gross margins for the major crops or major rotations. To this end, the Unit carried out a literature review of previous farm studies. This review found that the MALR-Reform Design and Implementation (RDI) Unit farm income data and MALR-GTZ farm surveys of cotton and other major crops were the only ones that might be usable as baselines because of their apparently careful methods and sampling, and because of the types of data collected. Each of these data sources covers two (different) governorates for 1997.[3] No apparently reliable dataset was found with wider coverage. Moreover, data from the MVE Unit's endline farm survey (2001) show that, crop by crop, averages of gross margins in Gharbeya and Assiut are generally similar to national (10-governorate) averages of gross margins (see Table 15-14). This created the hope that the 1997 MALR-RDI data for Gharbeya and Assiut could be used as a baseline.

Table 15-14. GROSS MARGINS, 2001 (LE/feddan, current prices)

Crop	Gharbeya and Assiut	Ten Governorates
Cotton	2,269	2,173
Rice	1,068	1,050
Wheat	1,441	1,289
Maize	1,068	814
Long-Season Berseem	1,700	1,638
Short-Season Berseem	403	478

Source: APRP/MVE Endline Producer Survey, 2001.

In an effort to see whether gross margins have changed from 1997 to 2001, the data for 1997 were paired with data for the same governorates from the 2001 MVE endline survey (Tables 15-15 and 15-16). When one examines the changes in gross margins, one sees that increases are large relative to the MALR-RDI data and much smaller or almost none relative to the MALR-GTZ data (Table 15-17). Moreover the relative ranking of the changes by crop is also quite different. It does not seem, therefore, that one or the other of these datasets could be used individually to represent the situation in Egypt as a whole. In general, the smaller changes in gross returns seem more likely, but the apparent care with which the MALR-RDI data were also collected gives the authors pause. Thus, the conclusion of the authors is that there is not a sufficiently reliable, compatible, and sufficiently broad baseline of gross margins (or farm income) for 1997 or thereabouts with which the 2001 MVE data can be compared.

Despite the absence of reliable baseline and endline data, it is still possible to discuss whether APRP had a strong impact at the farm level, based on the presumed effects of APRP policy reforms on specific components of gross margins.

Table 15-15. GROSS MARGINS, 1997 AND 2001, GHARBEYA AND ASSIUT (LE/feddan, current prices)

	Gharbeya			Assiut*		
Crop	**1997**	**2001**	**% Change**	**1997**	**2001**	**% Change**
Cotton	837	2683	221	819	1854	126
Rice	685	1068	156	-	-	-
Wheat	730	1381	89	720	1501	108
Maize	289	1041	260	560	1095	96
Long-Season Berseem	795	1480	86	1308	1919	47
Short-Season Berseem	138	507	267	169	299	77

Sources: 1997: MALR-RDI Cost of Production and Farm Income Study, 1999; 2001: APRP/MVE Endline Producer Survey, 2001. *No rice is grown in Assiut.

Table 15-16. GROSS MARGINS, 1997 AND 2001, DAQAHLEYA, AND BENI SUEF (LE/feddan, current prices)

	Daqahleya			Beni Suef		
Crop	1997	2001	% Change	1997	2001	% Change
Cotton	1851	1639	-11	1261	1531	21
Rice	1377	1412	3	N/A	N/A	N/A
Wheat	874	1360	56	864	1170	35
Maize	634	710	12	533	531	0
Long-Season Berseem	1417	1313	-7	1161	1319	14
Short-Season Berseem	327	466	43	255	382	50

Sources: 1997: MALR-GTZ1997 Farm Survey, Daqahleya & Beni Suef, 1998; 2001: APRP/MVE Endline Producer Survey, 2001.

Table 15-17. CHANGE IN GROSS MARGINS, 1997 TO 2001 (percent)

Crop	Gharbeya	Assiut	Gharbeya and Assiut	Rank	Daqahleya	Beni Suef	Daqahleya and Beni Suef	Rank
Cotton	221	126	***174***	*1*	-11	21	***2***	*5*
Rice	156	0	***156***	*3*	3	N/A	***3***	*4*
Wheat	89	108	***99***	*5*	56	35	***46***	*1*
Maize	260	96	***152***	*4*	12	0	***6***	*3*
Long-Season Berseem	86	47	***62***	*6*	-7	14	***2***	*5*
Short-Season Berseem	267	77	***163***	*2*	43	50	***46***	*1*

Sources: 1997, Gharbeya and Assiut: MALR-RDI Cost of Production and Farm Income Study, 1999; 1997, Daqahleya and Beni Suef: MALR-GTZ1997 Farm Survey, Daqahleya & Beni Suef, 1998; 2001: APRP/MVE Endline Producer Survey, 2001.
Note: The changes in gross margins for the pairs of governorates were calculated from the averages of the absolute values of the gross margins, not from the individual percent changes. Because the absolute values of the changes are sometimes quite different for the two governorates paired, the percent change for the pair is often not the same as the average of the percent changes for each governorate.

According to official data, the trend for yields of most crops in Egypt has been upward in the 1990s. Table 15-18 shows official MALR data for the major field crops for 1997 and 2001. The same trend is evident. However, it should be pointed out that the yield trend for cotton has not been strongly upward since the beginning of serious policy reform in 1986; it has been modest, at about 1 percent per year. Thus the trend apparent (more than 1.5 % per year) in Table 15-18 is an artifact of the particular years shown. The yield of rice, on the other hand, has been going up because of the introduction and adoption of higher-yielding SSVs. While the original introduction of SSVs was not an APRP impact (SSVs were introduced before APRP began), APRP took advantage of their increasing use to obtain significant irrigation water savings.

Table 15-18. NATIONAL AVERAGE CROP YIELDS (per feddan)

Crop	1997	2001	% change
Cotton (kentars)	6.80	7.23	6.3
Rice (tons)	3.54	3.91	10.5
Wheat (ardab)	15.68	18.40	17.3
Maize (ardab)	22.47	24.26	8.0
Long-season Berseem (tons)	25.76	28.25	9.7
Short-season Berseem (tons)	10.89	12.54	15.2

Source: MALR/EAS, *Agricultural Statistics,* various issues.

Since APRP is not likely to have had a significant impact on either the use of improved seed or the amount of fertilizer applied (either directly or through changes in its price, which were almost nil), it is unlikely that APRP reforms had any significant impact on the yield of major field crops (nor were they conceived for this purpose).

As a project that targeted the marketing and processing of crops more than their production, APRP is more likely to have had an impact on output prices than on inputs and yields. The following is a summary of APRP thrusts and reforms relative to cotton and rice. APRP did not target reforms at the producer prices of wheat or maize, although it might have had an indirect effect on the price of maize. The price of wheat is strongly affected by GOE procurement prices and the inability of the private sector to purchase Egyptian wheat.[4]

When APRP began, the GOE had set a very high floor price for seed cotton due to a previous apparent trend in the world market that shifted rapidly. APRP staff proposed that the GOE adopt a deficiency payment scheme. The purpose of this scheme was not to change the price directly, but rather to lower the cost of the price support program to the GOE. The deficiency payment scheme was adopted. In the following years, APRP urged the GOE to lower the floor price of seed cotton, as it was not sustainable and precluded the involvement of the private sector in the marketing of seed cotton, one of APRP's major goals. The GOE did indeed lower the floor price for seed cotton gradually. APRP strove for liberalization of the domestic cotton market and some progress was made. However, the market was not completely liberalized, and producer prices are not yet set by supply and demand. In particular, there is still limited competition to buy seed cotton at PBDAC rings, where there is still only one buyer. Private agents are allowed to operate their own buying rings, and some do. In these cases, there is sometimes competition for specific varieties, especially when the crop is smaller. Thus, in a few cases the effect of the small increase in competition, partly due to APRP, is a higher price for the farmer. In general price differentials between different grades of seed cotton are still set, and set too low, to encourage farmers to produce the kind of high-quality seed cotton that they produced even in the 1950s. Despite studies on this topic,[5] APRP was not able to get this changed. In summary, the effect of APRP on the pricing of seed cotton has been limited. It urged lower prices when they were too high, and promoted higher prices through

competition, which succeeded only to a limited extent. These effects were shown clearly in the survey results presented previously.

The domestic rice market was largely liberalized before APRP began. Prices have varied more in response to supply and demand factors, although GOE indicative floor prices, supported by public sector purchases after the harvest, have influenced the level of producer prices. APRP supported the privatization of public sector rice mills through employee stakeholder associations (ESAs). The ESA mills, however, are still largely under the control of the GOE. When they receive credit from the public banks early in the season, they are often used as a tool of GOE policy to buy paddy rice at a support price higher than the market price. APRP has not lobbied strongly either for or against this practice, although MVE analysts find that it goes against the APRP goal of promoting the role of the private sector in marketing. APRP also supported the creation of the Agricultural Commodity Council (ACC) and its rice subcommittee. The latter lobbied successfully for an export subsidy using as an excuse the imposition of a high support price (which because of its timing in the marketing year probably did not reach farmers). Thus, in rice, APRP has probably had almost no effect on the price of paddy, despite its valuable contributions to saving water through the use of SSVs and through its support for policy advocacy by the ACC.

The MVE Unit's concluding study on the wheat subsector found that the GOE was procuring a significantly higher proportion of production, a result that is consistent with our finding that farmers are selling more of their wheat. It is not clear why this is the case, however, since the producer price has not been raised substantially. In any case, there was no effort through APRP to influence wheat prices or returns. Numerous studies under the project, however, including those of the MVE Unit, called for reforms in the wheat subsector that would allow wheat farmers to sell their product to any buyer. Such competition for their product might lead to higher prices.

There are no presumed direct effects of APRP on the prices of any other major crops like maize or horticultural products, as there were no relevant benchmarks in these areas.

While the MVE Unit's endline farm-level survey dataset could not be compared to an equivalent baseline dataset, it provides a good baseline for future projects (see chapter 2), and the MALR farm income data should also provide a good baseline if their coverage continues to increase and if their accuracy is maintained. The lack of a suitable baseline for this study reinforces the importance of the MALR farm income data work begun under APRP and the need to continue it.

Effects of New Land Tenure Law. It was noticed during implementation of the baseline survey (Morsy et al., 1998) that many farmers were worried about the effects of implementation of the new law (to be implemented in 1997) on "the relationship between tenants and owners of agricultural land." Tenants

complained that the application of this law would leave them without any way to make a living, and most of those tenants have extended families. Tenants expected that after the new law was implemented, they would be working as hired laborers for low wages, since the supply of labor would increase. They claimed that the new law might lead to confrontations among farmers. Tenants rejected the idea of owning newly reclaimed land because they wanted to live in their old villages with their families.

Landowners said that the land was theirs and that it was their right to have it back. Owners also believed that getting their land back would benefit the agricultural sector and hence the Egyptian economy. Owners expected that a free land market—which means more appropriate rents and more freedom to change management and resource use—would lead to new cropping patterns that better reflect the profitability of different crops. Demand from processing industries would be one determinant of profitability, through output price, and farmers would grow more cash crops. The new producers would also be able to use modern production techniques, especially mechanization and new post-harvest methods (e.g., grading and packing), and achieve the advantages of economies of scale.

Our survey does not allow us to investigate all of these hypotheses, but we can make some comments on what happened after 1997. It is known that the implementation of the law went more smoothly than some had anticipated, partly because the GOE wisely set a 5-year waiting period from the time of passage of the law (1992) until the time of implementation (1997). During this period there were serious attempts to resolve conflicts before they got out of hand. Since the law was implemented at the beginning of APRP, we should consider the impact of the new law and the impact of APRP as taking effect almost simultaneously. Thus they would have reinforced each other when their effects were of the same type and in the same direction. For example, cropping patterns changed somewhat during APRP. We can say that the continuing freedom of farmers to choose their cropping pattern, and indeed their increasing confidence that this was the case, led to changes in cropping patterns that were based more on crop profitability and less on official recommendations. Similarly, there was a continuing trend of commercialization, namely sale of output. One can safely say that these effects were caused partly by both the new law and by APRP.

References

Morsy Ali Fawzy, Mamadou Sidibe, and Osman Salama. *The Impact of APRP at the Farm Level.* MVE Unit – APRP, Impact Assessment Report No. 28. Abt Associates Inc. Cairo, Egypt. July 2002.

Morsy Ali Fawzy, Ahmed Qadery M. Bahloul, Mohamed A. Meselhi, Mohamed Sayed Saeed, and Usama Ahmed El Bahnasawi. *Producer Survey*

Results, APRP-Tranche I. MVE Unit – APRP, Verification Report No. 6. Abt Associates Inc. Cairo, Egypt. March 1998.

Gleason, Jane and Sayed Hussein. *Study on Cost of Production and Farm Income Data for the 1997-98 Agricultural Season, Volume I.* MALR, RDI Unit – APRP, Report No. 89. December 1999.

Selzer, Thomas. *Results of the 1997 Farm Survey In Daquahlia and Beni Suef.* GTZ/CSPP Project Report No. 58. 1998.

Endnotes

[1] The authors would like to acknowledge the wise guidance and scientific advice of Dr. Saad Nassar. Eng. Mahmoud Nour provided encouragement and facilitated contacts. Special thanks go to Dr. Mohamed Omran for long discussions and feedback, and his participation in designing and implementing this study. The authors are greatly indebted to Dr. Gary Ender for his guidance, participation and support in formulating and implementing this study. Appreciation should be extended to Eng. Mohamad El Shahed, (former) head of the Economic Affairs Sector; without his cooperation and assistance, this study would never have been completed. Appreciation is also extended to Eng. Abd El Razik Hassan, (former) head of the Central Administration of Agricultural Economics and Eng. Saed El Agaty, Head of the Sampling Department, for their full support and cooperation. The authors also would like to acknowledge the hard work and dedication of the researchers who conducted the field investigations: Drs. Shaaban Salem, Ali Assem, Bayoumi Abdel Meguid, Emad Wahdan, Ragab Maghawry, M. Alaa Abdel Aziz, Mohamed Hiekal, and Ali Abdel Rahman. Appreciation is also extended to Dr. Abdel Wahab Shehata for his diligence in data verification and quality. Special thanks go to Dr. Sherif Fayyad for his hard work in handling the data on the computer and assisting in data tabulation.

[2] See chapter 8.

[3] The coverage of this dataset in terms of governorates has expanded for each subsequent year. However for the purpose of assessing the impact of APRP, it was essential to have a baseline for the beginning of the project.

[4] See chapter 11.

[5] See for example Krenz et al., 1999.

16 Impacts of APRP on Roles of the Public and Private Sectors

Derick Brinkerhoff, John S. Holtzman,
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The GOE is moving from being the major actor in all realms of economic activity to a role of providing the legal and regulatory framework necessary for the private sector and to support market-driven trade and investment. A common element across APRP reforms in liberalizing agricultural markets and removing policy barriers to private sector investment and participation is a significant shift in roles for both the public and private sectors.

The authors found positive and significant impacts of APRP technical and process assistance that helped better define and implement changing public and private sector roles in the Egyptian agribusiness system. The Government has taken steps to allow the private sector to play a larger role in pest management and extension services for horticultural exports. Through pilot efforts, public and private sector actors are building new capacities to work together and to take on new functions in pest management and in research and extension for horticulture. Construction is under way of a cold storage facility under private sector management at the Cairo airport. The Ministries of Agriculture and of Foreign Trade are providing more and better information to the private sector and are engaging trade associations in policy discussions and decisions. The Ministries of Agriculture and of Water Resources and Irrigation are cooperating in a new real-time irrigation information system that is improving the efficiency and effectiveness of Nile water use by Egyptian farmers. Trade associations and cooperatives have become more adept at mobilizing their interests, expressing their needs, and influencing agency behaviors.

Policy reform is more than issuing decrees, passing laws, and promulgating regulations. Appropriate technical content is critical, but the process of change cannot be ignored. In support of the changes in roles and in achieving the benchmarks, APRP contributed to results in the following ways. First, APRP provided technical expertise in analysis, international best practices, data collection methodologies, and training course design. Particularly important was assistance to the process side of reform in workshop design and facilitation, implementation planning/monitoring, awareness, and dissemination. Second, APRP served as a neutral broker between the Government and the private sector, and between government agencies. The various sets of actors remained confident that APRP was not taking sides, and thus were willing to listen to and follow

APRP experts' recommendations. Third, as a policy interlocutor with the Government throughout the elaboration of the benchmarks for the program's tranches, APRP helped to design implementation roadmaps, and facilitated legitimization of the benchmarks as targets. Fourth, APRP's implementation reform support strategy, by working simultaneously at multiple levels (central to local) with many partners (public and private) and by building in some early successes, maneuvered around implementation roadblocks and showed stakeholders that change was possible. Last, APRP successfully leveraged its resources and impacts. This contribution is exemplified by the collaboration with GTZ's Cotton Sector Promotion Program.

Changing Public Sector and Private Sector Roles in Egypt

Transition to Market Economy in Egypt. The United States Agency for International Development (USAID) supported the Government of Egypt (GOE) in agricultural policy reform beginning in 1986 with the Agricultural Production and Credit Project (APCP), which helped to reduce price and marketing controls, cut input and credit subsidies, and open opportunities for the private sector. In addition to APCP, the GOE implemented the Economic Reform and Structural Adjustment Program (ERSAP), supported by the International Monetary Fund and the World Bank, in 1991.[1] Following on the success of APCP, the Agricultural Policy Reform Program (APRP) helped the GOE maintain progress on liberalizing agricultural markets and undertake additional reforms to remove policy barriers to private sector participation and investment in agriculture.

A common element across APCP and APRP reforms has been the significant shift in roles for both the public and private sectors. The GOE is moving from being the major actor in all realms of economic activity to a role of providing the legal and regulatory framework necessary for the private sector, and of supporting market-driven trade and investment. Egypt's reform strategy has been characterized as gradual, where a sequence of small reform measures are taken over a period of years rather than a more dramatic, "big-bang" approach (Ibrahim and Lofgren, 1996). This strategy puts a premium on identifying an appropriate sequence of reforms, and then maintaining progress over the long haul, and avoiding stalemate, back-sliding, or derailment of the changes. APRP was a major partner with the GOE in supporting the reform process in the agricultural sector and agribusiness system.

This chapter highlights the changes in the roles of the public and private sectors that were encouraged and supported by APRP. The analysis targets a set of policy benchmarks selected on the basis of their direct links to changed roles, and aims to document some of the success stories achieved as a result of APRP assistance. Many policy evaluations concentrate on failures, based on the assumption that such a focus leads to corrective measures. Yet attention to success is also warranted to identify what has gone well and should be continued.

The first objective is to trace the impacts of APRP assistance on the following features related to the changes in roles: government delegation of functions to the private sector and establishment of public-private partnerships, capacity-building of both the public and private sectors to take on new roles, the GOE's shift to regulatory and information-provision functions, and private sector participation in policy formulation. The authors identify the incipient benefits and impacts of the changes in roles for farmers and other private sector actors.

The second objective is to examine APRP's assistance efforts in support of these changes, draw conclusions, and derive lessons learned for policy reform programs. These lessons are intended to inform USAID's thinking regarding agricultural policy reform design, and regarding policy reform programs in other countries and/or sectors.

Changing Roles of Public and Private Sectors in Agriculture. Fundamental to a consideration of change in public and private roles is a rethinking of the role of government, which is more limited, while the role of the private sector expands. The overarching concepts driving this role shift blend economic and governance factors. On the economic side are efficiency, effectiveness, and market mechanisms. On the governance side are accountability, transparency, responsiveness, and equity. These two categories of factors are linked in that efficient and effective markets depend on the quality of governance. It is now widely recognized that market-driven development requires not simply less government, but better government (see, for example, Grindle, 1997). As the 2002 World Development Report says, "Many of the institutions that support markets are publicly provided. The ability of the state to provide these institutions is therefore an important determinant of … how well markets function" (World Bank, 2002).

In the agricultural sector, less government means reforms: for example, liberalizing and/or privatizing input supply (e.g., fertilizer, seeds, pesticides, credit), marketing (e.g., state commodity boards, government-dominated cooperatives), and technology development (e.g., research and extension). Delegating functions to the private sector means that the government's role moves away from direct provision of services and/or domination of economic decision-making and toward working in partnership with producers' associations, trade groups, farmers, and private agribusinesses (see, for example, Carney, 1998). Less government means reduction and/or elimination of unnecessary and encumbering regulations and of administratively determined pricing systems.

For agriculture, better government involves roles for the public sector that, depending on the country, may be either new or undersupplied. Key public sector roles, for example, are providing a competition-enhancing regulatory framework for production, technology development, marketing, and trade; licensing private input and service providers where needed; generating and disseminating technical and market information useful to agricultural sector actors; enforcing property

rights, land tenure, and contracts; and assuring the provision of necessary infrastructure investment. Better government entails policies and programs that address situations of market failure, deal with externalities, and ensure a sufficient and ongoing supply of critical public goods. For example, in many developing countries, research and extension on food crops that benefit the rural poor, where producers have limited economic clout, need government intervention. This does not necessarily mean, however, direct public provision of goods and services.

Better government has a process dimension as well. Making agricultural information available and disseminating it to those who can use it contribute to the transparency that helps markets function more effectively. Providing producers' associations and trade groups with opportunities to engage in policy dialogue and to offer feedback on government agriculture-related services increases accountability and responsiveness. Public participation in policy design and decision-making also augments the quality of those policies and decisions.

The shift in roles has implications not only for government, but also for the private sector. As government delegates functions to the private sector and takes steps to create a competition-enhancing policy and regulatory environment within which private sector actors can operate freely, the private sector must have the capacity to fulfill those functions effectively. For example, input suppliers, exporters, and agribusinesses may need to expand rapidly to meet demand, maintain quality, meet standards, and develop new markets. As associations and cooperatives engage in their new roles related to participation in policy dialogue, they need to build a capacity for policy analysis and advocacy, to forge alliances, and to make sure they serve the needs of their constituencies. As the private sector shifts toward working in partnership with government, private actors need increased understanding of technology, of the market, and of regulatory issues. Another role involves self-regulation and social responsibility, which become more important as the private sector becomes a more prominent actor in socioeconomic development.

APRP Benchmarks Selected for Analysis. The design of APRP, its initial set of benchmarks, and the additional benchmarks developed and agreed to jointly between the GOE and USAID over the life of the program incorporate the principles behind the shift in public and private sector roles in agriculture that are described briefly above. From among all of APRP's benchmarks, those associated with the following policy areas (see Table 16-1) were selected as particularly illustrative of, and relevant to, the shifts toward both better and less government and toward increased private sector involvement in the agricultural sector:

- Government withdrawal from cotton pest management
- Promotion of, and cooperation with, trade associations
- Increased government capacity in generating and using information to reduce the mismatch between irrigation water supply and demand

Table 16-1. APRP BENCHMARKS: CHANGING PUBLIC AND PRIVATE SECTOR ROLES

Policy Area	Benchmarks (Tranche #, BM #)	Public-Private Role Issues
GOE withdrawal from cotton pest management	• The GOE will continue to supervise the cotton pest control program, and will make an announcement to: allow cotton growers to choose among MALR approved cotton pest control practices; and permit the private sector to provide MALR approved pest control services directly to the farmers (I, 4c.i, 4c.ii). • The GOE will establish a pest management strategy that defines clearly the roles of government agencies, private sector service providers (including cooperatives), and farmers in pest control. This strategy will include provisions to ensure environmental protection and government regulation, inspection and oversight of pest control operations carried out by private sector companies. Farmers will have a choice of service providers in a competitive market (II, C9). • GOE will revise and reissue open and transparent regulations to register pesticides and will issue regulations to license pesticide companies and applicators (III, D7). • The GOE will allow the private sector to provide all cotton pest management services by December 2000. The MALR will be responsible only for inspection and quality control, licensing and provision of extension advisory services (IV, D6).	• Delegation of functions to the private sector. • Private sector capacity-building. • Public-sector capacity-building. • Government role in regulation, licensing, and information.
Promotion of, and cooperation with trade associations	▪ The GOE will ensure that the private sector membership on the agricultural advisory councils comes from private industry/commodity groups (IV, D1). ▪ The GOE (MEFT) will direct funds to private associations to help finance activities related to the development of Egypt's competitiveness in exports (V, D6).	• Private sector capacity-building.
Increased public-sector capacity to provide and disseminate statistical, economic, and trade information	• The GOE (MALR) will collect, manage, and distribute agricultural data and information on farm production and income at the farm and national levels to meet the private and public sector needs (IV, D7). • The MPWWR and MALR will establish a system that improves flow of real-time in-formation with respect to irrigation demands and supplies (IV, C1). • MEFT) will establish a policy to publish Egypt's trade agreements and disseminate monthly bulletins of disaggregated, product-by-product trade data (V, D4).	• Government role in regulation, licensing, and information. • Public-sector capacity-building.
Private sector participation in policy dialogue and decision-making	• The GOE (MEFT) will issue a decree that requires the discussion of foreign trade draft regulations with stakeholders before the issuance of the regulation (V, D10).	• Government role in regulation, licensing, and information. • Private sector capacity-building. • Public-sector capacity-building.

- Private sector participation, through the Agricultural Commodity Councils (ACC) in agricultural marketing and trade policy dialogue and decision-making

A description and overview of each of these policy areas follows, along with a summary of APRP's target activities, and a list of the expected benefits of the reforms. Note that the Monitoring, Verification and Evaluation (MVE) Unit's Impact Assessment Report No. 20 (Brinkerhoff et al., 2002) provides more examples, with detailed discussion of the benchmarks and implementation programs, of the following four changes in public/private roles:

1. *Delegation of functions to the private sector:* provision of horticultural export support services, and strengthening of the role of agricultural cooperatives in cotton marketing. APRP worked closely with the Ministry of Agriculture and Land Reclamation (MALR) to focus its extension on horticulture and to delegate extension functions to the private sector. APRP also collaborated with the Horticulture Export Improvement Association (HEIA) and the GOE to establish a cold-storage facility at Cairo airport that would be managed by HEIA. APRP support to liberalization of the domestic cotton marketing system strengthened the roles and market shares of both private traders and cooperatives, particularly the Cotton Producers' Marketing Cooperative that worked with growers in the multipurpose cooperatives.

2. *Capacity-building of the private sector:* cotton pest management, and strengthening of agricultural cooperatives. APRP (and the Cotton Sector Promotion Program [CSPP]) technical assistance was important in defining public and private roles in cotton pest management, making pesticide dealers aware of the need for responsible and safe handling of pesticides, developing a pesticide dealers and applicators certification and licensing program, and developing dealer certification courses and training trainers to lead them. APRP also provided support to multipurpose cooperatives in their establishing management autonomy from MALR and new working relationships with several Egyptian and foreign private companies in the area of horticultural production and post-harvest handling.

3. *Capacity-building of the public sector:* regulation of cotton pest management; production and dissemination of higher-quality agricultural statistics and economic and trade information. APRP (and CSPP) assisted the GOE in shifting its role from controller and primary decision-maker on pesticide use to a focus on regulation and licensing. This required developing an appropriate regulatory framework and capacity. APRP also evaluated the quality of MALR agricultural data (in the Old and New Lands), worked closely with MALR/EAS to upgrade the collection of cost of production data from producers, assisted EAS to improve on yield forecasts and estimates, and provided informal counsel to MALR on the agricultural census and estimation of area cropped to major field crops. APRP also assisted the

Ministry of Foreign Trade (MFT) to improve dissemination of agricultural commodity and trade data, as well as information about GOE trade agreements.

4. *Private sector participation in policy:* policy advocacy support to the Egyptian Seed Association (ESAS) and cotton traders and cooperatives; Ministry of Foreign Trade transparency in trade regulations. APRP strengthened ESAS to become a consistent interlocutor with government agencies and legislators on technical issues related to seeds and on expanding the role of the private sector in seed markets. APRP and CSPP support to cotton traders and cooperatives strengthened their capacity to analyze policy alternatives and advocate specific policy reforms or changes in the regulatory environment. As a result of an APRP benchmark, MFT is required to consult the private sector before signing foreign trade agreements.

The interested reader is referred to Brinkerhoff et al. (2002) for additional details on the above four excluded cases. The cases that are discussed in depth in this chapter are presented below.

Government Withdrawal from Cotton Pest Management. Cotton is one of Egypt's most economically important crops, and the GOE has maintained tight control of all aspects of production and marketing for many decades, including pest management. Prior to the initiation of reforms, farmers were excluded from any decision-making related to pest control. The Government-controlled system was administratively cumbersome, expensive, inefficient, and led to overuse of pesticides. As part of agricultural sector liberalization and privatization, farmers have slowly been given more choices in pest management, and private pesticide suppliers have emerged to provide inputs and services. The APRP benchmarks aimed to progressively shift the Government's role from that of direct supplier of goods and services and of pest control manager to a role of providing inspection, quality control, regulation and licensing, and extension advice. The anticipated benefits of this role shift include: (1) improved private pest management service delivery networks, and positive spread effects on other input supply chains; (2) improved ability of farmers to manage pest control independently, and thus respond more quickly to local needs and conditions, as well as use pesticides more safely; (3) reduced application of pesticides due to increased knowledge and elimination of price subsidies; (4) ultimately, improved cotton yields, lower production costs, and higher incomes for farmers; and (5) redirection of government resources to other needs, such as registration, licensing, and monitoring of private pest providers.

Promotion of, and Cooperation with, Trade Associations. In a liberalized economy, the public and private sectors work jointly to promote economic growth with a shared interest in increased exports, employment, value-added, and incomes. This collaboration depends on mechanisms that can represent and give voice to private sector interests, and that can bring together government

policymakers and private actors for discussion and dialogue. Before liberalization, Egypt had few such mechanisms, and those were dominated by the state. APRP provided assistance to trade associations and to agricultural commodity councils. Benchmarks targeted structuring of the way the council functioned to assure fruitful policy dialogue, and government support to trade associations in export promotion. Expected benefits from the commodity councils include: (1) representative leadership on the councils; (2) a more formalized and effective role for the private sector in policy formation and implementation; and (3) better policies and regulations, particularly related to agricultural exports. Benefits from more government support to export promotion would be: (1) more effective promotional campaigns for exports, (2) more trust between the public and private sectors, and (3) increased exports for targeted commodities and products.

Private Sector Participation in Policy Dialogue and Decision-Making. Incorporating the perspectives and needs of the private sector into public policy discussions and decisions contributes to better quality policies and to building stakeholder buy-in to decisions taken. Participation helps to make transparency operational by opening up the decision-making process, and builds trust among participants, which can support the kind of public-private cooperation necessary for market-driven, export-led agricultural development. However, private sector participation is not necessarily limited to situations where the Government invites members of the private sector to engage in dialogue. Participation also refers to the private sector's self-initiated efforts to exercise voice in support of its interests.[2] In this sense, private sector participation contributes to countervailing the power of the state in its relations with citizens. APRP's work with trade associations has helped the private sector to mobilize constituencies in favor of agricultural and economic reforms. The expected effects are: (1) increased expression of private sector interests to public officials, (2) increased private sector influence in policy decision-making, and (3) ultimately, more accountability and decreased arbitrariness in agribusiness policymaking.

Another policy area where APRP supported expanding opportunities for private sector participation is in export promotion and trade policy. The MFT has taken steps to support the private sector in expanding exports through regulatory reform, but sometimes has proceeded without prior consultation with affected stakeholders, both individual firms and trade associations. APRP helped MFT formalize private sector participation in discussions of regulations and trade agreements before these are enacted in final form. The anticipated benefits of this institutionalized participation are: (1) sustained policy dialogue between public and private sector actors; (2) increased transparency and responsiveness of regulations to stakeholder needs, while avoiding capture by special interests or rent-seeking; (3) improved export promotion and trade policies; (4) greater understanding and acceptance of MFT regulations among exporters; and (5) increased foreign and domestic investment in export agriculture.

Increased Government Capacity in Information Provision and Dissemination. As the GOE has moved away from making production decisions for farmers, farmers need timely and high-quality information to optimize their use of land, water, and other factors of production. Processors and traders need information on yield forecasting and prices, both domestic and international. Improved quality of public information, and stronger educational outreach efforts to facilitate understanding and use of these data in decision-making by the public and private sectors, are important for agricultural growth. Information is a critical public good that government must provide in support of liberalization. APRP focused on assisting MALR to collect and disseminate farm-level agricultural and economic statistics, and to improve within-season crop yield forecasting for wheat and cotton; and helping the Ministry of Water Resources and Irrigation (MWRI) to deal with the mismatch between irrigation water use and supply. For a related set of information to promote agricultural exports, APRP targeted increased transparency of information on trade agreements, export and trade data, and commercial opportunities.

Delegation of Functions to Private Sector: Case of Cotton Pest Management

A cornerstone of Egypt's transformation from a state-dominated to a market-based economy involves expanding the role of the private sector by delegating functions that previously were fulfilled by the state. Opening up agriculture to allow more room for the private sector, particularly for exports, is critical for Egypt because of the prominent role agriculture plays. As the GOE has moved forward with freeing up the economy from state control and delegating functions to the private sector, APRP was a source of analytical and technical support to these efforts, recognized as such by those interviewed for this study and in other donor agency reports (for example, World Bank, 2001).

This section provides an example of the delegation of functions by the GOE to the private sector to which APRP provided assistance—the case of cotton pest management. Over a multi-year span, the GOE is moving pest control to private agricultural input firms, allowing farmers to make their own decisions regarding pest management, and reinforcing its regulatory and licensing role.

Reducing government control of pest management has been a goal of economic liberalization of the agricultural sector for many years. Over time, the private sector has assumed a larger role in providing these services; however, when it came to cotton, government intervention remained pervasive. Cotton is a major source of foreign exchange and it supplies the textile industry, an important exporter, employer, and income generator. However, the Government's tight control impeded the emergence of an internationally competitive cotton industry, and by the late 1980s senior MALR decision-makers began to consider measures to liberalize and privatize, thereby shifting the mix of roles between the public and private sectors. One aspect of this shift was to allow farmers choices about pest management regimes used on their fields. During the early to mid-1990s, the

Government gradually reduced cotton pest control subsidies, which were the target of four APCP benchmarks. However, MALR extension agents and pest control staff still made most of the decisions on cotton pest management for farmers and provided services directly, though farmers were now charged for the services.

APRP tranche I included a benchmark to authorize the private sector to provide pest management services to farmers (I, 4c.i, 4c.ii). Although the benchmark was not met, by the late 1990s MALR began to modify the legal framework so as to create the conditions under which the private sector could assume functions previously fulfilled by government entities, and the public sector could move in the direction of regulation and licensing. Severe pest infestations of the 1998/99 cotton crop highlighted the problems with the rigid and inefficient state-controlled pest management system, and the need for change. Decree No. 663 in 1998 provides for new pesticide registration procedures. The decree calls for licensing traders, applicators, and equipment; training and certification programs; curbing of product adulteration and smuggling; as well as environmental and health protections. It also streamlines farmer access to registered pesticides. Decree No. 256, issued in 1999, allows cooperatives to offer pest management services, and farmers to purchase pesticides from the cooperatives located in their villages. This decree signaled a shift from government domination of pest management to opening up service provision to private actors. While cooperatives are semi-public organizations, nonetheless, they have some features of private entities, and thus the decree indicated MALR's willingness to move in the direction of privatization of pest management service provision.

During this same period, to clarify the implementation steps for the decrees, MALR developed a strategy statement for the liberalization of pest management services, with support from APRP and GTZ's Cotton Sector Promotion Program (CSPP), encouraged by the tranche II benchmark calling for the strategy (C9). Since the essence of the reform was to expand the role of the private sector, it was important that the strategy statement emerge from a consultative and participatory process with private sector actors, rather than reflect a unilateral, government-only perspective. APRP and CSPP facilitated a series of meetings and workshops throughout 1998 to assemble input for the strategy, and supported its development along with an accompanying implementation plan. Strategy development included discussions with APRP about benchmarks for tranches III and IV, which became milestones for implementation (III, D7; IV, D6). The strategy was presented to H.E. Minister Wally, who approved it, thereby confirming MALR's commitment to proceed (Hindi and Treen, 1998).

The strategy development process revealed several factors that needed to be addressed to move ahead with cotton pest management reform. First, a number of MALR staff were concerned about farmers' and private pesticide firms' knowledge, capacity, and commitment to handle dangerous pesticides responsibly. This concern translated into a lack of trust, coupled with a reticence to relinquish control. Second, while numerous discussions bringing together government and

private sector stakeholders had been held, there were still differences of opinion regarding the scope and details of the shift in public-private roles for pest management. From the point of view of MALR technical staff, for example, a major question was, if they are allocating their functions to private sector actors, what then remains for them to do? Third, despite the espoused commitment to change roles and move away from command-and-control management, the behavior patterns of many (though not all) officials in MALR and related pesticide agencies continued to reflect the traditional top-down, directive attitudes of the past.

The reform implementation approach developed by APRP and CSPP in close consultation with MALR dealt with each of these issues. Workshops and meetings brought together public and private sector actors for intensive exchange and dialogue. From the private sector, participants included members of the Egyptian Association of Traders in Seeds and Pesticides (EATSAP) and Crop Life Egypt (the association of agrochemical producers). These events fulfilled several purposes. The intensive interaction with the private sector that took place served to build trust and confidence among government actors, helping them to see that their private sector partners were sincerely interested in dealing with pest management problems, regulatory and certification issues, and enforcement to curb abuses and reduce environmental and health threats. The style of interaction encouraged by the APRP facilitators and trainers sought explicitly to model new behaviors, demonstrating to government actors that participatory consultation and shared problem-solving was an effective way to engage with the private sector. Through the series of events a shared, mutually negotiated vision began to emerge that led to greater understanding of, and agreement on, their respective roles and responsibilities. APRP captured the shared vision in one of its Policy Briefs, which was widely disseminated (RDI, 2000a). As another dissemination tool, in cooperation with CSPP, APRP produced a 20-minute video on pest management liberalization, which helped to ensure a clear and consistent message. Finally, the workshops served important training, awareness creation, and capacity-building functions for both public and private sector actors, as the sections on capacity-building in the public and private sectors below discuss in more detail.

As a means both to work out the operational details of delegating pest management to the private sector and to demonstrate its feasibility, the reform implementation approach included pilot tests in four governorates: Daqahleya, Menoufeya, Beheira, and Kafr El Sheikh.[3] The pilots began in early 2000 with a workshop in Cairo for representatives from the four governorates, plus MALR central staff, followed immediately by implementation planning workshops for each individual governorate. These were followed by workshops for farmers, held in villages in the districts that were selected for the test. In November 2000, APRP facilitated a review workshop that examined progress to date and laid the groundwork for expansion the next year. In 2001 the pilot program was extended to other districts within the four governorates. APRP supported another round of implementation planning workshops, large numbers of farmer-level workshops,

and progress review sessions (see the sections on capacity-building of the public and private sectors for details). These events spread the shared vision of the new roles and responsibilities, through discussion and use of videos and written materials, and helped local actors, agricultural extension agents in particular, better understand the operational implications of delegation to the private sector and of public-sector oversight.

In tandem with the central-level consensus-building and visioning regarding roles and responsibilities, and with the pilot test program in the governorates, work progressed on the legal and regulatory framework. In 1999 in support of tranche III Benchmark D7, ARPR worked with MALR on an analytic review of existing pesticide laws and regulations, some dating from decrees issued in the 1950s (Oteifa et al., 1999). This exercise led to the preparation by MALR of new draft regulations for pesticide registration and a manual.[4] A series of seminars and workshops in 2000 focused on review of the draft pesticide regulations, the manual, and certification and training. EATSAP and Crop Life Egypt participated actively in the review process, and in 2001 EATSAP organized, with APRP and CSPP support, an extensive series of workshops for pesticide traders in Assiut, Tanta, Mansoura, Alexandria, and Zagazig. In mid-2001, EATSAP, Crop Life Egypt, APRP, and CSPP began developing a training program for pesticide dealers and applicators that will prepare them for MALR certification and licensing. The program includes an interactive training course with 10 modular sessions, and both a technical manual and a trainer's manual. Training-of-trainer workshops began in 2001, and continued in 2002, with assistance from APRP and CSPP (see "Capacity-Building of the Private Sector").

The story of cotton pest management liberalization and privatization is cited as a success both by those the team interviewed and by the various written sources the team consulted. It is a long narrative, covering nearly a 15-year period, with most of the changes taking place in the last 5 years, from the passage of Decree 663 in 1998 through Decree 1796 in 2001 to the present-day activities associated with registration and licensing of private pesticide providers. Decree 1796 gives cotton farmers the right to obtain services and inputs for pest control from cooperatives, private pesticide dealers, or service firms. The story reflects the evolutionary nature of shifts in policy and regulatory frameworks, the influence of entrenched bureaucratic interests and procedures, and the persistence of ingrained attitudes and behaviors. Given these factors and the tight state controls and risk-aversion of the Government at the start of the reform process, the degree of change achieved is remarkable and commendable. While the various actors in both the public and private sectors are not yet in a position to fully exercise their new roles and responsibilities, illustrated in Table 16-2, major steps have been taken. The new rules and regulations, the registration program, and the hands-on practical experience of the pilots are all concrete manifestations of the delegation to the private sector and the reduction of direct input and service provision by the Government.

Table 16-2. PRIVATE AND PUBLIC SECTOR ROLES AND RESPONSIBILITIES IN COTTON PEST MANAGEMENT

Private Sector:

Farmers

- Make decisions about spraying; choice of pesticides, purchaser, hire/own spraying equipment.
- Conduct pest management activities, including pest scouting, egg mass collection, and treatment application.
- Remain informed and up-to-date in technical aspects of integrated pest management.
- Pay for all costs associated with pest management operations in their fields.
- Follow government recommendations and regulations regarding pest management and pesticide use.
- Assume responsibility for adverse effects of their pest management decisions and actions.
- Encourage other farmers to work cooperatively on combined land plots to optimize pest management.

Pesticide Dealers and Cooperatives

- Establish and operate retail outlets to provide pesticides and pest management equipment and services to cotton producers at competitive prices.
- Provide credit services to farmers who request it to cover pest management expenses, and collect outstanding balances at the end of the season.
- Ensure proper storage facilities for pesticides and sprayers.
- Ensure availability of products and equipment, provide for maintenance and repair of sprayers.
- Support proper use of pesticides among farmers.
- Follow government regulations regarding pesticide and pest management equipment, and provide information as needed.

Public Sector:

Ministry of Agriculture and Land Reclamation

- Provide legal and regulatory framework for pest management, including licensing.
- Support enforcement agencies in the application of rules and regulations.
- Provide technical recommendations for cotton pest management strategies.
- Inspect and monitor pest control operations to protect consumers and producers, mitigate environmental impacts.
- Conduct pest monitoring, forecasting, and early warning; and maintain database.
- Develop training and education programs for farmers and private pesticide firms.

MALR Extension Agents

- Provide technical advice and support to farmers on all aspects of cotton production.
- Educate farmers in new pest control techniques.
- Encourage farmers to work cooperatively and form communal pest control units.
- Monitor pesticide applications and pest management practices in farmers' fields.
- Report cotton pest management results/findings to district, governorate, and central MALR units.
- Perform bollworm scouting, inform farmers of infestation levels, and provide technical guidance.

Sources: Adapted from RDI (2000a) and El-Fattal et al. (2001).

The road forward has not been without bumps and frictions. While MALR has begun to accept the private sector as a legitimate actor in pest management, suspicions remain, and private firms still voice complaints about the lack of trust. One step to address the trust issue that Crop Life Egypt has taken is to adopt a code of conduct so as to demonstrate a commitment and a capacity for self-regulation. EATSAP has developed a similar code, which as of this writing has not yet been signed by its members. On the regulatory front, there is a thicket of rules, some of which are contradictory, that leave the door open to inadequate enforcement, potential rent-seeking, and administrative interference in the cotton pest management marketplace.

APRP was instrumental to the success of cotton pest management in a number of ways. First, as a policy interlocutor with MALR throughout the program's tranches, APRP-led negotiations established the roadmap for cotton pest management liberalization and privatization that is embodied in the benchmarks. Second, APRP provided technical expertise in a variety of areas: pest management, legal and regulatory analysis, international best practices and protocols (e.g., World Trade Organization and European Union), workshop design and process facilitation, training course design, policy implementation planning and monitoring, and dissemination materials development. Third, APRP's reform support strategy, by working simultaneously at multiple levels (central to local) with many partners (public and private) and by building in some early successes in the pilot governorates, maneuvered around implementation roadblocks and assured the various stakeholders that change was possible. Fourth, APRP served as a neutral broker between MALR and the private sector; both sets of actors remained confident that APRP was not taking sides, and thus were, and are, willing to listen to and follow APRP experts' recommendations. Fifth, APRP successfully leveraged its USAID resources and impacts through close collaboration with GTZ's CSPP.

In some respects the story is not yet over. The achievements to date have laid the groundwork for the anticipated impacts on pest management service delivery, farmers' use of pesticides, yield increases, production efficiencies, and higher farmer incomes. There is some evidence that cotton farmers now use fewer pesticides, with the average application about half what it was before liberalization, and yields have maintained their current levels or improved. El-Fattal et al. (2001) report that farmers in the pilot program villages reduced their cotton pest management costs to less than LE 100 per feddan, versus costs as high as LE 170 per feddan in neighboring villages that did not participate in the pilot.

Capacity-Building of Private Sector: Support to Development of Trade Associations

As the public sector delegates more to the private sector, private actors need the capacity to take on new functions and responsibilities successfully. Sufficient and appropriate capacity is important for success not simply in the near-term, but for

expansion of the private sector's role into other functions as well. Governments are often mistrustful of private sector actors' abilities to carry out new functions. Trade associations are critical institutions for developing the capacity of the private sector to access and share relevant technical and market information, promote and market their products, identify and aggregate mutual interests, and engage in policy advocacy. APRP was instrumental in assisting a number of agricultural trade associations to increase their capacity.

The history of independent and effective trade associations in Egypt is relatively short. As is true of many countries where the state dominated the economy, Egyptian private sector actors tended to negotiate with government officials as individuals, relying on personal connections to exercise influence. However, with economic liberalization, two factors created incentives for the private sector to form associations: (1) in the global export economy, the costs of doing business through individual deal-making proved detrimental to competitiveness, and (2) as more firms entered the market, the private sector began to see the potential power of numbers in organizing to interact with government, obtain market information, and so on. Starting in the mid-to-late 1990s, a number of agricultural trade associations emerged, among them HEIA, the Egyptian Seed Association (ESAS), and the Egyptian Agribusiness Association.[5] These three are registered non-governmental organizations (NGOs). Most of the country's medium- to large-scale agribusiness firms and entrepreneurs have joined one or more associations.

Capacity-building for trade associations involves the right kind of organization and skills, appropriate and conducive venues and forums to interact with a range of stakeholders, both public and private, and sufficient resources to carry out activities and achieve results. APRP targeted all three of these features related to capacity-building for associations.

APRP support to ESAS illustrates the first type of capacity-building. ESAS was founded in March 1998 by a prominent agribusiness entrepreneur and several of his colleagues. The association is a registered NGO whose purpose, as stated in the enabling decree, is to represent the common interests of private sector seed producers and traders with the goal of creating "a liberalized and integrated seed industry conducive to private investment for the benefit of Egyptian farmers, exports and agriculture." Confronted with the problem of determining what it should do to achieve this goal, ESAS turned to APRP for assistance. As the executive director remarked when interviewed, "at the beginning people didn't have a clue what ESAS should do." Through a series of collaborative studies and workshops, APRP helped ESAS to: (1) analyze the regulatory framework and assess policy constraints, (2) develop a mission statement, a vision, a strategic plan, and action steps to carry it out, and (3) assess options for financial sustainability (Delouche, 1998; Humpal, 1998). Among the objectives in the plan was the establishment of a code of ethics for the industry, and APRP helped both with the process of consulting with members and other stakeholders through workshops and informal consultations, and with the technical content of the code

(Gisselquist et al., 1999). Other objectives focused on the legal and regulatory framework and on establishing partnerships with the Government on seed-related issues. Pursuit of these objectives led ESAS to concentrate on policy advocacy, and again APRP provided assistance. These efforts helped to increase ESAS capacity to participate effectively in policy dialogue with the Government and to win some important policy victories. These are discussed in the section "Private Sector Participation in Policy," below.

Related to supportive forums and venues for interaction with stakeholders, the various trade associations and unions realized that their interests could be more effectively advanced through open and regular communication with the Government, giving them the opportunity to influence decision-making. However, there was no venue that allowed them to play this role in an organized, systematic, and efficient manner. In response to lobbying, in 1996 the Government issued a presidential decree authorizing the establishment of the Supreme Export Council. As the council's technical secretariat, the Ministry of Trade and Supply (MTS) issued a decree in December 1997 establishing Commodity Councils that report to the Supreme Council. Among those created was the Agricultural Commodity Council (ACC), which was intended to serve as a cross-sectoral association that provides a venue for dialogue and discussion both among its private sector members and between them and Government. During the following year, there was little progress in making the ACC or any of the other councils operational, in part because the ministerial decree was not clear about the role of the councils, who could be members, how they would be selected, and so on.

APRP staff and their Egyptian counterparts recognized that if the ACC was to have the capacity to serve as an effective cross-sectoral venue for dialogue, selection of representatives to serve on the council should not be up to the Government, as was the case in the 1997 decree. APRP's tranche IV included a benchmark to ensure that private sector representatives of the various commodity committees of the ACC are chosen from private industry.[6] Discussion of this benchmark started in January 1999 with MTS, which subsequently approved it. In May 1999, APRP proposed a policy framework and related legal package that included a ministerial decree defining the roles, responsibilities, membership, funding, and so forth for the Horticultural Advisory Council and a law to establish industry unions. These proposals were developed in a series of consultative meetings with key private sector horticulture producers and exporters, specifically those involved in ornamental and medicinal plants, fresh fruits and vegetables, cut flowers, and pot plants.

In late 1999, APRP provided capacity-building assistance to the ACC similar to that it had provided for ESAS. Consultants helped the council, through a series of workshops and focus groups, to develop mission and vision statements, prepare an action plan, and agree on a set of roles and responsibilities for core council functions (Gormley and Khattab, 1999a). APRP also conducted a review of

export and commodity councils in other countries to give ACC members some ideas on what they could do and how they could organize (McCoy, 2000). APRP continued to support ACC capacity-building by organizing workshops, undertaking studies, and serving as a neutral facilitator for dialogue, particularly as the ACC has become more active in policy dialogue (see the section "Private Sector Participation in Policy," below).

The third feature of trade association capacity concerns resources. This does not mean simply the resources necessary to maintain membership services and regular operations. In most industrialized countries, export-oriented trade associations have access to public funds to pursue promotional activities abroad. APRP discussed such funding with the Ministry of Foreign Trade and developed two tranche V benchmarks to direct government funds to support private sector–led export promotion activities (Benchmarks D3 and D6). Under Benchmark D3, MFT provided support to the development and promotion of the logo for Egyptian cotton, which was intended to increase demand for Egypt's extra-long staple cottons. MFT worked with the Alexandria Cotton Exporters Association (ALCOTEXA) on developing the logo, and designated the association as the organization to certify its use on exports. Regarding Benchmark D6, a Ministerial Decree, No. 910/2001, was issued in December 2001 directing the Foreign Trade Sector of MFT to provide funds to Commodity Councils for purposes of export promotion. At the time of the team's interviews with associations in January 2002, the Government had not yet begun to provide funding for promotion activities by trade associations.

Trade associations and the ACC have achieved a remarkable degree of capacity for such relatively young entities. They have established solid organizational structures and become adept at policy analysis, constituency-building, and advocacy. The ACC has begun to prove itself as a useful forum within which to ensure an effective private sector voice in public policy dialogue. One contributing factor to its rapid advancement is that the leadership of both the trade associations and the ACC includes some of the wealthiest and most capable people in Egypt, with high levels of skills and sophistication, and strong connections with high government officials and others. Our interviews confirmed nearly unanimously, though, that APRP's assistance was critical to success on both the technical and process sides, particularly in helping to coalesce talented individuals into effective teams that could reach consensus, develop plans, mobilize resources, and follow through to achieve results. One challenge for the future will be to extend the capacity created beyond the rich and powerful to draw in smaller actors. This expansion will help to increase the likelihood that trade associations will embody broad representation of the private sector, which can encourage a wider distribution of economic benefits due to advocacy of interests that serve firms at all levels, not only the largest producers and exporters.

As noted, the Government funded the development of the cotton logo, and APRP provided technical assistance in cooperation with GTZ, working with both MFT

and ALCOTEXA. Allocations of government funds to support association activities to promote exports appear not to have been initiated. However, interviews with staff of MFT's Export Promotion Center indicate that the Government is supporting exporters with financial incentives through an equilibrium fund managed by the General Organization for Import and Export Control (GOIEC). The ACC is lobbying for more incentives of this kind, which are in essence subsidies for exports, not really support for export promotion.

Capacity-Building of Public Sector: Example of Water Supply and Use "Mismatch"

As the GOE moves toward a market-supporting model of governance and away from a state-controlled one, the functions of providing a conducive regulatory framework and information emerge as key. Regulation and information are public goods that, along with contract enforcement and assurance of property rights, are among the basic building blocks of a liberalized market economy (World Bank, 2002). In the context of agricultural policy in Egypt, providing these public goods is not so much a new role for the Government as it is the invigoration of an existing role that heretofore has been under-fulfilled. APRP worked closely with agriculture sector government officials at all levels, from the central to the district and village levels, to strengthen their capacity for regulation and information provision, analysis, and dissemination.

An information-related policy critical to Egyptian agriculture is matching water availability from the Nile River with farmers' irrigation needs. APRP, in collaboration with the Environmental Policy and Institutional Strengthening IQC team (EPIQ), has worked with MALR and MWRI on developing the capacity to implement a new policy to deal with the problem of the "mismatch."

In the days of state-controlled agriculture, MWRI (then the Ministry of Public Works and Water Resources) delivered water to farmers on the basis of cropping patterns and calendars determined by MALR. Despite central controls, these plans were often inaccurate representations of the actual crops grown. With liberalization, beginning in the late 1980s, and farmers' discretionary ability to choose what to plant, MALR's ability to predict cropping patterns and calendars declined further. Water releases from the Aswan Dam based on these plans resulted in a significant "mismatch" between supply and need. In some cases, large amounts of water (sometimes millions of cubic meters) were delivered but not used, while at other times water was not available for crops when needed, causing a reduction in agricultural production. Relations between MALR and MWRI were acrimonious, with each ministry blaming the other for the problem, and farmers complaining to the local offices of both agencies.

An important contributor to the "mismatch" problem was inadequate information capacity in and between the two ministries. There was no systematic transfer of accurate crop information from farmers or MALR to MWRI, nor did MALR or

farmers understand the constraints of the Nile irrigation system. Both ministries recognized that they needed the capacity to match real-time irrigation water demands with water deliveries in order to establish an efficient, demand-driven irrigation system. Such a system called for improved cooperation between MWRI and MALR at all levels, and better links to farmers.

A series of APRP benchmarks in tranches I, II, and III focused on improved water use in rice and sugarcane production, formation of water user associations, and development of an irrigation strategy. Work on these benchmarks led to better cooperation between MALR and MWRI, and laid the groundwork for the tranche IV benchmark (C1) to create a new joint information system. The two ministries formed an informal working group, supported by APRP and EPIQ, to lead the effort to design and implement the new system. APRP capacity-building for the information system began in 1998 with two training activities in the United States. In June, seven MWRI staff attended a 10-day water quality course in Wyoming. In August, 10 staff from MWRI and MALR participated in a 3-week study tour on irrigation and water management in Utah, Arizona, and California. In mid-August in Cairo, APRP facilitated a roundtable on strategic priorities for agriculture and water. This event assembled about 60 people from MWRI, MALR, the private sector, USAID, and APRP. It built awareness and consensus around the new information system.

In 1999, MWRI and MALR launched a pilot program in five irrigation districts in the governorates of Beheira, Beni Suef, Luxor, Qena, and Sharqeya. These districts cover approximately 270,000 feddans. APRP facilitated start-up workshops and meetings for the working groups formed in each governorate to plan and coordinate the collection and management of the required information. Data collection began during the winter season (1999-2000) in the five irrigation districts. Based on review workshops of the results of the winter trials, the working groups developed a more refined plan for collecting data on farmers' summer planting intentions and for data transfer protocols among the local, governorate, and central-level units in MALR and MWRI that were collecting and receiving the information. Data were collected and transferred every 2 weeks. These efforts were reviewed in two large workshops in Cairo in September and December, and a final plan was developed for the winter season (2000-2001) trials. Computers in the pilot areas were upgraded by MALR's EAS, which also provided training in data entry and transfer, with some support from APRP. A public awareness and information outreach campaign was developed in anticipation of expanding the program.

In August 2000, APRP facilitated a workshop in Cairo to review the experience of the pilot program, to identify and address implementation issues that emerged during the first year, and to plan for expansion of the program. Participants in this workshop were agricultural and irrigation engineers from the pilot districts, plus some heads of agricultural and irrigation directorates in the five governorates. Based on the success of the pilots, MWRI and MALR were eager to expand to 26

other irrigation districts in the targeted governorates. In 2001, APRP facilitated three expansion planning workshops, followed by training seminars for 150 MWRI and MALR staff in Qena, Luxor, and Beheira. Two review workshops in October 2001 in Cairo assembled 133 participants for further review and planning. That same month the ministers of both ministries signed a joint agreement formalizing their approval of the information system developed in the pilot program and creating an interministerial committee to plan the technical and financial steps to roll the system out nationwide. The national plan will be the basis for a major shift from the current water delivery system to a real-time, demand-driven system that will optimize the use of irrigation water and contribute to conservation (RDI, 2001a). APRP, in cooperation with MALR/EAS and EPIQ, is providing further capacity-building to buttress the success of the expansion through more training, computer upgrades, technical analysis, and workshop facilitation.

Both documents and the team's interviews cite the new real-time information system and MALR's and MWRI's capacity to use it to rationalize water releases from the Aswan Dam as a success story. Several impacts are noted. First, the timeliness and the match with needed water quantity have already improved in the pilot districts since the program began. Interviewees reported increased farmer satisfaction with water deliveries, as evidenced by a drop in complaints. Second, coordination and cooperation between MALR and MWRI improved significantly, a real achievement given their history. This cooperation exists at all levels, from central to local. In some districts, communication between staff of the two ministries is daily. This increased frequency of communication has had positive impacts on problem-solving for farmers. For example, the new information and its timely availability makes it possible to provide sufficient lead-time for farmers to adjust in cases of water shortfalls, particularly at the critical periods when they are preparing their fields and planting.

Third, and related to better problem-solving, the new system gives the two ministries a much greater capacity to generate high-quality data. Agricultural and irrigation engineers in the pilot districts cooperate better to unify and improve the quality of the data. Through direct contact, they are able to solve problems faced by the farmers with respect to water supply and demand. The databases for the five districts regarding the cropping patterns, acreage of each crop, and time of planting, have been established at the branch canal levels and not only allow for fine-tuning of irrigation water needs, but also contribute to better agricultural statistics. The reinforcement of data collection and analytic capacity will have spread effects in both ministries, where other policy and program issues may be addressed using computer-assisted solutions.

A fourth impact is an increased awareness among agricultural and irrigation engineers at the district level of the need to rationalize the use of irrigation water. This awareness has been transferred to farmers by extension agents in the course of surveying farmers on their crop mix and plans for the next season. Such

awareness is important, given the increasing competition between agricultural, industrial, and urban needs for the finite amount of Nile River water available to Egypt, fixed by international agreement at 55.5 billion cubic meters annually.

APRP's contribution to developing the real-time, bottom-up information system and building MALR's and MWRI's capacity is widely recognized. The benchmarks across all the tranches established the incentives and targets that encouraged MALR and MWRI to build a cooperative relationship in pursuit of common objectives. APRP provided technical assistance in system design, data issues, and computerization, undertaken in collaboration with EAS and EPIQ. APRP's facilitation assistance in the intensive series of planning, review, consensus-building, and training workshops and seminars helped with the process aspects of capacity-building and system development. Between August 1998 and November 2001, APRP-facilitated events, not including the U.S. training/study tours, that involved a total of 620 participants. This assistance effectively supported the actors in both ministries interested in making changes, particularly the widely-recognized "mismatch" policy champion in MWRI, Eng. Hussein Elwan.

Private Sector Participation in Policy: Supporting Emergence of Agricultural Commodity Councils

Helping the Egyptian government and the private sector define the nature of their interaction and collaboration to promote the growth of a free-market economy has been a major policy reform theme throughout APRP. The private sector promotes the interests of individual firms or of economic subsectors, such as processed foods, cotton, horticulture, or seeds. The public sector promotes the country's national interest and protects the welfare of the nation and the people. While the interests of the public and private sectors are not always identical, both share many of the same objectives. These include increased exports, employment generation, and added-value and incomes, to name a few. Policy dialogue between policymakers in the Government and representative private sector associations offers the private sector the opportunity to exercise voice and can lead to the achievement of shared goals, even in cases where the interactions themselves may on occasion be acrimonious or conflicting.

APRP support has been important to creating the capacity of the private sector to exercise voice and participate in policy dialogue, as the discussion in the section "Capacity-Building of the Private Sector" above shows. That support consisted of both specific benchmarks that helped to establish autonomous entities for policy dialogue (such as tranche IV, D1), and organizational development assistance to help the ACC and trade associations such as ESAS think through their mission, engage in strategic planning, undertake advocacy activities, and conduct independent policy analyses. The private sector's use of their capacity goes beyond specific APRP benchmarks, and the discussion below highlights several stories that illustrate how the private sector has engaged with government actors to

advance their interests. The outcomes achieved are in sharp contrast to the pre-liberalization era when state interests predominated.

With the creation of the ACC, the venues for members of the private sector to represent and promote their interests have grown. The ACC's subcommittees have been formed and have established programs, which they have also begun to implement: rice, seed, and fiber; transportation; peanuts and oil; flowers and ornamental and shade plants; fruits and vegetables; and animal and fish protein. Some, like the transportation council, have developed formal policy positions. The experience of the ACC's Rice and Grains Subcommittee illustrates private sector participation in policy.

At the beginning of APRP, rice millers and exporters had only one organization representing them, the Rice Branch of the Cereals Chamber of the Egyptian Federation of Industries (EFI). EFI is a public agency, reporting to the Ministry of Industry; the managers of the Cereals Chamber, including the Rice Branch, were paid by the Government. The Rice Branch met monthly (about eight or nine times per year) to discuss the general situation in the domestic and international (particularly, the regional, Eastern Mediterranean) rice markets. The industry person who chaired the monthly meetings was the head of a public sector rice milling company.

However, by October 2000, the Rice Branch was no longer the sole voice of the rice industry. That year, the ACC formed a Rice and Grains Subcommittee whose membership was largely from the private sector. The key members of this subcommittee are the heads of the largest rice exporting and milling companies. The Rice Branch continued to meet monthly in Alexandria, but its influence waned slightly.

When world rice prices declined to their lowest levels in 15 years during the early months of the 2000/01 export marketing season, Egypt's rice exports slowed, despite the fact that domestic rice prices were unusually low during the 4 months following the harvest of the 2000 paddy crop. The Minister of Agriculture, H.E. Dr. Youssuf Wally, proclaimed a minimum paddy purchase price in mid-January 2001 that was well above the levels paid to most producers following the rice harvest (from September through December 2000). The Rice Subcommittee saw this as an opportunity to argue vigorously for subsidies. One of the leading rice exporters put together a brief that noted how the higher paddy prices would even further depress Egyptian rice exports. Comparing this new price level with prices of competing rice in key international markets, the Rice Subcommittee argued forcibly for export subsidies. The Minister of Foreign Trade took their brief to the Cabinet, presented it, and the Cabinet responded by putting in place generous subsidies. The Export Development Bank was charged with disbursing subsidy payments to rice exporters.

The response to the implementation of rice export subsidies was immediate and enthusiastic, reversing a decline in exports in December 2000 and January 2001 due to stiff international competition and worldwide surpluses. Following implementation of the subsidy scheme (on 24 January 2001), Egypt went on to attain a record level of rice exports, 755,000 metric tons, more than twice the amount of the preceding two export marketing seasons.[7] The record exports also helped Egypt to dispose of potentially embarrassing and costly rice surpluses, following two record paddy harvests in summer 1999 and summer 2000.

Without strong private sector advocacy on the part of the Rice Subcommittee and its ability to put together a convincing brief, it is unlikely that the rice industry could have influenced the Government to implement an export subsidy scheme. It is also a testament to the clout of the ACC that its Rice Subcommittee was able to get the rice subsidy issue considered at the Cabinet level so quickly. Part of this is due to the ACC's strong working relationship with a receptive Minister of Foreign Trade, H.E. Youssef Boutros Ghaly, who took the Rice Subcommittee's brief directly to the Cabinet and strongly advocated rapid implementation of a rice subsidy. Perhaps another reason for quick results was the push by the Government to expand agricultural commodity and other exports to generate foreign exchange during a period when Egypt's foreign currency reserves were hemorrhaging. While APRP does not encourage subsidies, this case illustrates how the private sector has increased its participation in policy.

Process of Policy Change

Policy reform is more than issuing decrees, passing laws, and developing regulations. While these are necessary elements of policy change, they represent the starting foundation of the process rather than its culmination. To achieve results, policy change must focus on implementation. This means paying attention not only to what are the "right" policies, that is, what the technical content of policy prescriptions should be, but also to how to bring change about. Policy implementation combines both technical and process dimensions (Brinkerhoff, 1996).

APRP's approach to working with the GOE and the private sector to support a shift in their roles has blended technical and process assistance. This section considers the impact of the program's combined technical and process approach to policy implementation. The section begins with a closer look at the process dimension of policy reform. It reviews APRP's role and activities in addressing policy implementation requirements.

From Policy Formation to Implementation. Policy formation emerges from a confluence of political, economic, social, and technical issues and agendas that lead to policy decisions. These decisions, embodied in decrees and laws, rarely specify the details of implementation. Experience with policy reform across a wide variety of sectors suggests that implementation shares a common set of steps that are roughly

sequential (Brinkerhoff and Crosby, 2002).[8] The chances of successful implementation are enhanced to the extent that reformers address each of the steps. The set of steps includes the following: policy legitimization, constituency-building, resource accumulation, organizational design and modification, mobilizing resources and actions, and monitoring progress and impact.

- *Policy legitimization*: To make progress with implementation, key decision-makers must view the proposed policy as legitimate. To acquire legitimacy, some individual, group, or organization must assert that the proposed policy reform is necessary and vital, even though it will present serious costs. The more contentious the policy issue, or the more the new policy departs from past practice, the more important will be the legitimization function.

- *Constituency-building*: A constituency for the reform must be developed; the reform must be marketed and promoted. Constituents may be consumers of the service that the policy mandates, providers of inputs, or officials within implementing agencies. Constituents may also be groups with influence in the direction of the change, or that can bring resources to bear in support of the change. Constituents are the winners in the policy reform process. Constituency-building complements and amplifies legitimization. It aims not only at gaining acceptance but also at mobilizing and eventually institutionalizing a new set of stakeholders and beneficiaries with an interest in reform results.

- *Resource accumulation*: To implement a new policy, human, technical, material, and financial resources must be allocated to the effort. This means both securing initial funding and assuring the policy a place in the government's budget allocation process. Frequently, the agencies charged with implementing a new policy have limited resources and capacity. In many cases, a simple injection of funds is not enough. It also means lining up the right people and organizations to be involved as well.

- *Organizational design and modification*: This involves adjusting the objectives, procedures, systems, and structures of the agencies responsible for implementation. Reformers frequently need to confront the inertia and resistance of entrenched procedures and routines, and alliances with existing constituents and interests. Also, when policies require agencies to engage in tasks that are substantially different from current ones, capacity issues arise.

- *Mobilizing resources and actions*: This step builds on the supporting constituencies (Step 2) and the accumulated resources (Step 3), and marshals their commitment and resources to engage in concrete efforts to make change happen. Mobilization of resources entails both planning and doing. It includes the preparation of concrete action plans, clarification of performance targets and standards, and then the conduct of those activities. Frequently this

involves breaking the reform into a sequence of action steps. For example, many reforms begin with pilot sites for demonstration and learning.

- *Monitoring progress and impact*: If policy reform measures are successful, then their impacts will be evidenced through transformed behaviors, greater or improved benefits to consumers or clients, more effective or efficient production and use of resources, increased production and economic growth, and so on. Reformers need to establish and use systems to track progress. These systems not only alert decision-makers to implementation snags, but also inform them of intended and unintended impacts of reforms.

Role of APRP in Facilitating Policy Implementation. APRP's approach to policy implementation has largely incorporated the lessons of experience and best practices encapsulated in the implementation steps described briefly above. Using the steps as a template, the discussion below highlights selected APRP activities in support of the reforms reviewed in this chapter to demonstrate APRP's role and activities.

APRP played an important role in *developing legitimacy* for the liberalization and privatization policies for which the program has provided budgetary resources through its various tranches. The history of APRP and of APCP before it demonstrates that convincing Egypt's leadership of the need for and desirability of reform has been a long-term effort. First and most directly, APRP addressed policy legitimization through the process of policy dialogue with senior agriculture sector officials (and key officials in other APRP-collaborating ministries) that has led to agreements on benchmarks for the tranches. This dialogue has taken many forms. Sometimes it is informal, one-on-one, or small group discussion between Egyptian officials and APRP experts, joined periodically by USAID staff. Sometimes it is formal exchange through workshops or seminars, supported by APRP analytical studies. Second, APRP focused explicitly on widening the circle of actors who consider the program's targets important and worth achieving, and on identifying and working with policy champions. A clear example of this is APRP's work with MWRI's Eng. Hussein Elwan in support of resolving the irrigation water/demand mismatch issue. Several of APRP's policy champions came from the private sector; a good example is the founder of ESAS, Samir El Naggar.

In tandem with seeking policy champions and creating legitimacy for new ideas, APRP engaged in *constituency-building* to gain active support and commitment for the reform measures embodied in the program's targets. Through extensive participatory exercises, often in the form of workshops and seminars, APRP supported increased understanding and ownership of reforms among progressively expanding networks of stakeholders. These efforts have not only generated support for change and innovation, but also have served to reduce or deflect opposition by groups who considered reform measures harmful or threatening. APRP staff members have endeavored to the extent possible to make stakeholder

interactions win-win exchanges, rather than framing them in winner-loser terms. By consciously remaining in the background in public forums and in maintaining the position of neutral brokers, APRP staff have contributed to the creation of indigenous constituencies for change, which have a greater likelihood of sustaining momentum toward results than expatriate-led or -dominated efforts.

The delegation of provision of cotton pest control services to the private sector strongly exemplifies APRP's approach and its success in forging supportive constituencies in both the public and private sectors, and at the central and governorate levels. APRP's constituency-building with the private sector demonstrates a reform strategy that recognizes the power of demand-driven pressure for change from outside of government. In the case of cotton pest management, APRP facilitated the mobilization of the voices of farmers, EATSAP, and Crop Life Egypt to push MALR at various levels, central, governorate, and village, to open pest management to private sector actors.

The budgetary resources associated with the achievement of the various benchmarks for each APRP tranche obviously represent one critical illustration of *resource accumulation*. However, the GOE has also contributed significant financial resources beyond those provided by USAID's budget support to fund the various pilot activities undertaken by the program. Thus, the financial resources accumulated to implement APRP-induced reforms constitute a mix of USAID and Egyptian government funds.

As mentioned above, financial resources are not the only kind required to move forward with implementation. Getting the right people and organizations on board with appropriate skills, from both the public and private sectors, is necessary, too. APRP's work on reorienting agricultural research and extension is a good example of this implementation step.

A major component of APRP's technical assistance addressed *organization design and modification*. Shifting government agencies' roles away from direct service delivery and administrative control of markets and toward provision of a competition-enhancing regulatory framework and of agricultural export support has entailed important changes in agencies' objectives, operating procedures, structures, and staff behaviors. Examples reviewed in this chapter demonstrate either helping existing organizations to rethink their mandates, restructure their operations, and retool their staff; or forming new organizations to take on new functions. In the former category, APRP worked with numerous units of MALR at multiple levels and with affiliated agencies, plus other ministries such as MWRI, MFT, and MTS. In the latter category, APRP assisted in the creation of the ACC and the start-up of ESAS.

APRP assistance on the technical side has consisted of analysis and systems design; for example, the irrigation water supply information system that MWRI and MALR are now using to reduce the mismatch between farmers' irrigation

needs and water releases from the Aswan Dam.[9] Another example of analytic support to organization design and modification are the numerous RDI *Policy Briefs* that elaborate organizational issues, detail necessary procedural and structural changes, and offer recommendations (e.g., Nasser, 1998; RDI, 1999b and 2000). These *Policy Briefs* have been widely disseminated among public and private sector stakeholders in agriculture sector reforms. APRP's process support has been equally important in providing the organization development activities to help public and private sector actors engage in new behaviors and work together in cooperative partnerships rather than in state-dominated hierarchies.

With regard to *mobilizing resources and actions,* APRP's extensive facilitation of consensus-building, strategy development, and action planning reveals the important role it has played in getting stakeholders to plan and carry out concrete implementation activities. Egyptian reform implementation teams—with APRP facilitation, encouragement, and coaching—have used pilot tests and demonstration projects to show early successes, refine reform models, and build confidence. All of these efforts have served to move implementation forward. The impressive numbers of stakeholders assembled in APRP-facilitated workshops for cotton pest management attest to the attention APRP paid to mobilizing resources and action to make implementation progress on the various associated benchmarks. APRP's capacity-building has used these workshops and planning meetings to model new behaviors and interaction patterns for all stakeholders, and has created a cadre of Egyptians skilled in designing and managing such workshops and meetings. At the level of individual organizations, APRP also helped with resource and action mobilization. This is exemplified in APRP's work with trade associations and the ACC (see, for example, Gormley, 2000; Gormley and Khattab, 1999a and 1999b; and McCoy, 2000).

Monitoring implementation progress is built into the rationale and structure of APRP as a series of performance-based budget support tranches. APRP was an important partner in demonstrating the importance of monitoring to Egyptian reform implementors. The need for monitoring and making adjustments to implementation plans is linked to the strategy of using pilots and demonstrations to make progress on liberalization and privatization. Thus, for example, APRP built monitoring systems and review workshops into the implementation efforts it has supported in cotton pest management and reorientation of research and extension services. Another important APRP contribution has been in helping public-sector actors expand the use of evidence-based policymaking. This was illustrated, for example, by APRP's assistance to MALR in improving agricultural information and statistics (e.g., Gleason and Hussein, 1999; Holtzman et al., 2000; Krenz et al., 2001; see also Ehrich and Morsy, 2002).

Further, APRP advanced the role of the private sector in policy implementation monitoring as part of private/public policy dialogue, and increased government transparency and accountability. Private sector actors participated in APRP policy studies and workshops to review experience and results, and to provide input into

refining current policies being implemented and into the formulation of the ongoing agricultural policy reform agenda. In terms of the iterative cycle of policy implementation steps, participation in policy monitoring reinforces the legitimacy of the policy measures being implemented and contributes to maintaining and/or expanding constituencies for change. A good example comes from the cotton pest management effort. The participation of EATSAP and Crop Life Egypt in policy monitoring through self-regulation (the code of ethics) has served both to reinforce the legitimacy of private sector involvement in pest control and to reassure the various stakeholders of the desirability of the change.

Lessons Learned and Conclusions

Since 1996, APRP-supported policy reforms have addressed a wide array of policy issues related to liberalization and privatization of the agricultural sector. These reforms have been the subject of numerous benchmarks associated with the APRP tranches. We selected a small sub-set of those benchmarks for scrutiny regarding how they, and the APRP-supported activities undertaken to achieve them, contributed to changes in the roles fulfilled by public and private sector actors. Earlier sections of this chapter have offered assessments of APRP activities in support of these role changes, examining delegation of functions to the private sector, public and private sector capacity-building, private sector participation in policy, and the steps in policy implementation. An overall picture emerges of positive and significant impacts of APRP technical and process assistance on all of the benchmarks reviewed.

Benchmarks with clearly visible benefits include:

- State withdrawal from cotton pest management
- Promotion of trade associations
- Effective use of irrigation system information

A benchmark where some initial benefits have emerged or where there is high potential for future benefits is in the promotion of private sector participation in policymaking.

Lessons Learned. This section does not repeat or try to summarize this chapter's assessments in detail. Rather, it makes some observations and lessons on policy reform.

1. In liberalized, export-oriented economies, the public and private sectors must work together in ways that take advantage of their distinctive competencies and capacities. As the GOE liberalizes and delegates economic activities to the private sector, the potential for partnerships increases. Initiating partnerships depends on a minimum level of trust between the parties involved, as Tyner (1999) points out, and as this study confirmed. Maximizing this potential requires developing shared objectives, jointly

deciding on roles and responsibilities, and following through on agreed actions. APRP served critical functions in making delegation to the private sector and partnerships happen; these include confidence- and trust-building, serving as a neutral broker, modeling new consultative behaviors, facilitating new interaction patterns, and building capacity. The effective fulfillment of these functions clearly contributed to the success of public-private partnerships in cotton pest management and research and extension services.

2. Policy projects can serve as an important impetus for initiating change, and through their budget support as a pivotal motivator for pursuing reform. APRP contained a set of goals and objectives that laid out guideposts for reform, and were used as a means to focus policy dialogue and to exert pressure for change. The benchmarks, and their associated indicators were the specific performance standards for reform. Ideally, the consultative process of developing benchmarks or of undertaking studies that led to benchmarks helped to create legitimacy for the reform measures and to build consensus. In practice, this pre-benchmark consensus-building was sometimes truncated. APRP's technical and process assistance often had to use the benchmarks as "rallying points" to mobilize policy champions and to stimulate progress after senior officials had already signed off on them.

3. The GOE's gradualist policy implementation strategy has led to a series of short-term successes. The positive elements of incremental reform are that where it can be easier to deal with stakeholder opposition, effects can be tracked over time and mid-course corrections made, and action plans fine-tuned. However, the gradualist strategy has posed some problems for APRP teams seeking to help build constituencies and consensus because gradualism also conveys ambivalence and hesitation, which calls into question credibility and commitment.[10] Some stakeholders have doubts that the Government is sincere about reform, and thus are not sure they want to be involved. For example, among the private horticulture exporters interviewed for another of APRP's impact studies, as well as several of this team's private sector interviews, skepticism and cynicism were expressed about the Government's intentions in regard to supporting the private sector. To achieve long-term results in Egypt, reformers and their donor partners need to "stay the course."

4. Working on the demand side of policy reform is critical to getting results. APRP's experience confirms the importance of demand-creation among stakeholders outside of government, a lesson from policy change in other countries and sectors (Brinkerhoff and Crosby, 2002). While building public sector capacity and supporting government change agents is important, government commitment and ability to supply reform is significantly enhanced when reforms are backed by pressure from the private sector and civil society. This effect is analogous to the economic principle of demand-pull leading to increased supply. APRP's collaboration with, and support to, HEIA, ESAS, ACC, EATSAP, and Crop Life Egypt have been valuable in

moving forward with the role shifts reviewed in this study, a point made by many interviewees.

5. A corollary to the previous lesson is that private sector demand-making capacity is not always used in support of the intended agendas of donor-supported reforms. The example of the ACC's Rice Subcommittee lobbying for a rice export subsidy demonstrates this point. APRP's reform agenda takes a firm stand against subsidies, yet within Egypt's private sector, there are many actors who want government to do more than simply provide the "level playing field" for economic competition, along with market and economic statistics. Donor-supported technical assistance can make suggestions and demonstrate arguments to their counterparts in favor of particular policies, but cannot force their acceptance and still maintain a collaborative and facilitative relationship with indigenous leadership for change. This lesson highlights the need for donors to maintain commitment for the long-term, even when host-country constituents make policy choices they do not necessarily agree with.

6. Scaling up the pilots in the various APRP policy areas related to public and private sector role changes (cotton pest management, reorientation of research and extension services) will be critical to generating intended program impacts. APRP support has succeeded in launching demonstration efforts that have helped the public sector to shed functions and the private sector to take those functions over, and to help both sectors work together effectively as partners. However, scaling up to cover the entire country will face a number of key challenges. First will be the resources to facilitate the expansion. With APRP coming to a close, MALR and its private sector partners will not have access to ongoing technical and process assistance. While the various stakeholders have some capacity to carry forward on their own, existing capacity is not deep enough to support scaling up without further outside help. Second, nationwide expansion will confront political factors that are likely to constrain implementation. For example, most of these reforms will, if fully implemented, lead to public sector downsizing and staff layoffs. It is well known that Egypt's state bureaucracy is overstaffed. However, historically, the GOE has been reluctant to downsize (Weiss and Wurzel, 1998), and given the current economic downturn, that reluctance has, if anything, increased. Thus, interest group politics, whose effects can to some extent be mitigated in smaller pilot tests, will necessarily emerge more forcefully as reforms are scaled up.

Implications for Future USAID Programming. This section offers thoughts on implications for future USAID and other donor programming.

1. Because policy reform is an inherently political process, USAID should pay attention to the interest group dynamics that shape policies and institutions. Various groups will seek to influence them in ways that will serve their

interests. Collier (2002), writing about "making aid smart," argues that donors have two avenues for intervention. First, they can undertake actions to change the beliefs of stakeholders about what policies and institutions best serve their interests. Second, they can seek to make marginal changes in the balance of influences among groups.

2. Regarding changing stakeholders' views and beliefs, one important intervention is to strengthen indigenous capacity to analyze policy issues. APRP did this successfully in its work with business associations, which should be continued under future reform programs. Beyond business associations, private or university-based think tanks could be included to stimulate provision of independent, external sources of agricultural policy analysis expertise. For example, USAID/Cairo has supported the Egyptian Center for Economic Studies (ECES) to do analyses of macroeconomic and trade policies. Egyptian universities as institutions have limited analytical capacity, though in certain cases individual faculty members have the relevant skills. Universities follow a research and consulting model, however, which means that professors have few incentives to bring grants and contracts to their departments, and prefer to take on assignments as individuals. Thus, the most feasible approach may be to encourage business associations to hire outside expertise in situations where their own internal analytical capacity is insufficient.

3. Regarding shifting the relative power of various stakeholders, continued strengthening of business associations and cooperatives should be envisioned. This further encourages the demand-pull approach to reform implementation. In the future, USAID should consider ways to expand trade association membership beyond the "big boys" in the Egyptian private sector, so that the interests of smaller exporters and producers can be represented in policy dialogues and decisions. Some associations have smaller members, but the major associations are dominated by their larger, wealthier members. There may be something of a trade-off here in that the larger members have more clout with government decision-makers, so it may in fact be the case that smaller members are content to allow the "big boys" to take the lead in exchange for having some but not all of their interests addressed.

4. The neutral facilitator/broker role played by APRP process assistance was important for reform implementation. It can significantly lower the transaction costs of change, both for public and private stakeholders, and contributes to achieving desired outcomes. Future USAID reform programs should retain this kind of assistance in conjunction with providing technical and analytical expertise.

5. In each of the policy areas examined in this chapter, interviewees pointed out the long-term nature of the changes that APRP supported. Particularly given the starting point in Egypt, with its long history of state-led and -dominated

economic and governance patterns, the role shifts involved in liberalization and privatization call for extensive reorientation and transformation. While some of the gradualism can be attributed to government-donor gamesmanship, entrenched interests and attitudes, along with lack of sufficient capacity, are also factors. The implication for USAID is that assistance in support of reform will necessarily need to be long-term as well.

6. While long-term investment in support of policy reform may be called for, targeted interventions will help to make that investment effective. The suggestions made regarding support to business associations and policy analysis expertise represent a couple of possible targets for the future. Within the public sector, agencies that are bottlenecks to progress could be targeted. For example, interviewees for the horticulture export study (Lamb and Gribi, 2002) indicated that the customs agency is a major source of impediments and rent-seeking for exporters. Customs reform could be an important target for supporting continued agricultural liberalization and privatization policy goals.

References

Agricultural Research Center. *Objectives, Achievements, Current Activities, Future Prospects.* Agricultural Research Center. Cairo, MALR. 1998.

Bingen, R. James and Derick W. Brinkerhoff. *Agricultural Research in Africa and the Sustainable Financing Initiative: Review, Lessons and Proposed Next Steps.* Technical Paper No. 112. Washington, DC: U.S. Agency for International Development, Bureau for Africa, Office of Sustainable Development. August 2000.

Brinkerhoff, Derick W. Process Perspectives on Policy Change: Highlighting Implementation. *World Development* 24(9): 1395-1403. 1996.

Brinkerhoff, Derick W., and Benjamin L. Crosby. *Managing Policy Reform: Concepts and Tools for Decision-Makers in Developing and Transitioning Countries.* Bloomfield, CT: Kumarian Press. 2002.

Brinkerhoff, Derick W., John S. Holtzman, Adel Mostafa, and Nabil Habashi. *The Impact of APRP on the Roles of the Public and Private Sectors in Egyptian Agriculture.* Cairo: APRP/MVE Unit, Impact Assessment Report No. 20, June 2002.

Carney, Diana. *Changing Public and Private Roles in Agricultural Service Provision.* London: Overseas Development Institute, Natural Resources Group. 1998.

Collier, Paul. *Making Aid Smart: Institutional Incentives facing Donor Organizations and their Implications for Aid Effectiveness.* Washington, DC: U.S. Agency for International Development, Forum Series on the Role of Institutions in Promoting Economic Growth, Forum No. 2: The Institutional Economics Approach to Aid Effectiveness, February 25, 2002.

Delouche, James C. *Egyptian Seed Association (ESAS) Mission, Agenda and Services.* Cairo: APRP/RDI Unit, Report No. 49, November 1998.

Ehrich, Rollo and Morsy A. Fawzi. *The Impact of APRP on the Egyptian Agricultural Information System.* Cairo: APRP/MVE Unit, Impact Assessment Report No. 23. July 2002.

El-Fattal, Lamia, Anthony Treen, Samir Shehata, and Tarek Mourad Fahmy. *Cotton Pest Management: Transferring Responsibilities from MALR to Farmers, Cooperatives and Other Private Sector Providers.* Cairo: APRP/RDI Unit, Report No. 136, June 2001.

El-Zanaty and Associates. *Knowledge, Attitudes and Practices of Egyptian Farmers towards Water Resources.* Cairo: Ministry of Public Works and Water Resources, Water Communication Unit, GreenCom Egypt III, and APRP, October 1998.

Fletcher, Lehman D., ed. *Egypt's Agriculture in a Reform Era.* Ames, IA: Iowa State University Press. 1996.

Gisselquist, David, Mohamed Zaki Gomaa, and Lawrence Kent. *Assisting the Egyptian Seed Association to Design and Introduce a Code of Ethics and Supporting Trade and Arbitration Rules.* Cairo: APRP/RDI Unit, Report No. 85, November 1999.

Gleason, Jane and Sayed Hussein. *Study on the Cost of Production and Farm Income Data for the 1997-98 Agricultural Season.* Vol. 1. Cairo: MALR, Economic Affairs Sector and APRP/RDI Unit, Report No. 89, December 1999.

Gormley, Wilma. *Development of Leadership Strategies Workshop for Commodity Councils and Development of Workshop on Strategic Thinking and Planning for Commercial Representation Sector, Ministry of Economy and Foreign Trade.* Cairo: APRP/RDI Unit, Report No. 111, June 2000.

Gormley, Wilma and Fatma Khattab. *Agricultural Commodity Council: Report on APRP/RDI Organizational Development Assistance.* Cairo: APRP/RDI Unit, Report No. 83, November 1999a.

Gormley, Wilma and Fatma Khattab. *Strengthening Associations: Facilitator Guidelines for Conducting Workshops.* Cairo: RDI, RDI Policy Brief No. 17, September 1999b.

Grindle, Merilee S., ed. *Getting Good Government: Capacity Building in the Public Sectors of Developing Countries.* Cambridge: Harvard Institute for International Development. 1997.

Harik, Iliya. *Economic Policy Reform in Egypt*. Cairo: American University in Cairo Press. 1998.

Hindi, Zidan and Anthony J. Treen. *Liberalization of Pest Management Service: Overall Reform Strategy.* Cairo: RDI, RDI Policy Brief No. 9, November 1998.

Hirschman, Albert O. *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States.* Cambridge: Harvard University Press. 1970.

Holtzman, John S. *Liberalization and Privatization of Key Subsectors in Egypt's Agricultural Economy: Progress and Challenges.* Cairo: APRP/MVE Unit, Impact Assessment Report No. 14, November 2000.

Holtzman, John S., Adel Mostafa, Ezz El Din, Abdel Kader, Nabil El Santricy, and Sherif Fayyad. *The Impact of Privatization and Policy Reform on the Cotton Spinning Industry in Egypt.* Cairo: APRP/MVE Unit, Impact Assessment Report No. 15, November 2000.

Humpal, Donald S. *Financial Planning Consultancy to the Egyptian Seed Association—ESAS.* Cairo: APRP/RDI Unit, Report No. 50, November 1998.

Ibrahim, Saad Eddin and Hans Lofgren. "Successful Adjustment and Declining Governance? The Case of Egypt," in *Governance, Leadership, and Communication: Building Constituencies for Economic Reform*, eds. Leila Frishtak and Izak Atiyas. Washington, DC: World Bank, pp. 159-205. 1996.

Khedr, Hassan, Rollo Ehrich, and Lehman B. Fletcher. "Nature, Rationale, and Accomplishment of the Agricultural Policy Reforms, 1987-1994," in *Egypt's Agriculture in a Reform Era*, ed. Lehman D. Fletcher. Ames, IA: Iowa State University Press, pp. 51-84. 1996.

Krenz, Ronald D., John S. Holtzman, Adel Mostafa, and Mohamed Abu El Wafa. *Policy Lessons from the 2000/2001 Cotton Marketing Season in Egypt.* Cairo: APRP/MVE Unit, Impact Assessment Report No. 17, July 2001.

Lamb, John and Noubia Gribi. *The Impact on Horticultural Exports of Policy Reforms Under APRP.* Cairo: APRP/MVE Unit, Impact Assessment Report No. 22, July 2002.

McCoy, Steven A. *Agricultural Commodity Councils: Future Steps.* Cairo: APRP/RDI Unit, Report No. 95, January 2000.

MVE (Monitoring, Verification, and Evaluation Unit). *Benchmark Background Document: Tranche V.* Cairo: APRP/MVE Unit, February 2001a.

MVE. *Effects of Policy Reform Under APRP: Progress Indicators, 1999/2000.* Cairo: APRP/MVE Unit, April 2001b.

Nasser, Kamal. *Efficient and Strong Institutions for Agribusiness and Agricultural Development.* Cairo: APRP/RDI Unit, RDI Policy Brief No. 8, September 1998.

Oteifa, Bakir, Zidan Hindi, Salwa Dogheim. *Analytical Review of Pesticide Laws and Regulations in Egypt.* Cairo: APRP/RDI Unit, Report No. 70, June 1999.

RDI (Reform Design and Implementation Unit). *Agriculture: Vision for 2003.* Cairo: Author, RDI Policy Brief No. 12, February 1999a.

RDI. *Rural Organizations in Egypt.* Cairo: RDI Unit – APRP, RDI Policy Brief No. 18, September 1999b.

RDI. *Cotton Pest Management Services: Shifting Responsibilities from MALR to Farmers, Cooperatives and Other Private Sector Providers.* Cairo: RDI Unit – APRP, RDI Policy Brief No. 21, June 2000.

RDI. *Matching Irrigation Supply and Demand: Solving Water Delivery Problems in a Liberalized Agricultural Economy.* Cairo: RDI Unit – APRP, RDI Policy Brief No. 25, December 2001a.

RDI. *New Directions for Research and Extension.* Cairo: RDI Unit – APRP, RDI Newsletter, vol. 4, no. 4, pp. 1-6. December 2001b.

Spector, Bertram. *Negotiated Rulemaking: A Participative Approach to Consensus-Building for Regulatory Development and Implementation.* Washington, DC: U.S. Agency for International Development, Center for Democracy and Governance. Implementing Policy Change Project, Technical Note No. 10, May 1999.

Tyner, Wallace E. *Suggestions for the Agricultural Policy Reform Project in Egypt.* Cairo: APRP/RDI Unit, Report No. 67, April 1999.

Weiss, Dieter and Ulrich Wurzel. *The Economics and Politics of Transition to an Open Market Economy: Egypt.* Paris: Organization for Economic Co-operation and Development, Development Center. 1998.

World Bank. *Arab Republic of Egypt. Toward Agricultural Competitiveness in the 21st Century: An Agricultural Export-Oriented Strategy.* Washington, DC: Middle East and North Africa Region, Report No. 23405-EGT, December 2001.

World Bank. *World Development Report 2002: Building Institutions for Markets.* Washington, DC. 2002.

Endnotes

[1] ERSAP reduced producer and consumer subsidies, deregulated interest rates, unified exchange rates, lowered fiscal deficits and cut the money supply, encouraged more economic liberalization, and initiated public enterprise restructuring.

[2] The economist, Albert Hirschman, defines voice as "any attempt at all to change…an objectionable state of affairs, whether through individual or collective petition to the management directly in charge, through appeal to a higher authority with the intention of forcing a change in management, or through various types of actions and protests, including those that are meant to mobilize public opinion" (Hirschman 1970: 30).

[3] The pilot test program grew out of the planning for how to meet APRP tranche IV Benchmark D6.

[4] The manual includes: registration and licensing requirements, initial and renewal; testing protocols and associated technical standards; approval, registration, customs clearance, and certificate of analysis forms; and rules governing pesticide stores and shops.

[5] HEIA was established as a result of another USAID-funded project, the ATUT. ESAS and EAGA have both received capacity-building support from APRP.

[6] Government practice was to name individuals as ACC members, with a mention of their firm affiliations in the nominating decree, with an implicit understanding of which associations they would represent. The APRP benchmark sought to replace individuals with associations in the decree; then it would be up to the association members to select the individual to represent them.

[7] APRP/MVE estimates that the cost of this subsidy program was approximately $20 million, though it led to record rice export revenues of $159 million (with the previous high being $130 million in 1997/98).

[8] The discussion here draws from USAID's Implementing Policy Change Project (1990-2001), which provided analytic and technical assistance in managing policy reform in over 40 countries. IPC's experience, lessons, and tools are assembled in Brinkerhoff and Crosby (2002).

[9] This type of organization design assistance has been a very significant contributor to APRP impacts. Other examples of APRP support to information systems can be found in Ehrich (2001).

[10] A complicating factor in sorting out commitment from capacity constraints is the Egyptian public bureaucracy, which, through its widely recognized cumbersome procedures and administrative lethargies, contributes to sluggish reform implementation. Thus telling the difference between intentional hindrance and system inefficiency can sometimes be difficult.

V Agricultural Growth, SMEs and Employment

This section takes the broadest view of all. The purpose of the chapters in this section is not to evaluate directly the actual impact of APRP. Rather it is to shed light on the potential impact of rapid agricultural growth and the mechanisms through which it could bring about increases in employment, particularly in rural areas. Thus, they discuss the potential impact of any program like APRP that assists the agricultural sector to increase its rate of growth. In rural areas, small and micro enterprises (SMEs) play a key role in employment generation, since there are few larger enterprises in rural areas. SMEs might be a logical stepping stone from employment in agriculture toward work in a larger enterprise, either in an SME that grows or in another larger enterprise. Chapter 18, using the results of survey data, discusses the possibilities for this mechanism to function and the extent to which agricultural growth could jump-start this process. Chapter 17 provides the conceptual framework at the national level for this work, discussing the development of a simplified, three-sector model for the Egyptian economy that reveals the importance of agricultural growth in generating employment and, thereby, reducing poverty. A key notion is that the products of rural SMEs are non-tradable, i.e., they are currently not exportable.

17 The Effect of Agricultural Growth on Employment in Egypt: A Three-Sector Model[1]

John W. Mellor and Chandrashekhar Ranade

A three-sector model is constructed that allows focus on the key elements of the relation between the structure of growth and change in the demand for, and hence in the income of, low-income labor. The model has three sectors: Agriculture (which is tradable), Urban Tradable (the bulk of large-scale urban enterprise), and Non-Tradable. The first two sectors can sell in international markets and hence do not face declining prices as output is increased. The third sector depends entirely on domestic demand. Employment is largely in the non-tradable sector, although its share of GDP is modest. Thus, GDP growth depends largely on the ability to expand production in the tradable sectors, while employment growth depends largely on increases in (domestic) demand for non-tradables. With high balanced growth, that is, with both the agricultural sector and the urban tradable sector growing quickly, the demand for labor increases rapidly. If urban tradable growth is maintained at a high level, but agriculture does not grow at all, then the demand for labor grows only slightly, if at all, faster than the labor force, and wage rates and the income of the labor class rise hardly at all. In contrast, if the basic source of urban tradable growth is eliminated but agricultural growth is maintained, the urban tradable sector grows slowly, the GDP growth rate slows markedly, but the demand for labor slows very little. The purpose of this comparison is to show explicitly that it is agricultural growth that drives the demand for labor. Concisely, the structure of growth makes a tremendous difference. Agricultural growth increases the income of labor through its impact on the demand for the goods and services of the rural non-tradable sector. It should also be noted that in a model of this type, factors of production move readily across the economy in response to relative prices, and goods move readily into the export market when domestic production grows faster than domestic demand. In practice, policies must be in place to not impede, and indeed to positively facilitate, those flows.

Increasing employment rapidly enough to absorb labor force growth, large-scale labor redundancy in the public sector, and substantial unemployed and underemployed labor is generally viewed as the most critical economic problem facing Egypt. However that problem is defined, the solution is rapid acceleration in growth in the demand for labor. As shown below, 62 percent of the labor force

is in the employment-intensive, small-scale, non-tradable sector. Two-thirds of those are in the rural non-tradable sector, another 23 percent is in agriculture, and only 15 percent of the labor force is in the urban tradable sector.

No achievable growth rate in the urban tradable sector can solve the employment problem in the short to intermediate term. Indeed, it would seem impossible to solve the employment problem in the near term without substantial growth in the employment-dominant non-tradable sector. By definition, demand for increased output in the non-tradable sector must come from increased domestic expenditure. The following discussion shows that agriculture is potentially the dominant source of such expenditure. Thus, it is agriculture and non-tradables that must provide the solution for this important problem in the short and intermediate terms. This paper provides a three-sector model that clarifies the processes by which that may occur.

The agricultural growth rate can accelerate substantially as agricultural technology advances, policies improve, and institutions develop. The subject of this chapter is the differential impact of acceleration in the agricultural growth rate on Gross Domestic Product (GDP) and the demand for labor. The chapter first describes the employment and GDP composition of the urban and rural sectors and the tradable and non-tradable subsectors within each. These are then summed into two tradable sectors, agriculture and urban, and one non-tradable sector. Data are then presented on the quite different factor shares in the production of each sector as well as the very different average and marginal expenditure patterns of the recipients of the various factor shares. Focus is on the differences in expenditure on the non-tradable sector. Those are the data required to analyze the differential impacts that growth in the agricultural and urban tradable sectors have on the demand for labor.

Economic development is described as a process of transforming an economy from largely non-tradable to largely tradable. In the early stages of the transformation, the bulk of the poor are in the non-tradable sector. Thus, poverty reduction, demand for labor, and income distribution are largely determined by growth in domestic demand for the output of that sector. It is shown that agriculture is the primary source of such growth in demand and that the urban tradable sector is far less important in that respect.

The model presented in this chapter is based on neoclassical assumptions. That is, that markets work and provide optimal allocation of resources, that all resources are fully employed, that knowledge is perfect, and that adjustments to changes in prices and resource quantity are instantaneous. It should be noted that while the principal economic problem of Egypt is conveniently described as one of unemployment, the reality is somewhat different. In fact, only a small percentage of the labor force is actually unemployed. The problem is actually more general; that is, the low income of those whose income comes primarily from labor, particularly in occupations that demand only unskilled or semi-skilled labor. The labor market will tend to pay a higher wage in the more capital-intensive urban tradable sector than in the non-tradable sector, partly because the higher skills that

are demanded and partly to ensure stability of the labor force in view of the high cost of capital and the consequent high cost of idle capital. Nevertheless, the wage levels in the various sectors are linked. Thus, the economic problem of the low income of the laboring class is one of increasing the demand for labor more rapidly than the supply, with a consequent increase in the wage rate. An increase in the wage rate measures the improvement in the incomes of laboring people.

While numerous studies show that economic growth reduces poverty, a substantial subset of such studies show that the structure of the growth is important to poverty reduction. Recently there has been an international focus on absolute poverty. However, lifting large numbers of people out of poverty will occur only by increasing the real incomes of those who earn their income largely from their labor. Thus, reducing poverty is roughly synonymous with increasing the multiplicand of the amount of employment and the wage rate.

Early analysis by Ahluwalia (1978) and by Mellor and Desai (1985) shows that fluctuations in poverty in India were largely explained by fluctuations in the agricultural growth rate. Recent work analyzed the relation between sectoral growth rates and poverty reduction over time and across geographic regions. Timmer (1997) shows that 85 percent of poverty reduction is attributable to agricultural growth. Ravallion and Datt (1996) show that rural growth and agricultural growth have a far greater impact on poverty reduction than does urban, industrial, or large-scale tertiary growth. These same studies show that there is a lag in reduction of poverty from agricultural growth and that the impact on poverty of agricultural growth in the context of highly skewed land distribution is weak. The model presented in this chapter reconciles those findings.

Model Conceptualization

A three-sector model has been constructed that demonstrates that growth in the agricultural tradable sector and growth in the urban tradable sector have quite different impacts on the employment-intensive, non-tradable sector. Demand for output from the two tradable sectors is not constrained by national income. They can export what is not consumed domestically. For those sectors, production is determined by the factors of production, land, labor, and capital, and by technological change. The third, non-tradable sector, has growth constrained by domestic demand from expenditure by the two tradable sectors. It cannot export because of low quality and high transaction costs. Since the bulk of employment is in the non-tradable sector, the determinants of demand for the output of that sector is the prime determinant of growth in the demand for labor, of wage rates, and, hence, of income of the laboring class.

The production functions for the three sectors are very different:

- Land is important to agricultural production, and because of a constraint in its supply, technological change is a major source of agricultural growth. Labor is also important.

- Urban tradables do not use land, capital is dominant, and labor is of modest importance.
- The non-tradable sector is simplified to use only labor in its production.
- Income to labor, all labor in the three sectors, is the primary source of demand for the non-tradable sector.
- Income to land accrues largely to farmers of modest income and that income is spent the same as income to labor. One could assume that expenditure pattern of land income was quite different from the expenditure pattern of labor. For example, where it accrues to absentee landlords, it could be assumed to be spent like returns to capital. That would be consistent with data that show that when land is highly unequally distributed agricultural growth has little impact on poverty (Timmer, 1997).
- Income to capital is assumed to be entirely spent on tradables.
- Not all wage payments are considered as a return to labor. That portion of wage payments in excess of that of farmworkers is classified as capital (human capital) and is spent on tradables.

Thus, the relevance of the model hinges on: (1) a large, dominantly rural, non-tradable sector that has a high factor share to labor and represents a major share of total employment; (2) a tradable agriculture sector that spends a high proportion of its income on non-tradables; and (3) a tradable urban sector that has a low factor share to labor that is in turn the only source of its expenditure on non-tradables.

Data Set for Egypt

Data are needed for the initial division of employment and GDP among the three sectors, factor shares for the three sectors, and, expenditure and price elasticities for non-tradables from the income of labor and land.

Employment. The Central Agency for Public Mobilization and Statistics (CAPMAS) 1998 Labor Force Survey categorized the labor force as urban and rural and within each by farm, establishment, non-establishment, government, and other. Rural includes large villages (effectively good-sized market towns) and their satellites, but not district headquarter towns, other towns of that size, and metropolitan centers. For the purposes of this paper it is an excellent definition because the larger villages are the main trading centers for rural areas and are relatively self-contained except for agricultural sales out of the village complex and purchases by merchants of goods from outside for local sales.

Table 17-1 presents the CAPMAS data in the first column of numbers and then divides the subsectors into non-tradable and tradable groups. Tradable refers to subsectors that can at the margin export; it does not mean that everything in the subsector is exported, only that incremental production can be exported at the international price. In practice this means that in anticipation of production growing faster than the domestic market, active steps can be taken to ensure that international quality and other standards are met. That requires entrepreneurial

action and institutional development. The paper assumes that such steps will be taken. In this context, all of agriculture is seen as tradable, but the caveats implied in the preceding are especially relevant to agricultural subsectors such as horticulture and livestock. To some extent the condition of tradability can be met by import displacement, for example, in the case of maize. It is assumed, per Table 17-1, that all enterprises of more than 50 employees, all public sector enterprises, and government administration in urban areas are tradable. Government administration is taken as tradable because of its complementary relation to tradable enterprise. This seems more logical than grouping it as non-tradable. Only 4 percent of the labor force falls in that category.

Non-tradable goods and services are those that are not exportable, for quality and transfer cost reasons. All the rural non-farm sector is classified as non-tradable. That sector includes a massive 43 percent of the total labor force. From the survey data analyzed by Gavian et al. (2002), none of the rural establishment firms (i.e., those with a fixed place of business) employed more than three persons. The sample size was adequate for representation of larger firms if they existed in greater than negligible numbers. It is notable that essentially all of their output is sold in the village structure. A high proportion of all enterprise in rural areas is service.

The classification of rural enterprise is justified. In the urban sector it could be argued that the division between tradable and non-tradable establishments should have been set at somewhat lower than 50 employees. Lowering that dividing point would add at most a percentage point or two to the tradable sector from the non-tradable sector.

The labor force data are summarized in Table 17-2, which also includes the data on GDP and factor shares to be discussed in succeeding sections.

GDP. No matter how important it may be for employment analysis, national income data are not kept according to tradable and non-tradable sectors, or even by size of firm. Thus, segmenting in this manner requires considerable extrapolation from existing data. The data for GDP are much less tractable for division according to the purposes of this paper than are the employment data, which fit well and, therefore, are quite reliable for this purpose. One of the purposes of this chapter is to show how important knowledge of both economic growth and employment growth data are and, thus, to encourage classification of data along those lines.

National income accounts (CAPMAS, 2001) provide the value added for agriculture: 17 percent of total GDP. The following estimating procedure provides a good estimate of the proportion of GDP in the rural non-farm sector. The International Food Policy Research Institute (IFPRI) Rural Household survey data for Egypt (Bouis et al., 1999) show that 43 percent of farmers' consumption expenditures are on non-food items. It is assumed that 90 percent of that is spent locally (consistent with Gavian et al., 2002). It is further assumed that 75 percent

Table 17-1. LABOR FORCE DATA (CAPMAS) AND SUBDIVISION INTO FOUR SECTORS, EGYPT, 1998

Sector	Labor Force (00s)	Total (%)	Non-Tradable (%)	Tradable (%)
Rural				
Farmers	47232	23		23
Government	24659	12	12	
Establishments	12059	6	6	
Outside Establishments	54119	25	25	
Other	519	*	*	
Subtotal	138588	66	43	23
Urban				
Government	30790	15		
Public Enterprises	(12360)	(6)		6
Public Services	(10270)	(5)	5	
Administration	(8160)	(4)		4
Establishments	24571	12		
Over 50 Employees	(10193)	(5)		5
Under 50 Employees	(14378)	(7)	7	
Outside Establishments	14233	7	7	
Other	883			
Subtotal	70477	34	19	15
Total	209065	100	62	38

Source: All data in first column of numbers, except those in parentheses, are directly from the CAPMAS 1998 Labor Force Sample Survey.

Notes:

[1] Urban Government is divided as follows: Public Enterprise as reported in Public Enterprise Statistics. Public Services is intended to represent the same set of public services, in large part education and health, as provided in rural areas and at the same per capita level, and is therefore calculated at 42 percent of the rural number for government services. The government administration number is the residual for government.

[2] Establishments are divided into those over 50 and those under 50 employees, according to surveys of manufacturing.

[3] Although 1.6 percent of the labor force is comprised of farmers in urban areas, they are summed into the rural area, since the impact of all agriculture is to be measured.

[4] Other is rounded to zero, since it is in each case less than 0.5 percent.

of output is marketed (slightly less than the figure in Gavian et al.); that the marketing margin is 23 percent; and that half of the average 23 percent marketing margin occurs in the rural non-farm sector. An arbitrary 1 percent of income is assumed as spent on local capital expenditures, such as major housing additions or farm improvements in irrigation. Consumer expenditure surveys do not include capital expenditure and so there are no data for this important item. The sum of these items totals 9 percent of GDP spent in the rural non-tradable sector. With a multiplier of two (consistent with a marginal propensity to spend within the rural non-farm sector of 0.5, which is roughly consistent with the IFPRI farm expenditure data), that comes to 18 percent of national GDP in the rural non-

tradable sector. Those data are consistent with data by Delgado et al. (1998) for Africa, and Hazell and Roell (1983) for Malaysia and Nigeria.

Table 17-2. EMPLOYMENT AND GDP SHARES AND FACTOR SHARES, EGYPT, 1998 (percent)

Sector	Employment Proportion	GDP Proportion	Labor Share	Capital Share	Land Share	Total Share
Rural						
Agriculture	23	17	55	10	35	100
Non-tradable	43	18	100	0	0	100
Subtotal	66	35				
Urban						
Tradable	15	57	10	90	0	100
Non-tradable	19	8	100	0	0	100
Subtotal	34	65				
Total	100	100				
Agriculture	23	17	55	10	35	100
Urban Tradable	15	57	10	90	0	100
Non-tradable	62	26	100	0	0	100
Total	100	100				

Sources: Labor force data from Table 17-1; GDP data calculated from national income statistics; factor shares are calculated from the employment and GDP shares, with non-tradable as the base.

The remaining 65 percent of GDP is urban and is to be divided between the urban tradable and non-tradable sectors. A calculation for the urban tradable sector is made similar to that for the rural tradable sector, as follows. The 8 percent of GDP in the urban non-tradable sector is consistent with 10 percent of output paid to labor (see the factor share discussion), an average propensity of labor to spend on urban non-tradables of 50 percent (roughly the same as farmers, plus 1 percent of the share of capital spent on non-tradables, primarily construction by small-scale suppliers and a multiplier of two). That calculation results in 8 percent of the urban GDP in the non-tradable sector and, therefore, 57 percent in the urban tradable sector.

The data are summarized into the three sectors at the bottom of Table 17-2. It is notable that agriculture has similar proportions of GDP and employment; urban tradable has nearly four times as high a share of GDP as of employment; and the non-tradable sector has nearly 2 ½ times as high a share of employment as of GDP. It is important to note that these numbers reflect the differences in capital per worker; they do not reflect differences in wage rates.

Factor Shares. The relative shares to labor and capital can be calculated from the relationship between employment proportion and GDP proportion, shown in Table 17-2. Gavian et al. (2002) show a negligible amount of capital in non-

establishment rural firms, and only a few thousand Pounds per worker in establishment firms. Consistent with Liedholm and Mead (1987) it is assumed that the bulk of that capital is a direct embodiment of labor and, therefore, is not separated from labor as a factor of production. That leaves the factor share in non-tradables entirely to labor. The factor shares for the other two sectors are relative to those for non-tradables (Table 17-2).

In the case of agriculture, the land and capital shares must be separated. The sum of the two as calculated above is 45 percent. The factor share for land is drawn from Morsy (2002). They are averages for several crops, and approximate 35 percent. Egyptian agricultural land has value only when irrigated. Thus, the land factor share covers land and associated water. The capital factor share at 10 percent is the residual between the 45 percent calculated for the two factors and the calculated share to land of 35 percent. Land is, of course, an important factor of production in agriculture and has a profound effect on both the sources of growth in agriculture and the expenditure patterns of agricultural income. Thus, the factor shares in agriculture are 55 percent labor, 10 percent capital, and 35 percent land. Summing the land and capital factor shares gives results that are the same as those arrived at from the employment and GDP proportions.

The factor shares for non-tradables of 90 percent to capital and 10 percent to labor may appear low with respect to labor. First, it should be noted that factor shares are quite different from physical capita labor ratios. Factor shares reflect the low wage rates of labor. Second, while some manufacturing may have much higher factor shares to labor, support industries such as electric power have much lower-than-average factor shares. Third, wage rates in the urban tradable sector are on the order of twice the wage rates of agricultural labor. That difference reflects human capital, which is part of the capital factor share, not the labor factor share.

Expenditures on Non-Tradables. The core of this model is expansion of the non-tradable sector, which dominates employment. By definition, expansion of the non-tradable sector depends on increased incomes of those who spend on non-tradables. The model has three sources of increased expenditure on the non-tradable sector: (1) farmer income, composed of the factor shares to labor and land in agriculture; (2) labor income in the tradable sector, which is small; and (3) labor income in the non-tradable sector, which can expand only if demand increases from the other two sources. On the latter point, although it seems difficult to grasp, the non-tradable sector cannot expand by spending on itself. There must be an outside source of funds spent on the sector. Then, from that increase in income, a substantial portion will be spent within the sector. That latter spending provides the multiplier on the outside source of spending. Thus, when Gavian et al. (2002) report that the non-tradable sector spends more in the non-tradable sector than in agriculture, that is correct (see also chapter 18). However, it is larger because the sector is larger than agriculture because of the elastic demand for its product from the agricultural sector. But, it is agriculture that provides the initial impetus for growth of the sector. Gavian et al. are simply reporting the statics of the situation.

It is assumed that all income to capital, in all sectors, including human capital, is spent only on tradable goods and services. Human capital is substantial in the urban tradable sector. As laborers' wage rates rise, and employment increases, expenditure on non-tradables increases, but not as return to human capital rises. That latter expenditure is allocated to tradable goods and services. Thus, all people consume non-tradables, and as wage rates rise they increase their consumption of non-tradables, even those with large components of human capital in their total income. But, those with human capital income increase expenditure on non-tradables only in proportion to the rise in the base income attributable to the pure labor part of their income. Farmers receive income from their labor and from land. It is assumed that both sources of income are spent in the same manner. (A different assumption about land income could be made, as explained at the beginning of the paper.)

Just as GDP data do not facilitate segregating the labor-intensive, non-tradable sector, similarly consumer expenditure data do not facilitate the same segregation. As the sectors are categorized in this analysis, farmers are the most important source of consumer expenditures for non-tradables. Rural survey data for Egypt, reported by Haddad and Ahmed (1999) and Bouis et al. (1999), allow a first approximation of those expenditures. Forty-three percent of rural expenditures is for non-food goods and services and the income elasticity of that expenditure is 1.8 (Bouis et al., 1999). In the modeling exercise, that elasticity is conservatively rounded down to 1.5. As shown below, the village complex with its market town is substantially self-contained, so essentially all of that expenditure is in the village and hence in the non-tradable sector (Gavian et al., 2002). We do not have an empirical estimate of the income elasticity of demand. We are assuming a low cross price elasticity between tradables and non-tradables (0.20), and based on that, the own price elasticity for non-tradables is –1.25.

It is assumed that urban laborers have similar expenditure patterns with respect to urban non-tradables. To the extent that urban laborers spend relatively more on tradables, that is balanced by expenditures from human and other forms of capital income on non-tradables. Again, a multiplier of two is assumed, consistent with the expenditure data.

There are transfer payments into and out of agriculture. Remittances, both from outside the country and from urban areas comprise about six percent of rural income (Adams, 1999.) Rents paid to absentee landowners are similar in size. Twenty percent of farmland is rented or a mixture of rented and owned (Morsy, 2002). Rent of one-third of the crop, consistent with previously cited data, would roughly balance the six percent inflow from remittances. Hence these flows are ignored in the model.

Village as Self-Contained Unit. One of the most important assumptions in this analysis of employment growth in the immense, labor-intensive, rural non-farm sector is the high (1.5) income elasticity of demand for rural non-farm goods and services. That high elasticity makes the sector dynamic—it grows faster than

agriculture. An early literature (e.g., Hymer and Resnick 1967) built on the opposite assumption that as farmers' incomes rose, farmers would be attracted to spend outside the rural areas on largely tradable commodities, and the rural non-tradables sector would quickly perish. If this were true, the employment problem would be virtually intractable since so much of base employment is in the rural non-tradable sector. The reality is that rural non –farm providers of goods and services adapt to changing circumstances, including rising incomes. All types of rural workers increase the quality of what they produce and adapt it to more modern tastes, the nature of services changes, and shops carry a quite different range of goods.

Survey data for Egypt show that at middle-income country levels of rural income and in close proximity to urban influences, the rural area, with its growing market town and satellite villages remains largely self-contained (Gavian et al., 2002). Farmers spend practically all of their income in the rural areas, rural non-farm businesses purchase the bulk of their inputs in the rural area, essentially all of their customers come from the rural area, and all of their work force comes from the rural area. Farmers spend little of their income in urban areas and urban people buy hardly at all in the rural areas. As a general observation, throughout low- and middle-income countries where agriculture prospers, whether it is the Punjab of India or the smallholder tea areas of Kenya, the rural market town is a vibrant expanding place (Mellor, 1992). Where agriculture is stagnant, the market towns are stagnant (Mellor, 1992).

Model Presentation

Sectors. The economy comprises three sectors: Tradable Agriculture Sector, Non-Tradable Sector, and Tradable Urban Sector. It is a small economy, which takes international prices as given and does not affect them.

The production in the Tradable Agricultural Sector is a Cobb-Douglas Production function with three inputs of production, as follows:

$$A = t_a K_a^{\alpha} L_a^{\beta} Z^{\gamma} \qquad (1)$$

Where A is the output of the sector; Z, K_a, and L_a are, respectively, land, capital and labor inputs; and α, β, and γ are parameters. The parameter t_a measures technological change in the agricultural sector.

The production in the Tradable Industries Sector is a Cobb-Douglas Production function with two inputs of production, as follows:

$$Q = t_q K_q^{\varphi} L_q^{1-\varphi} \qquad (2)$$

Where Q is the output of the sector; K_q and L_q are, respectively, capital and labor inputs; and φ is a parameter. t_q is a measure of technological change.

The output (NT) in the Non-Tradable Sector is assumed to be proportional to the labor input, as follows:

$$NT = \delta L_{nt} \qquad (3)$$

Where L_{nt} is the labor input and δ is a parameter.

K and L are, respectively, the total capital and the total labor inputs, exogenously given as follows:

$$L = L_a + L_q + L_{nt} \text{ and } K = K_a + K_q \qquad (4)$$

Market Equilibrium Conditions. The price of agricultural and industrial goods is determined in the international market. It is assumed that the four domestic markets in the economy are competitive and are as follows:

The labor market equilibrium is determined by differentiating Equations (1), (2), and (3) by L_a , L_q , and L_{nt}, and equating the marginal products of labor, respectively, as follows:

$$\beta P_a K_a^{\alpha} r_a^{(\beta-1)} Z^{\gamma} L^{(\beta-1)} = P_{nt}\delta = W \qquad (5)$$

and

$$\beta P_a K_a^{\alpha} r_a^{(\beta-1)} Z^{\gamma} L^{(\beta-1)} = (1-\varphi) P_q K_q^{\varphi} r_q^{-\varphi} L^{-\varphi} \qquad (6)$$

where $r_a = L_a/L$, $r_q = L_q/L$, P_a = price of agricultural goods, P_q = price of industrial goods, and P_{nt} = price of non-tradable.

Equation (5) shows that the wage rate is directly proportional to the price of non-tradables.

The capital market equilibrium is determined by differentiating Equations (1) and (3), and equating the marginal products of capital as follows:

$$\alpha P_a K_a^{\alpha-1} r_a^{\beta} Z^{\gamma} L^{\beta} = \varphi P_q K_q^{\varphi-1} r_q^{1-\varphi} L^{1-\varphi} \qquad (7)$$

The equilibrium in the non-tradable market is given by equating the supply of non-tradable goods and the demand for it by labor. Only laborers and farmers consume non-tradable goods. Note that in the agricultural sector the income of laborers is the sum of return from labor as well as land.

$NT = C_{nt}(L_a + L_q + L_{nt}) + C_{nt}(\gamma/\beta)\eta L_a = \delta L_{nt}$, that is

$$\delta r_{nt} = C_{nt}[1+(\gamma/\beta)\eta r_a] \qquad (8)$$

where

$r_{nt} = L_{nt}/L$, and C^{nt} is the consumption per laborer for non-tradable goods and it is a function of income and prices, as follows:

$(\delta C_{nt}/\delta W)(W/C_{nt}) = \eta$ = income elasticity of demand for non-tradable goods
$(\delta C_{nt}/\delta P_{nt})(P_{nt}/C_{nt}) = \varepsilon$ = price elasticity of demand for non-tradable goods

Note also that the second term in the right-hand side of Equation (8) is the additional consumption of non-tradables by the agricultural laborers (peasants) from the income from land.

As said above, the market for tradable agricultural and industrial goods is internationally determined, whereas the P_a and P_q are exogenously determined.

Comparative Statics. The above model is used to study the effects of various exogenous variables like the total capital stock and labor force, technological changes in the agriculture, industry**,** and non-tradables on endogenous variables such as K_a, K_q, r_a, r_q, r_{nt}, P_{nt}**,** and W. In order to do this we logarithmically differentiate Equations (5), (6), (7) **,** and (8) with various exogenous variables. Differentiating these equations with respect to the technological change in the agricultural sector t_a and after rearranging the terms we get:

$$\alpha(\delta K_a/\delta t_a)(t_a/K_a)+(\beta-1)(\delta r_a/\delta t_a)(t_a/r_a) -(\delta P_{nt}/\delta t_a)(t_a/P_{nt}) = -1 \quad (9)$$

$$[\alpha + \varphi(K_a/K_q)](\delta K_a/\delta t_a)(t_a/K_a) + (\beta- 1)(\delta r_a/\delta t_a)(t_a/r_a) +\varphi(\delta r_q/\delta t_a)(t_a/r_a) = -1 \quad (10)$$

$$[-(1-\alpha) - (1- \varphi)(K_a/K_q)](\delta K_a/\delta t_a)(t_a/K_a) +\beta(\delta r_a/\delta t_a)(t_a/r_a) – (1- \varphi)(\delta r_q/\delta t_a)(t_a/r_a) = -1 \quad (11)$$

$$-(r_a/r_{nt})(\delta r_a/\delta t_a)(t_a/r_a) –(r_q/r_{nt})(\delta r_q/\delta t_a)(t_a/r_a) -(\eta + \varepsilon)(\delta P_{nt}/\delta t_a)(t_a/P_{nt}) = 0 \quad (12)$$

The changes in K_q, W, and r_{nt} can be found by using the following equations:

$$(\delta K_q/\delta t_a)(t_a/K_q) = - (\delta K_a/\delta t_a)(t_a/K_a)(K_a/K_q) \quad (13)$$

$$(\delta W/\delta t_a)(t_a/W) = (\delta P_{nt}/\delta t_a)(t_a/P_{nt}) \quad (14)$$

$$\delta r_{nt}/\delta t_a = -\delta r_a/\delta t_a -\delta r_q/\delta t_a \quad (15)$$

The above equations can be solved simultaneously for the changes in seven endogenous variables, namely, K_a, K_q, r_a, r_q, r_{nt}, W, and P_{nt}, and the values can be found in terms of the parameters and exogenous variables. The set of solutions are the percentage changes in the values of endogenous variables with respect to the percentage changes, in different exogenous changes and are as follows:

Endogenous Variables	**Solutions**

Where

$$\Delta = (\eta+\varepsilon)\varphi(1-\alpha-\beta)+(\underline{r}_a/r_{nt})(\alpha-\varphi)-(r_q/r_{nt})[(1-\alpha-\beta)+((1-\varphi-\beta)(K_a/K_q)]$$

and

$$R= r_a(\gamma/\beta)\eta/[1+r_a(\gamma/\beta)\eta]$$

CHANGE IN CAPITAL STOCK (K)

K_a	$(r_q/r_{nt})(K/K_q)(-1+\varphi+\beta)/\Delta$
K_q	$K/K_q[1-(r_q/r_{nt})(K_a/K_q)(-1+\varphi+\beta)/\Delta]$
r_a	$-(r_q/r_{nt})(\alpha-\varphi)/\Delta$
r_q	$[(\eta+\varepsilon)(1-\alpha-\beta)\varphi(K/K_q)+(R/r_{nt})(\alpha-\varphi)/\Delta$
P_{nt}&W	$(r_q/r_{nt})\varphi(-1+\alpha+\beta)(K/K_q)/\Delta$
r_{nt}	$(\eta+\varepsilon)\varphi(r_q/r_{nt})(K/K_q)(-1+\alpha+\beta)/\Delta$

TECHNOLOGICAL CHANGE IN AGRICULTURE (t_a)

K_a	$[(\eta+\varepsilon)\varphi - R/r_{nt} - r_q/r_{nt}]/\Delta$
K_q	$-[(\eta+\varepsilon)\varphi - r_a/r_{nt} - r_q/r_{nt}](K_a/K_q)/\Delta$
r_a	$[(\eta+\varepsilon)\varphi - (r_q/r_{nt})(K/K_q)]/\Delta$
r_q	$-[(\eta+\varepsilon)\varphi(K_a/K_q) - (R/r_{nt})(K/K_q)]/\Delta$
P_{nt}&W	$-\varphi[(R/r_{nt}) - (r_q/r_{nt})(K_a/K_q)]/\Delta$
r_{nt}	$-(\eta+\varepsilon)\varphi[(R/r_{nt}) - (r_q/r_{nt})(K_a/K_q)]/\Delta$

TECHNOLOGICAL CHANGE IN URBAN TRADABLES (t_q)

K_a	$[(\eta+\varepsilon)(\beta-1)+R/r_{nt}+r_q/r_{nt}]/\Delta$
K_q	$-[(\eta+\varepsilon)(\beta-1)+R/r_{nt}+r_q/r_{nt}](K_a/K_q)/\Delta$
r_a	$-(\eta+\varepsilon)\alpha + (r_q/r_{nt})(K/K_q)/\Delta$
r_q	$\{(\eta+\varepsilon)[(1-\alpha-\beta)-(\beta-1)(K_a/K_q)]-(R/r_{nt})(K/K_q)\}/\Delta$
P_{nt}& W	$[(R/r_q)\alpha-(r_q/r_{nt})(1-\alpha-\beta)$ $+(\beta-1)(K_a/K_q)(r_q/r_{nt})]/\Delta$
r_{nt}	$(\eta+\varepsilon)[\alpha(R/r_q)-(1-\alpha-\beta)(r_q/r_{nt})+$ $(\beta-1)(K_a/K_q)(r_q/r_{nt})]/\Delta$

LABOR FORCE GROWTH (L)

K_a	$(1-\beta-\varphi)[(R/r_{nt})+(r_q/r_{nt})]]/\Delta$
r_a	$[-(n+\varepsilon)\varphi(1-\alpha-\beta)+(r_q/r_{nt})(1-\alpha-\beta)(K/K_q)]/\Delta$
r_q	$[-(R/r_{nt})(1-\alpha-\beta)(K/K_q)+(\eta+\varepsilon)\varphi(1-\alpha-\beta)]/\Delta$
P_{nt} & W	$[(R/r_{nt)+}(r_q/r_{nt})](1-\alpha-\beta)\varphi)/\Delta$
r_{nt}	$(n+\varepsilon)\varphi(1-\alpha-\beta)[(R/r_{nt})-(r_q/r_{nt})]/\Delta$

TECHNOLOGICAL CHANGE IN NON-TRADABLE SECTOR (δ)

K_a	$(1-\beta-\varphi)(1+\varepsilon)/\Delta$
r_a	$(1+\varepsilon)(\alpha-\varphi)/\Delta$
r_q	$(1+\varepsilon)[(-1+\alpha+\beta)+(\beta+\varphi-1)(K/K_q)]/\Delta$
P_{nt}	$\{-(R/r_{nt})(\alpha-\varphi)+(r_q/r_{nt})[(1-\alpha-\beta)+(1-\varphi-\beta)(K_a/K_q)]$ $-(1-\eta)\varphi(-1+\alpha+\beta)\}/\Delta$
r_{nt}	$\{-(1+\varepsilon)(\alpha-\varphi)(r_q/r_{nt})-$ $(R/r_{nt})(1+\varepsilon)[(-1+\alpha+\beta)+(\beta+\varphi-1)(K/K_q)]\}/\Delta$

$$W \qquad 1+\{-(R/r_{nt})(\alpha-\varphi)+(r_q/r_{nt})[(1-\alpha-\beta)+(1-\varphi-\beta)(K_a/K_q)] \\ -(1-\eta)\varphi(-1+\alpha+\beta)\}/\Delta$$

In order to study the impact of the exogenous variables on the endogenous variables over time we combine all of the changes in the exogenous variables. The period for such an analysis is 1 year. The growth rates of endogenous variables are given in percent per year and are derivatives with respect to time. They are estimated by using the growth rates of the exogenous variables in the combined equations. In the analysis, it is assumed that the parameters, such as the factor shares and the income and price elasticities, do not change.

Simulation Results. Five scenarios are presented using the foregoing model. The Base Case Scenario is to show the relationships from a high balanced growth rate, with rapid growth in both the agricultural sector and the urban tradable sector. All the other scenarios keep all the variables in the Base Case Scenario the same except for the one that is specified.

- Scenario II shows the impact of radically slowing the agricultural growth rate by eliminating technological change in agriculture, all else kept the same.
- Scenario III radically slows the urban tradable sectors' growth by reducing the capital formation rate to equal the labor force growth rate, all else kept the same.
- Scenario IV expands the labor force faster than the labor force growth rate by 5 percentage points, allowing for the rapid absorption of an unemployed labor force.
- Scenario V incorporates technological change in the non-tradable sector at a 4 percent rate. Since labor is the only factor of production in the non-tradable sector, increasing productivity by 4 percent has the same effect on output as if the labor input into the sector increased by 4 percent. In effect, that is analogous to expanding the labor supply only to the non-tradable sector. It is a variant of Scenario IV.

The key outputs from the five scenarios are presented in Table 17-3.

It must be remembered that this is a neoclassical model with all resources fully employed and, most important, that resources move freely and instantly to equate the marginal returns. To the extent that resources move less freely, the growth rate will be slowed. Thus, in all of the following the growth rates are high.

Base Case Scenario – Rapid Balanced Growth. The Base Case Scenario provides assumptions that provide a balanced growth rate similar to what might be expected for a middle-income country like Egypt, but with favorable development policies. It assumes a 1.0 percent rate of expansion of land (i.e., irrigated area); 5.0 percent rate of technological change in agriculture; a 2 percent rate of technological change in urban tradable sector; 8 percent rate of growth of the capital stock; and 2.8 percent growth of labor force.

Table 17-3. KEY FINDINGS FROM RUNS OF MODEL (GROWTH RATES) (percent)

Scenario	GDP	Real Wage Rate	Agriculture	Urban Tradable	Non-Tradable
Base Case	7.5	2.7	5.6	9.1	5.2
II	6.6	0.2	-0.2	9.9	3.8
III	4.7	2.2	7.0	3.8	5.4
IV	9.6	3.1 (8.1)	9.9	8.2	12.5
V	11.7	3.8	3.2	15.0	9.9

The growth rate of the irrigated area, net of losses including urbanization, is consistent with plans of the Government of Egypt and the actual experience of the past two decades. It is a very rapid rate of growth by the standards of most countries. The labor force growth data are from CAPMAS (1998) and reflect the high population growth rates of two decades ago.

The 5.0 percent pace of technological change in agriculture is consistent with a 3.0 percent rate of increase of crop and animal yields and a 2.0 percent increase in productivity resulting from change in output composition toward higher value and higher productivity crops such as horticulture. Scientifically mature agricultures achieve a steady 1.5 percent rate of growth of yields; Egypt has yields that are 20 to 50 percent lower than those in the countries with the highest yields that have a comparable resource base (e.g., Israel for cotton, northern Australia for rice, and so on [FAO database]). The image of very high yields in Egyptian agriculture comes from comparisons with global or high-income country averages. Egypt, however, has extraordinarily productive agricultural resources and should be compared with successful countries with similar resources. Hence, an additional 1.5 percent growth rate for catch-up seems reasonable. Globalization and rising domestic incomes combine to increase the market for high-value horticulture crops and technological advances in marketing, as well as in production, facilitate a shift that increases productivity.

The growth rate of 8.0 percent in the capital stock is consistent with a saving/investment rate of between 15 and 20 percent. That is at the low end of the range for fast-growth, middle-income countries (Mellor, 1972). The 2.0 percent rate of technological change is arbitrarily chosen. Note that in the urban tradable sector, technological advance is embodied in fixed capital. Thus, there is a sharp contrast between the tradable agriculture and tradable urban sectors in the way growth is achieved. One is through technological advance; the other is through capital input. In the Base Case Scenario, all the growth rates fall within the ranges of fast-growth, middle-income countries discussed in Mellor (1975).

With this structure of growth, the real wage rate increases at a 2.7 percent rate. That rapid increase occurs despite the labor force growing at 2.8 percent and being absorbed in the work force. That is a measure of the rate of increase of the aggregate income of the labor class—the poorest persons in the economy.

The rate of growth of the real wage rate can be interpreted in terms of increased employment in the context of unemployed labor that reflects an elasticity of supply of labor of 1. In that case, a 2.7 percent increase in wage rates depicted in the model presents itself as a 2.7 percent increase in employment; on the labor force base of 21 million, that is, 567,000. That increase is in addition to absorption of the labor force growth. Labor force growth at 2.8 percent adds 588,000 jobs on a base of the 21 million strong labor force. Thus, the total increase in employment in this fast-growth scenario is 1.115 million jobs. Without the technological change that generates the bulk of agricultural growth, only 42,000 jobs would be added in addition to the labor force growth. Total job formation is cut in half.

Scenario II – Slowing Agricultural Growth. If one keeps all parameters the same except to eliminate the primary source of growth for agriculture – that is, to reduce technological change in agriculture to 0, then the rate of growth of GDP declines by only 11 percent, while the real wage rate growth virtually ceases, declining from 2.7 percent to a negligible 0.2 percent. This provides a plausible explanation of the empirical findings of Timmer (1997) and Ravallion and Datt (1996). Note that in this simulation the rate of growth of agriculture becomes negative as capital and labor are drawn to the industrial sector. That drives home the point that agricultural growth is dependent on technological change; without it, resources move to other sectors. What is clear is that if the sources of growth of agriculture are neglected, then the GDP growth rate slows only modestly, but employment growth is virtually eliminated. A growth strategy that focuses only on the tradable urban sector can lead to moderately rapid growth of GDP, but the distribution of income will be highly inequitable.

Scenario III – Slowing Urban Tradable Growth. If one turns the situation around and keeps all assumptions as in the Base Case Scenario, but grows the capital stock at the same rate as the labor force (2.8 percent), then the growth rate of GDP drops sharply, by more then one-third, to 4.7 percent, but the rate of growth of real wages is still a quite rapid 2.2 percent. This is a strategy that focuses only on agriculture and neglects the tradable urban sector. In this scenario the tradable urban sector grows at only 3.8 percent. Thus, an agriculture-only strategy provides good growth in employment and hence income distribution, but quite poor growth in GDP.

Scenario IV – Accelerating Labor Force Growth to Absorb Unemployment. In the Base Case Scenario the price of non-tradables increases at the same rate as the wage rate (since labor is the only factor of production in the non-tradable sector). That means that in a high-growth scenario the growth rate of the non-tradable sector is sharply constrained by the rising price of labor and elastic demand. That is not consistent with the analysis of the small-scale sector (Liedholm and Mead, 1997) that is always depicted as a sector with highly elastic supply. Note that in the Egypt survey (Gavian et al., 2002), the rural non-farm sector consistently reports an ability to respond to increased demand without employing additional resources, implying considerable underemployment. Such underemployment of labor is not consistent with a neoclassical model.

The effect of a pool of unemployed labor is explored in this model by assuming an underemployed labor force that becomes available over time at a rate of 4 percent of the total labor force each year. Thus, a run is made exactly the same as the Base Case Scenario, but assuming the labor force grows not at 2.8 percent (CAPMAS), but at 7.8 percent. As stated previously, the current labor force growth rate of 2.8 percent per year is a reflection of the population growth rates of two decades ago, which were much higher than at present. That allows for mobilizing unemployed labor at the rate of 5.0 percent of the total labor force, absorbing an unemployed labor force of 20 percent in 5 years. The results of this run are striking. The non-tradable sector grows at 12.5 percent. Despite the growth in the labor force, the wage rate increases by 3.1 percent per year, and the per capita income of the laboring class increases by 7.1 percent per year (the 4 percent rate of increase of employment in excess of the labor force growth rate of 2.8 percent and the 3.1 percent rate of increase in the wage rate).

The rate of increase of the agriculture and the non-tradable sectors is greatly accelerated by rapid expansion of the labor force. That is because they are both labor intensive, compared to the urban tradable sector, and in a neoclassical model factor proportions adjust to absorb an increased labor supply. As a result, the wage rate rises despite the rapid growth in labor force. This result does show the high cost of rigidities in the labor market and in production technology. In the real world, rigidities of factor proportions in agriculture would not allow such rapid absorption of labor, agricultural production would not grow as quickly, and the real wage rate would not rise as much.

Scenario V – Technological Change in the Non-Tradable Sector. A rate of technological change in the non-tradable sector of 4.0 percent may be seen as either simple technological change or as drawing in additional labor that is specific to the non-tradable sector, perhaps because of deficiencies in human capital for working in other sectors. The price of non-tradables decreases slightly by –0.02 percent, while the real wage rate rises by 3.8 percent. This is the only scenario in which the wage rate and the price of non-tradables are not the same. As a result, the non-tradable sector expands rapidly, as does the urban tradable sector. The rising wage rate draws labor out of agriculture and so the agricultural growth rate slows to 3.2 percent.

The Real Exchange Rate. Change in the real exchange rate is measured by the change in the wage rate and the price of non-tradables. Thus, a structure of growth that rapidly increases the demand for labor will cause a rise in the real exchange rate. That means that the cost of producing tradables rises and the exchange rate will have to depreciate in compensation. The domestic price of tradables will rise somewhat. That will push some consumption back toward the non-tradable sector. That effect is not measured in this model.

Conclusion

Agriculture and industry grow by quite different means, primarily because of very different factor shares in the two sectors. Technological change is the primary source of growth in agriculture; increased capital stock is the primary source of growth for industry. Slowing technological change in agriculture has a devastating effect on growth of incomes of the laboring class. Slowing capital investment has a similarly devastating effect on growth of GDP.

In the scenarios presented, eliminating agricultural growth only reduces the GDP growth rate by 12 percent. It virtually eliminates any improvement in incomes of the laboring class. It thus has a horrendous effect on income of labor, income distribution, and poverty. By contrast, reducing capital formation to the level of the population growth rate and maintaining the high agricultural growth rate slashes the GDP growth rate by over one-third, but reduces the rate of increase of the wage rate by only 15 percent.

All these numbers are a realistic depiction of the situation if neoclassical conditions prevail. In that sense they are an ideal to which the economy should strive, but not one that will be completely attained. However, the relative relationships do hold. It is the agriculture sector's impact on the non-tradable sector that drives employment growth. And, it is technological change in agriculture, broadly interpreted, that drives the bulk of the process of employment creation.

Thus, growth does increase the income of the laboring class, but the structure of that growth, which sectors grow, is the dominant determinant of the participation of labor in the growth process. The structure of growth that benefits labor is one that has rapid growth of agriculture with its strong multiplier effect on the rural non-farm sector.

References

Adams, Richard H., Jr. *Nonfarm Income, Inequality, and Land in Rural Egypt*. PRMPO/MNSED. World Bank. September 1999.

Ahluwalia, Montek S. "Rural Poverty and Agricultural Performance in India." *Journal of Development Studies*, 14: 298-323. 1978.

Arab Republic of Egypt, Central Agency for Public Mobilization and Statistics. *Labor Force Sample Survey*. 1998.

Arab Republic of Egypt, Central Agency for Public Mobilization and Statistics. *Statistical Yearbook.* 2001.

Bouis, Howarth et al. *Patterns of Food Consumption and Nutrition in Egypt*. IFPRI/FSR-APRP. Ministry of Trade and Supply. January 1999.

Datt, Gaurav et al. *A Profile of Poverty in Egypt: 1997*. IFPRI. Egypt Food Security Project Paper No. 3. August 1998.

Davies, Stephen P. et al. "Small Manufacturing Enterprises in Egypt." *Economic Development and Cultural Change*. 1992.

Delgado, C. et al. *Agricultural Growth Linkages in Sub-Saharan Africa.* IFPRI. Research Report No. 107. 1998.

Gavian, Sarah, Tamer El-Meehy, Lamia Bulbul, and Gary Ender. *The Importance of Agricultural Growth and SME Development to Increases in Rural Employment in Egypt.* MVE Unit - APRP, Special Study No. 5. Abt Associates Inc. Cairo, Egypt. July 2002.

Haddad, Lawrence and Akhter U. Ahmed. *Poverty Dynamics in Egypt: 1997-1999.* IFPRI/FSR/APRP. Ministry of Trade and Supply. September 1999.

Hazell, Peter B.R. and Ailsa Roell. *Rural Growth Linkages: Household Expenditures Patterns in Malaysia and Nigeria.* Washington, International Food Policy Research Institute, Research Report No. 41. 1983.

Hymer, Stephen and Stephen Resnick. "A Model of an Agrarian Economy with Nonagricultural Activities." *American Economic Review.* June 1967.

Lele, Uma and John W. Mellor. "A Two Sector Model of Labor Transfer." *Oxford Economic Papers.* September 1972.

Liedholm, C. and Donald Mead. *Small Scale Industries in Developing Countries: Empirical Evidence and Policy Implications*. MSU International Development Papers. 1987.

Mead, Donald C. and Carol Liedholm. "The Dynamics of Micro and Small Enterprises in Developing Countries." *World Development*, 26, no. 1, pp.61-74. 1988.

Mellor, John W. *Pro-Poor Growth-The Relation Between Growth in Agriculture and Poverty Reduction*. Manuscript. Abt Associates Inc., Bethesda, MD. 1999.

———. *Agriculture on the Road to Industrialization*. Johns Hopkins University Press, Baltimore. 1992.

———. *The Economics of Agricultural Development*. Cornell University Press, Ithaca. 1966.

——— and G. M. Desai, eds. *Agricultural Change and Rural Poverty*. Baltimore, Johns Hopkins University Press. 1985.

——— and U.J. Lele. "Growth Linkages of the New Foodgrain Technologies." *Indian Journal of Agricultural Economics*, 28(1): 35-55. 1972.

Morsy Ali Fawzy, Mamadou Sidibe, and Osman Salama. *The Impact of APRP at the Farm Level*. MVE Unit – APRP, Impact Assessment Report No. 28. Abt Associates Inc. Cairo, Egypt. July 2002.

Ravallion, M. and Guarav Datt. "How Important to India's Poor is the Sectoral Composition of Economic Growth." *The World Bank Economic Review*, 10, no. 1. 1996.

Timmer, C. Peter. *How Well do the Poor Connect to the Growth Process?* CAER Discussion Paper No. 178. Harvard Institute for International Development, Cambridge. December 1997.

UNIDO, Country Industrial Statistics, posted at the following website: http://www.unido.org/data/stats/showstat.cfm?cc=EGY-d (source for Labor Share in Value-Added, Manufacturing and Textiles, Egypt, 1985 and 1999).

World Bank. *Arab Republic of Egypt Country Economic Memorandum. Egypt: Issues in Sustaining Economic Growth.* Report No. 16207-EGT. Volumes I-IV. March 1997.

Endnote

[1] The authors are grateful to Dr. Saad Nassar, then Program Director for APRP, for his guidance to the project and this analysis. We are honored to have had the participation of Dr. Ahmed Goueli in various seminars related to this paper and his insightful comments. Eng. Mahmoud Nour provided his deep insights into the working of the agricultural sector. Dr. Dean de Rosa made particularly useful suggestions about the real exchange rate that is implicit in the model. Dr. Gary Ender encouraged development of the model, played a major role in the discussions that defined the approach, and served as a continuous constructive critic. We have drawn from the earlier work I did jointly with Dr. Sarah Gavian and are grateful for her useful input into that work. Dr. Mohamed Omran and Dr. Glenn Rogers provided detailed comments and continuous critical input. Dawn Thomas and Anne Williams continued the substantial USAID support. We are grateful to Dr. Morsy Ali Fawzy for guidance in interpretation of data and understanding of the Egyptian economy and to Dr. Sherif Fayyad for developing much of the statistical base for the paper. Sara Piccicuto searched diligently and successfully for key bits of data, particularly with respect to factor shares and expenditure patterns.

18 The Importance of Agricultural Growth to SME Development and Rural Employment in Egypt[1]

Sarah Gavian, Tamer El-Meehy,
Lamia Bulbul, and Gary Ender

This report uses survey data to test hypotheses related to (1) the importance of agricultural incomes in generating demand for non-agricultural goods and services in rural areas, (2) the links between small businesses in rural areas and the surrounding community from which they draw their demand, labor force, and input supply, and (3) the responsiveness of small enterprises to increased demand, particularly in terms of job creation. The results of three different surveys of more than 1,200 small and micro enterprises (SMEs) and 600 households provide estimates of total employment, household incomes, and household expenditures. We identified and sampled home-based enterprises (HBEs), a second universe of small and micro enterprises sometimes missed by other studies.

The agricultural sector provides a modest amount of income (23%) to rural households. However, those households buy a very large proportion of their goods and services from rural SMEs; 19 percent of all demand generated in rural areas is represented by the link between agricultural incomes and rural SMEs; 24 percent is the government-to-rural SME link and 19 percent is the SME-to-rural-SME link. Thus rural households do rely on agricultural incomes and spend on small local businesses, but the links were weaker than expected.

The large SME sector is highly dependent on the local economy for demand, and for labor and other inputs. Although SMEs are generally labor-intensive, most have significant excess labor capacity. SME owners identify a shortage of demand as their major constraint; if demand increased, they report that they would have existing staff work harder and longer, rather than add additional staff. Presumably a large and sustained increase in demand would lead to more jobs either in existing SMEs or new ones, but the results suggest such job creation would occur with a lag.

This points to the importance of demand and economic growth for job creation. Incomes flowing from SMEs represent an important source of rural demand, much of which is spent back in the SME sector. For these multipliers to get started, there must be an initial surge in demand for SME goods and services from outside the SME sector—from government, large business, or agriculture. As Egypt continues macroeconomic reforms, government employment should diminish sharply. Even as the private sector's share of the economy expands, the role of medium and large enterprises in generating employment will be fairly minor because such businesses are only a small part of the economy. Thus, the growth of agricultural incomes and demand will be critical to filling the void and creating new jobs.

Agricultural growth can be a major driver of poverty reduction in developing countries. Agriculture tends to be a large sector, which spends its income primarily on domestically produced goods and services. To the extent that those goods and services are produced using a high degree of labor, agricultural growth creates jobs. Usually these jobs are created in nearby small enterprises that often employ the poorer, less-educated portions of the society. Thus, improving agricultural incomes not only improves the welfare of agricultural households and increases food supply, but also has the important impact of stimulating pro-poor non-farm employment in rural areas.

In their paper *The Determinants of Employment Growth in Egypt: The Dominant Role of Agriculture and the Rural Small-Scale Sector,* Mellor and Gavian (1999) estimated the potential for agricultural growth to stimulate jobs in the Egyptian economy. In chapter 17 of this volume, Mellor and Ranade further develop those concepts into a model of the Egyptian economy designed to highlight the interplay between the rural and urban tradables and non-tradables sectors of the economy (considering agricultural goods as rural tradables). That analysis shows that a balanced strategy of strong growth in each of these sectors (on the order of 5.6% per annum) can create about 1 million jobs in the Egyptian economy, predominantly in rural areas.[2]

Of course, other kinds of growth also create jobs. The issues are, how many jobs, for whom, and where? The link between growth and job creation thus depends on what types of goods are demanded, who produces them, using what resources, and facing what constraints? As a companion piece to chapter 17, this study seeks to determine: (1) incomes and sectoral spending patterns for rural households, (2) the size of the current labor force disaggregated by economic sector (with a particular focus on small rural enterprises), and (3) the potential for the major recipient of household spending, small and micro enterprises (SMEs), to create jobs. Linking those attributes together in the Egyptian context provides a perspective on the

degree to which agricultural demand can drive employment gains in rural areas. The results are intended to add breadth to the related Mellor and Ranade analysis.

The objective of this chapter is to test a series of hypotheses related to: (1) the importance of agricultural incomes in generating demand for non-agricultural goods and services in rural areas, (2) the tight links between the small businesses that make up the non-agricultural sector in rural areas and the surrounding community from which they draw their demand, labor force, and input supply, and (3) the responsiveness of the small enterprises to increased demand, particularly in terms of job creation. Based on the results of three different surveys of more than 1,200 SMEs and 600 households, we also derive estimates of base employment, household incomes, and household expenditures for each of the sectors in rural areas of Upper and Lower Egypt. By actively seeking out the often-invisible class of SMEs based out of people's homes in rural areas, we are able to describe the 58 percent of these enterprises that are missed by most other studies. The results of these surveys make an important contribution to our understanding of rural dynamics, because other studies have not traced household spending or SME customers geographically or by economic sector.

Sector Framework

Many studies have focused on the linkages between economic growth, employment, and poverty reduction. Economic growth alone cannot solve all the problems associated with poverty and unemployment, but these conditions cannot be eradicated without economic growth (Timmer, 1997). Overall growth causes the incomes of the poor to rise proportionately with average incomes (Dollar and Kraay, 2001) but their income share can actually fall under certain growth scenarios (Eastwood and Lipton, 2001). Thus the structure of growth is very important to the eradication of poverty.

Fundamental Role of Agricultural Sector. Agriculture must be an essential element of any pro-poor growth strategy. Several studies suggest that growth in the agricultural sector reduces poverty more than growth in the industrial sectors (Timmer, 1997; Ravallion, 2001; Eastwood and Lipton, 2001; Mellor, 2001a; Hazell and Haddad, 2000; Datt and Ravallion, 1998 and 1997; Mellor, 1976; Mellor and Lele, 1972; and Johnston and Kilby, 1975). Thirtle et al. (2001) performed a cross-section analysis using World Development Indicators data from the World Bank to demonstrate a strong statistical relationship between agricultural productivity and poverty reduction. Depending on the model and dataset used, a 10 percent increase in crop yields leads to a reduction in the percentage of people living on less than US$1 per day of between 6 and 12 percent.

While many studies have now linked agricultural growth to employment and poverty reduction, few have tried to capture the specific dynamics at play to identify subsector strategies; such modeling is at an early stage. Using data from Egypt, West Africa, and Rwanda, Mellor estimated the potential for different agricultural sector strategies to generate jobs (Mellor and Gavian, 1999; Mellor, 2000; and Mellor, 2001b).

In chapter 17, Mellor and Ranade recast the growth linkages in terms of a simplified model of tradable and nontradable sectors in Egypt, and highlight the importance of this distinction between tradable and nontradable goods to the dynamics of growth.[3] Sustained economic growth requires a sustained demand for Egypt's products, which comes from the sales of Egyptian tradables on international markets. The revenues thus earned then flow through the Egyptian economy, stimulating demand for local nontradables, tradables, and imports. Mellor and Ranade agree with Delgado et al. (1998) that while there are multiplier effects within the nontradable sector (as one earner of incomes from nontradable activities spends on the products of another producer of nontradables), this chain reaction will run its course in due time, depending on leakages such as demand for imports. Both studies suggest that the infusion of new income will most likely come from increases in agricultural productivity leading to decreased prices that make farm products competitive outside the country (or zone). Both studies also stress the importance of this income in jump-starting local consumer demand, and thus employment, in the nontradable sectors.

Agriculture serves as a main driver of pro-poor growth for at least three reasons. First, agriculture is a large sector in most developing country economies and as such, has an important absolute and relative effect on overall economic growth and job creation. Although tempered by its tendency to grow more slowly than other sectors and to benefit from labor-saving technologies, changes in this large sector can have a large influence on employment (Mellor and Gavian, 1999).

Second, rising incomes in agriculture are the dominant source of demand for the labor-intensive small-scale sector in rural and market towns (Mead and Liedholm, 1998; Liedholm and Mead, 1987). Farmers typically have a high marginal propensity to consume domestically produced goods. Furthermore, the host of rural small businesses producing rural housing, furniture, local garments, shoes, baskets, as well as providing a wide range of personal services has little access to urban or international markets. Training and micro-finance programs aimed at increasing the productivity of small enterprises will succeed only if local markets can absorb the added supply.

Third, agricultural growth not only generates incomes for farmers and in turn their local goods and service providers, but also generates the additional food needed to

meet the consequent growing demand. Because food usually dominates the expenditure basket of the poor, poverty reduction requires that rising incomes be accompanied by a simultaneous increase in the quantity of food. Otherwise, the resulting inflation would choke off non-farm growth (Mellor, 1976).

Sectoral Framework. Mellor and Gavian (1999) put forth a model of how agricultural growth drives overall economic growth and, in turn, employment growth. The Mellor and Gavian model is based on a three-sector economy: agriculture, an agriculturally-driven non-agricultural sector (ADNA) that is stimulated only by agricultural demand, and the autonomous sector, which includes all non-agricultural activities except those driven by agriculture. Following the growth linkage, employment increases in ADNA are determined solely by demand, and thus by income growth in the agricultural sector. One purpose of this study is to refine our understanding of these growth and employment links in the Egyptian context. We are thus operationalizing these concepts by more rigorously defining the relations between the agricultural and nonagricultural sectors in terms consistent with national income accounting. We partition the economy into sectors based on the nature of the goods and services generated, and further disaggregate the sectors by ownership, location, and type of enterprise. Thus, Table 18-1 distinguishes between private and government ownership, agricultural and non-agricultural outputs,[4] small and large enterprises, and metropolitan and non-metropolitan (rural and small town) locations.

Note that both in Table 18-1 and throughout the paper, the word *sector* is used very flexibly in reference to any of the cells above. Thus the use of terms such as the *private* and *public sectors*, the *urban* and *rural sectors*, and the *small business sector* are based on the understanding that these are all equally valid and internally consistent ways to partition the economy into analytically meaningful units.[5] The *rural sector* is used as shorthand to mean villages and small towns. Although conceptually, *urban* is intended to include both cities and metropolitan areas, the sample did not include the latter. In Egypt, however, where populations have crowded for thousands of years along a narrow fertile belt that extends through the harsh desert, the distinction between urban and rural is relative. Metropolitan areas, governorate capitals (headquarters), and district capitals (headquarters) are *urban.* The rest of each district is divided into local units, which are considered *rural*. The 1996 census data show Egypt to be 43 percent urbanized by this definition. Four of Egypt's 27 governorates (Cairo, Alexandria, Port Said, and Suez) are classed as "Metropolitan," with absolutely no rural population, and five are desert. Taken as a whole, the remaining governorates of Upper and Lower Egypt are 29 percent urban and 71 percent rural. However, population densities in Egypt are very high, even in officially "rural" areas. While the overall population

Table 18-1. FRAMEWORK FOR SECTORS

Ownership	Type of Output	Type of Firm	Rural/Urban Classification	Geo Hierarchy
Private	Agricultural	Independent/Micro/Small	Rural	Villages & Small Market Towns
			Urban	Cities
				Metropolitan Areas
		Large	Rural	Villages & Small Market Towns
			Urban	Cities
				Metropolitan Areas
	Non Agricultural	Independent/Micro/Small	Rural	Villages & Small Market Towns
			Urban	Cities
				Metropolitan Areas
		Large	Rural	Villages & Small Market Towns
			Urban	Cities
				Metropolitan Areas
Government			Rural	Villages & Small Market Towns
			Urban	Cities
				Metropolitan Areas

density of approximately 60 persons/square kilometer (km^2) (154 persons/square mile [mi^2]) is low, this figure masks tremendous extremes of sparsely populated deserts and among the world's most densely populated cities. The 1996 population density for Upper Egypt is 225 persons/km^2 (583 persons/mi^2), while that of Lower Egypt is 931 persons/km^2 (2,412 persons/mi^2), as compared with 52 persons/km^2 for all developing countries and 27 persons/km^2 for the Middle East and North Africa and 28 for Sub-Saharan Africa (World Bank data).

Hypotheses. The purpose of this analysis is to establish, for Egypt, the potential for agricultural growth to provide a major stimulus to employment growth, which is linked to poverty reduction. We hypothesize that agriculture is a major component of rural incomes in Egypt; that rural populations tend to buy goods and services that are produced by local (or at least domestically) small businesses; and that these small businesses are labor-intensive and are able to respond to increased demand by creating jobs. At first, local businesses create employment by extending the hours of existing workers, but eventually they create new jobs. These processes can be grouped into a series of hypotheses that are tested with survey data and other information on the Egyptian economy:

- The first hypothesis concerns the flow of income from the agricultural sector to the non-agricultural sector (in particular, small businesses) in rural areas. It is hypothesized that rural households rely on agricultural incomes and spend on small local businesses; by extension, it is hypothesized that urban households will be less dependent on agriculture for their incomes and less likely to spend in local small businesses.
- The second hypothesis relates to the links between small businesses and the local community. SMEs are hypothesized to constitute a large sector that is highly dependent on (and contained in) the local economy. They draw their demand, labor, and other inputs from the local economy, and this economic isolation is thought to be stronger in rural communities than in urban ones.
- The third hypothesis concerns the response of small businesses to increased demand. Demand is thought to be the major constraint to SME expansion, and SMEs are hypothesized to be ready to respond to an increase in demand. SMEs are presumed to be labor-intensive, and thus respond to increased demand by hiring local labor. Rural SMEs are hypothesized to be more employment-intensive (i.e., use a greater proportion of labor to capital) than urban ones and thus are more likely to add jobs when demand increases.

Methodology

The data used in this analysis came from three different surveys targeted to: households, established small and micro enterprises (E-SMEs), and HBEs. Established SMEs are those enterprises with fixed premises used regularly for economic activity. HBEs, on the other hand, are enterprises that lack such premises and that most likely are located within the household. The household survey was used to determine the sectoral distribution of household income and household spending, with a particular focus on the importance of agricultural income and spending on SMEs. The three surveys were also designed to provide estimates of the number of jobs in each of the sectors, with a particular focus on identifying labor in non-established SMEs not otherwise identified in other surveys. The purpose of the SME surveys was to determine the major characteristics of rural SMEs, which are poorly documented in Egypt. Questions focused on the type of activity, size and nature of the labor force, capital investments, and their response to changes in demand. The fieldwork for the established SME survey was carried out from March through May 2001; the household and HBE surveys were carried out in February 2002.[6]

Sampling Frames. For the E-SME survey and the household survey, official lists were used to establish a sampling frame. For E-SMEs, a complete listing for each village was obtained from the local unit administrative office. The household sampling frame was based on a complete list of all residential units. In Sharqeya and Beheira, these data came from a list of all households with registered electricity meters, provided by the local electricity company. In Assiut, a complete household listing was obtained from the local health care unit in each village.

The sampling strategy for the HBEs was more complicated because there was no listing available. (Such enterprises are home-based and usually not registered with the Government.) A first questionnaire was administered to the 600 households in the household sample. If, as a result of responses to questions on the first questionnaire, the household contained a non-established enterprise, a second questionnaire was administered to the owners of that enterprise.

Although this study focuses on rural Egypt, the sample included a small number of households and small businesses from urban areas. It is not strictly possible to generalize to all of Egypt from such a sample. Nonetheless, analytically it can show the extent to which urbanization might influence the results.

The surveys were carried out in 3 of the 17 governorates of Upper and Lower Egypt. The remaining Urban and Frontier governorates were excluded because of their lack of agriculture.[7] The study adopted a stratified three-stage systematic

random sampling technique. The 17 governorates of Upper and Lower Egypt were stratified into three clusters, based on several criteria. These criteria included geographical representation (Upper versus Lower Egypt), proximity to metropolitan areas, availability of both old and new lands, poverty level (measured by the United Nations Development Programme [UNDP] poverty index), unemployment rate, share of agricultural labor force, persons per feddan, and population density. One governorate was randomly selected from each of the three resulting clusters; these were Assiut (Upper Egypt), Beheira, and Sharqeya (both of Lower Egypt). The capital of each governorate was selected for the sample. Each capital city was divided into four quadrants to avoid geographical bias, and a fixed number of units were selected from each. District headquarter cities were also included.

Within each governorate two districts were selected randomly. To avoid bias in our selection, all the districts in each governorate were ranked according to a deprivation index composed of a number of indicators, and accordingly one relatively rich and one relatively poor were selected.[8] In general, each district consists of one capital city and a number of local units (LUs). The urban part of the district sample was drawn from the district capitals; the rural part of the sample for each district was taken from the LUs.

LUs are composed of one mother village and a number of smaller villages plus their surrounding hamlets. Two LUs were randomly selected from districts with more than five LUs and only one LU from those with less than five LUs. In all, nine LUs were selected. From each LU a random sample of two villages plus the mother village was chosen. In addition, the sample included five hamlets around one of the villages.

Sample Sizes. A total of 600 households, 600 established SMEs, and 600 HBEs were targeted for each of the three surveys; the ultimate sample size varied due to field conditions. Sample units were selected from both urban and rural areas, where the former consists of both the capital city for the governorate and the district, and the latter includes LUs, mother village, and smaller villages for each of the three separate surveys. Twenty sample units were drawn from each of the eight cities in the sample. The remainder (440 units) was distributed as follows:

- Households: The targeted 600 units were divided equally among the three govenorates (200 each). As mentioned above, 160 households were selected from urban areas. The remaining portion of the sample (440 households) was drawn from rural areas. In each governorate, 15 households were selected from the hamlets in each LU. The rest of the sample was distributed among the LUs in proportion to the total number of residential units.

- HBEs: The sample size was set identically to the household survey.

- E-SMEs: As with the other two surveys, 20 units were drawn from each of the eight selected cities, and the remaining proportion of the sample in each governorate was drawn from the LUs. The total sample (600 units) was distributed 160 to urban areas, with the remaining 440 distributed among the three governorates in accordance with the proportion to the total number of SMEs in the selected areas.

Representativeness of Sample. The sample was drawn to represent all rural communities in Upper and Lower Egypt. As there are no rural communities in the great unsampled metropolitan areas and very few in the also unsampled Frontier governorates, the rural figures can be taken to represent the total rural population of Egypt. On the other hand, very few households and businesses were sampled in urban areas, and statistics from these samples cannot be used to represent Egypt with great confidence. They do, however, provide a general idea of rural-urban differences. Because of the weakness of the urban sample, it is not possible to derive figures representative of the national situation.

Rural Jobs, Incomes, and Spending

The numerous links between agricultural and nonagricultural growth in rural areas include the flow of incomes and people between the two sectors. In this section we provide a snapshot of how rural households earn and spend their incomes, with particular attention to the role of agriculture as a source of incomes and jobs. Although our focus is on the rural households, we also include results on the small sample of urban households included in the survey.

Rural Jobs and Incomes. According to the survey results, rural households have an average of nearly seven members, two more members than urban households (Table 18-2). These figures are somewhat larger than the figures from other surveys in Egypt. Using Central Agency for Public Mobilization and Statistics (CAPMAS) data, El-Laithy et al. (1999) give household sizes as 5.5 persons in rural and 4.4 in urban areas. An IFPRI survey (Datt and Jolliffe, 1998) produced an average household size of 5.8 persons. The differences may be due in part to different sampling strategies (where the current survey does not include metropolitan areas).

Few of the household members work at jobs that permit them to make cash contributions to the household budget (1.5 per household), and most of those

Table 18-2. HOUSEHOLD DEMOGRAPHICS

	Rural	Urban
Household (HH) Size (Persons)	6.9	4.9
Number of Breadwinners	1.5	1.5
Number of Different Jobs per Household	1.6	1.7
Number of Jobs per Breadwinner per Household	1.1	1.2
% HHs with Contributing Spouse	16%	36%
% HHs with Contributing Offspring	35%	19%
% HHs with Other Cash Contributing Members	98%	90%
% Female-headed HHs	2%	8%

Note: A household is defined as a group of people, not necessarily related, who both eat together (from the same budget and cooking facilities) and sleep in the same dwelling most of the time. A breadwinner is a household member who makes cash contributions to the household budget. A FTE job converts the total number of hours worked by each individual in each job into its full-time equivalent (thereby combining seasonal and part-time jobs into full-time jobs). Other cash contributing members are non-spouse, non-offspring household members who contribute cash to the household budget; it includes other relatives and non-relatives to the household head.

breadwinners have only one job. There are few households in rural areas headed by women, and spouses (regardless of gender) usually are not involved in income-generating activities. Women play a considerably larger role in urban areas, both in heading households and in supplementing household incomes. Results from Datt and Jolliffe (1998) suggest that the current finding may understate the role of women, given that they found 15 percent of all households to be female-headed.

Employment is evaluated in three ways: total hours, number of jobs, and full-time equivalent (FTE) jobs. Survey respondents were asked how many different remunerative activities they had, as well as the share of their time and hours per week they typically worked in each activity. Consistent with the CAPMAS method for counting jobs, each person who spent more than 1 hour per year in a remunerative activity was considered a breadwinner, and that activity was counted as a *job*. To consolidate full-time, seasonal, and part-time activities into a common measure, hours per week were converted into weekly FTEs using sector-specific averages for the duration of the sector workweeks.[9]

The breakdown of employment by sector was approximately the same using measures of hours, jobs and FTEs (Table 18-3). This suggests that most jobs involve roughly the same number of hours and involve an equivalent blend of full- and part-time activities. Private, non-agricultural employment (i.e., in SMEs and in medium and large businesses) accounts for about half of the total in both rural and urban areas. Most of this (85%) is in small enterprises, which are more important in urban areas where the poor do not have access to land. One-third of

Table 18-3. EMPLOYMENT BY SECTOR: HOURS, JOBS, FULL-TIME EQUIVALENTS

	Hours/Week		Jobs		FTE	
	Rural	Urban	Rural	Urban	Rural	Urban
Total	511,369,723	427,889,804	10,665,724	10,452,135	9,908,687	8,418,249
Agriculture	126,350,048	9,337,180	2,474,864	132,910	2,167,239	160,157
SME	176,545,979	241,988,460	3,515,018	5,236,002	3,108,204	4,260,360
Medium, Large Business	48,227,565	27,785,625	842,294	579,563	862,747	497,059
Government	160,246,131	148,778,539	3,833,548	4,503,659	3,770,497	3,500,672
Shares	100%	100%	100%	100%	100%	100%
Agriculture	25%	2%	23%	1%	22%	2%
SME	35%	57%	33%	50%	31%	51%
Medium, Large Business	9%	6%	8%	6%	9%	6%
Government	31%	35%	36%	43%	38%	42%

Egyptian work hours are in the government sector; this share is slightly higher in urban areas and lower in rural areas. It is also slightly higher in terms of jobs and FTEs. The agricultural sector accounts for 22 to 25 percent of employment in rural areas and less than 2 percent in urban areas.[10]

According to the survey results, the average household income was LE 13,426/year (US$3,182) in rural areas and LE 11,310/year (US$2,680) in urban areas.[11,12] Nearly all of the income for Egyptian households is earned, which is to say it comes in the form of cash payments for labor (88% and 91% in rural and urban households, respectively). The rest comes from the value of household food production and what they receive as unearned income in the form of remittances, pensions, rents, and gifts or charity (Table 18-4).[13] This means that households are tremendously dependent on wage labor for their incomes, even in rural areas.

The income from each of these sources (earned, unearned, and home-produced food) was then divided separated according to the sector of origin. For the largest

Table 18-4. TOTAL HOUSEHOLD INCOMES: EARNED, UNEARNED, AND HOME-PRODUCED

	Rural	Urban
Total Household Income (LE)	13,426	11,310
Earned	88%	91%
Home Produced Food	7%	2%
Unearned	5%	6%
Of which:	100%	100%
Pensions	44%	55%
Remittances	2%	2%
Rents/Revenues	40%	28%
Other	14%	15%

portion, earned income, survey respondents described their income-generating activities by size of enterprise, location, ownership (private or public), and sector (agriculture, trade, services, and manufacturing). The value of the food they produced at home was attributed to either the rural or urban agricultural sector, depending on their residence. Because people may not know which sector generated the unearned income they receive, remittances, pensions, rents, and gifts were grouped as other/unknown.

The results closely mirror the employment shares shown in Table 18-3.[14] Both government and SME employment figure very prominently in household incomes. Rural Egyptians derive the largest share of their incomes from the government sector (36 percent), followed by SMEs and agriculture (28 percent each), and medium and large business (8 percent). The relative position of the SME and government sector in generating incomes is reversed for urban Egyptians (46 percent and 44 percent respectively). Income from medium and large businesses accounts for 7 percent, and urban agriculture (in city or metropolitan areas) is a very minor 3 percent of total income.

In relation to the hypothesis that the agricultural sector provides a major source of incomes in rural Egypt, the results are therefore qualified. As one would expect, rural households rely more on agriculture for their incomes than urban households (28 percent versus 3 percent); but even in rural areas, agriculture makes up less than one-third of household incomes.

Household Spending. The larger the agricultural sector, the greater will be the potential impact of its growth on domestic employment. At the same time, the strength of the link between agricultural incomes and SME employment also depends on how much of that income gets spent on the goods and services that SMEs provide.

The cash component of the total income figures shown in Table 18-4 comprises 88 percent of total income in rural areas. The remainder comes in the form of home-grown food and in-kind gifts (as opposed to cash gifts). Households were asked how much they spent weekly on a list of food items, monthly on a list of regular expenditures, and annually on a list of exceptional expenditures. They were also asked where they purchased each item in terms of location and economic sector.

Of the LE 12,474 (US$2,956) spent annually by rural households, slightly less than one-half (44%) is devoted to food (Figure 18-1). Another one-fourth is spent on basic services (e.g., housing, fuel, medical, clothes, education, transportation, and fuel). Ceremonies (e.g., religious, marriages, births, funerals, *Haaj* and *umra*) and financial transactions (e.g., debt payments, *gamia*, and *noqot*) each account for about 10 percent of household spending. The remaining 7 percent is split between public services (e.g., electricity, water, sanitation, and taxes) and consumer durables. Urban households have little home-grown food (Table 18-4), but otherwise maintain generally the same spending pattern as shown for rural households.

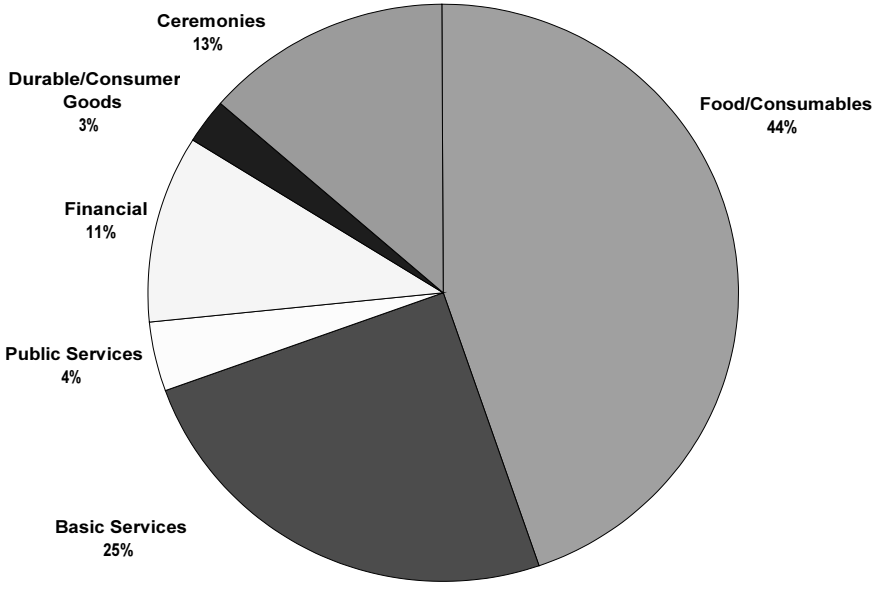

Figure 18-1. RURAL HOUSEHOLD EXPENDITURES, BY CATEGORY

Based on data from the 1995/1996 Household Income Expenditure and Consumption Survey (HIECS), El-Laithy et al. (1999) found a slightly greater overall proportion of budget devoted to food (56%) than shown in Figure 18-1; as above, the proportion of rural consumption devoted to food was greater than for urban (60% versus 52%). These greater food shares are likely due to the more careful inclusion of home-produced food in the consumption figures.[15] Data on the other expenditure categories are more difficult to compare.

Table 18-5 provides a breakdown of household purchases by sector and location. Assuming that households do not differentiate between a pound earned in agriculture and a pound earned in another sector and that they spend the next pound earned in the same manner as the last pound earned, then the current breakdown of purchases by sector should indicate where households will spend additional income.[16]

The survey results strongly support the hypothesis that households make their purchases locally. Rural households spent 77 percent of their cash incomes in their villages and only 22 percent in cities. The tendency to buy locally is even stronger for urban households, who presumably have a greater range of consumer choices available in their vicinity. Fully 98 percent made their purchases in cities. Essentially none of the households in this non-metropolitan sample traveled to metropolitan areas to shop (e.g., Alexandria, Cairo, Port Said, or Suez).

Both rural and urban households make the vast majority of their purchases in SMEs.[17] Consistent with the previous result, rural households rely on rural SMEs, while urban households rely on urban SMEs. Rural households make 87 percent of their purchases in SMEs and, of that, 77 percent in the village. Both populations rely minimally on goods and services from medium and large businesses or government. In particular, SMEs are an important source of food supplies in both rural and urban areas. Even in rural Egypt, nearly all food comes from small retail shops and street markets, rather than directly from producers.

Linking Agricultural and SME Demand. Table 18-6 shows the demand linkages that were found. The shaded figures are the sector breakdown of earnings (one row) and expenditures (two columns). The unshaded figures in the center are the product of earnings share and expenditure share for each pair of sectors. These can be interpreted as the impact of earnings from each sector on demand for the goods and services of the other sectors.

Table 18-5. HOUSEHOLD PURCHASES BY LOCATION AND SECTOR: RURAL VERSUS URBAN

	Rural (%)	Urban (%)
Breakdown by Location of Expenditure	100	100
Village	77	1
City	22	98
Metro	1	0
Breakdown by Sector and Location		
Agricultural Sector	2	2
Village	100	8
City	0	92
Metro	0	0
SME Sector	87	84
Village	77	1
City	21	98
Metro	1	0
Medium and Large Business	3	7
Government	7	6

In rural areas, incomes are derived from a broad array of sources, with the largest share from the government sector (36%). Purchases are highly concentrated in the SME sector (87%). Taken together, the government-SME linkage accounts for 31 percent of total rural income flows.[18] The next strongest links in rural areas come equally from the money people earn in SME and agricultural activities and spend on SME goods and services (25% each, divided into 19% in rural SMEs and 6% in urban SMEs). All other linkages are weak.

The urban linkages are slightly different. Although urban residents have a spending pattern similar to that of rural residents, their earnings pattern is skewed away from agriculture and toward SMEs and government. Taken together, this means the SME-to-SME link (39%) and the government-to-SME link (37%) are even stronger in urban areas than in rural areas.

Summary. The first set of hypotheses was that rural households rely on agricultural incomes and spend on small local businesses; it was also proposed that urban households are less dependent on agriculture for their incomes and are less likely to spend in local small businesses. The survey results suggest that the agricultural sector provides a modest amount (28%) of income to rural households. However, those households in turn buy a tremendous amount of their goods and services from SMEs, most, but not all of which, are rural SMEs. Nineteen percent of all demand generated in rural areas is represented by the link

Table 18-6. ORIGIN AND DISPOSAL OF INCOME, BY SECTOR

Sector	Rural					Urban				
	% Expenditure	Share of Income				% Expenditure	Share of Income			
		Agriculture	SME	Med. & Lrg. Ent.	Govt.		Agriculture	SME	Med. & Lrg. Ent.	Govt.
		28%	28%	8%	36%		3%	46%	7%	44%
Agriculture	2%	1%	1%	0%	1%	2%	0%	1%	0%	1%
SME	87%	25%	25%	7%	31%	84%	3%	39%	5%	37%
Rural	*67%*	*19%*	*19%*	*5%*	*24%*	*1%*	*0%*	*1%*	*0%*	*1%*
Urban	*20%*	*6%*	*6%*	*2%*	*7%*	*83%*	*3%*	*38%*	*5%*	*37%*
Med., Large Enterprise	3%	1%	1%	0%	1%	7%	0%	3%	0%	3%
Government	8%	2%	2%	1%	3%	6%	0%	3%	0%	3%

between agricultural incomes and rural SMEs. This is modestly less than the 24 percent share from the government-to-rural SME link and on par with the 19 percent share from the SME-to-rural-SME link. The first part of the hypothesis is thus true, but slightly weaker than anticipated.

The results confirm that urban households are (far) less dependent on agriculture and (slightly) less likely to spend in local (urban) SMEs than are rural households. The impact of agricultural income on SME demand in urban areas is, therefore, negligible as compared to the role of the agricultural sector in rural areas. Instead, urban SMEs must depend on demand generated by incomes from other SMEs (39%) and from government (37%). As urban SMEs account for 50 percent of all jobs in urban areas (Table 18-3), maintaining demand for their products must remain an important element of labor force policies.

Overall, how important are incomes in the agricultural sector for job creation? The direct impact on demand of incomes earned from agriculture is considerably smaller than the impact on demand of incomes earned in SMEs and government. But neither of these latter sources of income is robust. Where does the SME income come from in the first place? As long as there is something outside the SME sector growing, then the SME-to-SME link gets activated. That growth must come either from government, large businesses, or agriculture. As Egypt continues macroeconomic reforms, government employment should diminish sharply, eroding its direct and indirect impact on demand for SME products. The private sector role in the economy must expand. The role of the medium and large enterprises in generating employment will be fairly minor, as such businesses make up only a small piece of the economy, and they are often too capital-intensive to generate many jobs. Thus, the growth of agricultural incomes and demand will be critical to filling the void and creating new jobs.

Characteristics of SMEs

SMEs are recognized as an important source of employment and income for rural populations in developing countries. To gain a better understanding of the SME sector in rural Egypt, we present the main characteristics of these enterprises based on our research results (unless otherwise noted).

SME Types, Prevalence, and Ownership. To capture all SMEs in operation, a distinction was made between established SMEs and HBEs (home-based enterprises). In the literature, an establishment is defined as some fixed facility used regularly for an economic activity, whether it is an independent building or part of a building (Arab Republic of Egypt, CAPMAS, 1998). Thus, the term *established SMEs* (E-SMEs) refers to enterprises that have fixed premises.

Table 18-7. SME CHARACTERISTICS

	Rural			Urban		
	Total	**E-SME**	**HBE**	**Total**	**E-SME**	**HBE**
Number of SMEs (millions)	2.0	0.8	1.3	3.4	1.5	1.9
Share of owned SMEs	100%	42%	58%	100%	45%	55%
% Female owned	19%	13%	22%	19%	18%	30%
Average number of workers	1.6	2.0	1.2	1.8	2.4	1.2
Distribution of workers	100%	100%	100%	100%	100%	100%
1-5 workers	98%	96%	100%	96%	95%	99%
6-15 workers	2%	4%	0%	4%	5%	1%
Average age of enterprise (yrs)	10.6	10.7	10.5	13.0	14.4	11.7

regularly for economic activity. HBEs, on the other hand, lack such premises and most likely are located within the household. Neither definition is equated directly with the formality or legality of the enterprises. When weighted to represent their corresponding geographical location, the survey data suggest there may be as many as 2 million SMEs in rural areas and as many as 3.4 million in the urban areas of Upper and Lower Egypt. HBEs are more numerous, making up between 58 percent and 55 percent of all SMEs in rural and urban areas, respectively. There are thus 1.4 HBEs to every 1.0 E-SME in rural Egypt.

SMEs are extremely small. Survey results show that most SMEs are tiny enterprises, with an average of 1.6 workers for rural SMEs and 1.75 for urban SMEs. E-SMEs are larger than HBEs, regardless of location. In part the lower average size of HBEs results from their tendency to be staffed solely by an owner-operator. While 37 percent of E-SMEs involve only one person (owner), rural HBEs have a much higher proportion (59%) of owner/worker. Urban SMEs tended to be about 60 percent owners only. Even SMEs that have multiple workers still fall in the micro category (1–5 workers). Only 3 percent of all SMEs are small enterprises (6–15 workers), and these are almost entirely E-SMEs. Other studies suggest that the micro category (one-person establishments) constitutes slightly more than one-half of all enterprises. In fact, one-person enterprises constitute almost one-half of the whole SME universe in Egypt (Arab Republic of Egypt, 1996).

Urban SMEs are on average older than rural SMEs, especially among E-SMEs (Table 18-7). This is consistent with Mead and Liedholm's (1998) findings on the higher survival and growth chances of urban SMEs in comparison with rural ones. (Note that the figures in Table 18-7 do not reflect the high rate of SME failure, but only those who were still surviving at the time of the interviews.)

Founding the enterprise is the common practice among E-SME owners; in rural areas 85 percent were founded by the current owner, whereas in urban areas, 74 percent had founded their own business; thus 13 percent of E-SMEs in rural areas and 26 percent in urban areas were inherited. The general tendency to found a new SME rather than join or inherit an existing one suggests that SMEs may grow in number rather than in size.

SME Labor. About one-fifth of the SME labor force is female. Women are especially prevalent in rural HBEs (30 percent), suggesting that women may be concentrated in the low skill–level activities.

More than 60 percent of rural SMEs were owned and operated single-handedly by the same person (Table 18-8). This finding is consistent with the 50 percent estimate of El-Mahdy and Osman (2000). Our research shows that out of the established SME total labor force, only 2.6 percent are seasonal workers. Seasonal workers are more concentrated than regular workers in the 16–30 year age group and typically are unrelated to the owner.

Data on educational attainment was collected only for E-SMEs. In general, the workforce in rural E-SMEs has less education than the workforce in urban E-SMEs. Although most E-SME labor in both locations had an intermediate education (i.e., between secondary school and university education), 26 percent of the rural workforce in E-SMEs is illiterate, compared to only 10 percent of the workforce of their urban counterparts. Overall, rural E-SMEs seem to be at a disadvantage when it comes to human capital.

SME Inputs. Most SMEs use inputs other than just labor for their operations. About one-half of all purchased inputs used by SMEs come from the immediate locality (i.e., the village or city where they are located) and this is the same for rural and urban SMEs (Table 18-9). Forty-six percent of rural SMEs and 49 percent of urban SMEs obtain most of their inputs from within their localities; these shares rise to 55 and 56 percent, respectively, when taken as the share of those who actually purchased inputs. Seldom do SME owners purchase inputs from a village outside their own location, rather they turn to other cities or metropolitan areas when they are unable to meet their needs locally. Urban SMEs are somewhat more likely to look for inputs in another city.

E-SMEs and HBEs have different patterns for purchasing inputs. All E-SMEs purchased some inputs, whereas about 40 percent of HBEs did not. When HBEs do purchase inputs, they are more likely to rely on their local markets than are E-SMEs (rural HBEs in their village, urban HBEs in their city).

Table 18-8. SME LABOR FORCE CHARACTERISTICS, BY LOCATION (percent)

	Rural			Urban		
	Total	**E-SME**	**HBE**	**Total**	**E-SME**	**HBE**
Average Age of Regular Workers						
< 12	0	0	1	1	1	0
(12-15)	4	4	3	2	1	4
(16-30)	44	46	34	45	46	41
(31-60)	51	47	60	49	46	53
> 60	3	4	2	4	3	3
Relation of Regular Workers to Owner						
Owner	62	50	82	52	41	73
Immediate	16	21	8	13	15	9
Other Relative	5	6	2	3	4	1
No Relation	17	23	8	32	39	18

When considering origin of labor, the vast majority of rural and urban SMEs are highly dependent on their localities to hire workers. The trend is slightly more pronounced among urban—rather than rural—SMEs. A slightly higher proportion of rural SMEs hire workers from other cities and villages. One possible reason is that the urban labor market is more varied and may be more able to meet the labor needs of SMEs.

SME Customers. The first hypothesis developed in this study proposes that a large share of agricultural income is spent in the rural sector and that a large proportion of that goes to buy goods and services produced by SMEs. The analysis showed that households spend a great portion of their budgets on their local SMEs. This strong link is confirmed by results from the SME surveys, which show the importance to the customer base of local clients, in general, and "farmer" clients in particular.[19]

In general, most rural and urban SMEs draw a large amount of their demand from local residents, and sell most of their output within their localities, which means they are largely confined to their local markets. Rural SMEs are especially dependent on local demand. Sixteen percent of rural SMEs depend on the village for most of their customers, and 75 percent depend on the village for all of their customers (Table18-10). Urban SMEs sell to a somewhat broader base; 31 percent depend on their city for most of their customers, and 17 percent depend on the city for all of their customers.

Table 18-9. ORIGIN OF INPUTS, BY LOCATION

	Location	Original Data		Adjusted to reflect only those who purchased inputs	
		Rural	Urban	Rural	Urban
Total	Same village/city	46%	48%	55%	56%
	Another village	4%	1%	5%	1%
	Another city	17%	28%	20%	33%
	Metro cities	17%	9%	20%	10%
	Did not need inputs	16%	13%	N/A	N/A
E-SME	Same village/city	50%	47%	50%	47%
	Another village	4%	1%	4%	1%
	Another city	20%	40%	20%	40%
	Metro cities	25%	12%	25%	12%
	Did not need inputs	0%	0%	N/A	N/A
HBE	Same village/city	39%	51%	67%	86%
	Another village	4%	0%	7%	0%
	Another city	12%	4%	21%	7%
	Metro cities	3%	4%	5%	7%
	Did not need inputs	42%	41%	N/A	N/A

Rural SMEs, which have a larger customer base in the villages, also have a higher proportion of sales to farmers (Table 18-11), while urban SMEs depend to a much lesser extent on farmers: 64 percent of rural SMEs identified farmers as all or most of their clients as compared with 16 percent of urban SMEs. There are also significant differences between the two types of SMEs. HBEs are less dependent on farmers than E-SMEs in both rural and urban areas.

Summary. We have shown that there is substantial heterogeneity among SMEs. First, there are many very small HBEs that typically lack formal legal status and are, thus, almost "invisible" in an official sense. In many ways, these HBEs have a profile different from that of their established counterparts:

- HBEs: Most are tiny, even smaller than E-SMEs. They are likely to be operated by one person (owner/worker), and at least twice as likely to be female-headed as their E-SME counterparts. HBEs are often focused on service delivery, although trade is also very important to rural HBEs. Approximately 80 percent of the workers are men, and the use of seasonal labor is negligible. Most sell their products from home, followed in importance by the marketplace and street vending. Their client base is overwhelmingly local, although more so for rural HBEs than urban ones. In rural areas (where there are agricultural activities), 54 percent of the HBE respondents said that farmers make up most or all of their clients, but farmers are even more important to rural E-SMEs, making up 80 percent of their clients.

Table 18-10. CUSTOMER BASE, BY LOCATION (percent of SMEs)

		Rural Location		Urban Location	
		% Customers from Villages	% Customers from Cities	% Customers from Villages	% Customers from Cities
Total	All	75	2	5	17
	Most	16	9	13	31
	Half	3	4	7	5
	Quarter	4	6	27	10
	Few/little	2	15	25	32
	None	1	65	22	4
E-SME	All	73	1	6	26
	Most	18	4	15	47
	Half	3	2	7	5
	Quarter	3	3	24	3
	Few/little	2	16	22	13
	None	1	74	26	6
HBE	All	78	12	3	0
	Most	11	40	1	1
	Half	4	12	10	5
	Quarter	6	27	42	24
	Few/little	1	10	44	69

Table 18-11. IMPORTANCE OF FARMERS TO SME CUSTOMER BASE (percent)

		Rural	Urban
Total	All	27	2
	Most	37	14
	Half	17	10
	Quarter	9	27
	Few/little	8	38
	None	2	9
E-SME	All	29	2
	Most	41	17
	Half	12	8
	Quarter	8	25
	Few/little	7	37
	None	3	11
HBE	All	25	1
	Most	29	2
	Half	26	20
	Quarter	10	35
	Few/little	9	41

- E-SMEs: The prototypical E-SME is likely to be engaged in trading, and employing about two regular workers—one a relative about 23 years old, with an intermediate degree, and the other about 45 years old and semi-literate at most. As with HBEs, approximately 80 percent of the workers are men and the use of seasonal labor is negligible. Rural E-SMEs are very dependent on their village for their markets (91 percent local versus 8 percent from a city or metropolitan area), whereas urban E-SMEs are more dependent on their city, although to a lesser extent (63 percent local versus 37 percent in villages or metropolitan areas). Although farmers are only a minor portion of the client base for urban E-SMEs, they are a major part of the client base for rural E-SMEs.

Rural SMEs are somewhat more "contained" than urban SMEs. Both get approximately one-half of their inputs and over 80 percent of their labor from their locality (i.e., their respective village or city), but rural SMEs are much more dependent on their locality for their client base than are urban SMEs. Ninety-one percent of rural SME owners rely on their village for all or most of their customers, while the corresponding figure for urban SME owners was only 48 percent. Rural SMEs are far more likely to identify all or most of their customers as farmers (44 versus 15 percent for urban). They are also somewhat more likely to dip into their own production for home consumption.

SMEs also differ by sector of economic activity. For example, trade is the largest sector in terms of the number of enterprises. One explanation is the relatively low capitalization level required, hence the ease of market entry. On the other hand, SMEs engaged in services tend to have the largest enterprise size in terms of both labor and capital. Services also appear to be more dynamic in terms of growth in both labor and capital.

Finally, the results of this study show that SMEs exhibit a high degree of self-containment in the local economy in terms of customers, input, and labor. This is in contrast to other studies (e.g., Lanjouw and Lanjouw, 2001) that showed that rural SMEs often not only depend on local demand or inputs but also are forced to purchase inputs outside their localities, and in some cases by importing from other countries. Similarly, these studies show that at least part of rural expenditure goes to goods imported from outside the region.

The findings, therefore, strongly support the second hypothesis that SMEs constitute a large sector that is highly dependent on the local economy for their demand, labor, and other inputs. The findings give less support to the proposal that this economic isolation or *containment* is stronger in rural than in urban communities. The implication is that changes in demand for SME products will

be felt first and foremost in the local community. Thus it is possible for an increase in agricultural incomes to have a substantial impact on demand for local SME products and for the SMEs, in response, to demand more labor and other inputs from the local economy. The issues involved in how SMEs may in fact respond to the increased demand are treated in the following section.

Growth Patterns and Dynamics

We have established that local communities are the major source of demand for the large SME sector in Egypt and that this relationship is even stronger in rural areas than in urban areas. We also showed that agriculture incomes make up a substantial portion (although not the majority) of that local demand for SME output in rural, but not urban, areas. If indeed rural incomes were to grow, thus stimulating additional demand for SME goods and services, how would SMEs respond? To what extent do they exploit excess capacity, and when do they expand?

There are many possible means of assessing SME growth: changes in labor force, capital investments, sales, output, or assets. According to Mead and Liedholm (1998), most analysts prefer measures of labor force growth because these do not require complicated efforts at deflation. In conditions of high underemployment (as with most Egyptian SMEs), a modest growth in sales or output may reflect a fuller use of existing capacity rather than an expansion of that capacity. We examine firm growth by adding capital, or expanding their workforce, or both.

SME Capital. For the purpose of this study, we analyze three kinds of capital:

- Initial capital: Capital invested by the entrepreneur upon establishing his/her enterprise
- Additional capital: Other capital investments made by the entrepreneur in the course of the enterprise life
- Total capital: Enterprise net worth, adjusted to reflect present value

Most SMEs have extremely small total capital assets. Established SMEs operating in urban areas have the greatest capital investment (nearly LE 45,000 or $10,664). Their rural E-SME counterparts have only about one-third that amount, while HBEs (whether urban or rural) have very minimal amounts of capital. The total capital is composed primarily of the initial capital that was invested in the SME. The majority of SMEs did not add capital since their establishment. This trend is more pronounced among HBEs than other SMEs, where 85 percent of the former did not add any capital at all. Urban E-SMEs are much more likely to add capital than are rural establishments.

Taking into consideration the varying ages of enterprises by type and location, the annualized increase in capital ranges from 1 to 3 percent.[20] E-SMEs grew by about one-third over their average life-to-date. HBEs grew slower than E-SMEs, with rural HBEs growing twice as fast as urban HBEs.

For the most part, these small sums of capital came from personal savings or from family members. Consistent with other findings, only a small minority obtained a bank loan for their initial capital (9% of urban and 7% of rural SMEs, all of which were E-SMEs).[21] However, bank loans were a more visible source of additional capitalization, whereby the above percentages jumped to 19 percent in the case of urban E-SMEs and 15 percent in the case of rural ones.

Labor Force Dynamics. SMEs are, by definition, small. Those in rural Egypt are tiny and do not hire seasonal labor. What potential do they have for expansion and job creation?

It is difficult to study the potential for SMEs to generate jobs by using information on labor force dynamics for existing SMEs. As shown in previous sections, most SMEs are more micro than small, and a great number consist of only one worker/owner. Such a demographic structure gives little scope for exploring the impact of growth. Rather than monitor the labor force of individual SMEs (which may not change much over time), one would need to monitor the number of SMEs in the communities over time.

Ideally information would also be collected on indicators of actual demand at the SME level. The evidence suggests that there has been only a modest increase in aggregate demand over the last decade. The average SME sampled was approximately 10 years old. Over the 1990-2000 decade, gross domestic product (GDP) per capita grew 2.6 percent per year. This represented a mild slowdown from the 1980s, during which time GDP per capita increased at 2.8 percent annually. Although these figures are highly aggregated and ignore the very real issues of income distribution between economic classes, they suggest that there has been little opportunity to test SME responsiveness to high levels of sustained demand in real life. This is the value of the modeling effort by Mellor and Ranade, who simulate conditions of high demand.

Results from the current survey indicate that throughout their lives, 73 percent of rural E-SMEs hired no additional workers, compared to almost 60 percent of urban E-SMEs. Of the 26 percent of rural E-SMEs that added workers, most added a single worker over their lives. Urban E-SMEs were more likely to add workers (36%), mostly by adding more than one worker throughout their lives. As for HBEs, with 82 percent of HBE workers also being the owners of the

enterprises, and with an average enterprise size of 1.2 workers per enterprise, the contribution of HBEs to employment through expansion is even more marginal. The prototypical HBE is operated by one owner/worker.

Our findings seem to be in line with international experience, which suggests that three-fourths of the jobs created by this sector are generated through start-ups. Seventy-five percent of enterprises either witness no change or actually lose labor, with the remaining 25 percent of enterprises that do grow add only a small number of workers.

The differences between the different types of E-SMEs are less marked. The services sector is somewhat more dynamic (43 percent adding workers) than manufacturing (34 percent adding workers) or trade (31 percent).

When they experience an increase in demand, the general preference of the entire SME sector (establishments and HBEs alike) is to work harder rather than to extend working hours or add workers (Table 18-12).[22] This pattern prevails across the rural/urban divide as well as across sectors. Rural SMEs respond that they will work harder (58 percent), extend hours (34 percent), and add workers (8 percent). Urban SMEs are more responsive across the spectrum: they will work harder (64 percent), work longer (45 percent), and add workers (23 percent). Among the different sectors, services seem to have the highest potential for hiring additional workers (32 percent), compared to manufacturing (15 percent) or trade (14 percent).

Table 18-12. RESPONSE TO INCREASED DEMAND, BY LOCATION AND SECTOR (percent)

Percent	Type of SME	Location		Sector		
		Urban	Rural	Trade	Services	Manuf.
Work Harder	E-SMEs	50	43	44	62	50
	HBEs	93	90	89	93	92
	Total	64	58	55	84	51
Extend Working Hours	E-SMEs	40	31	35	55	34
	HBEs	54	40	41	55	71
	Total	45	34	37	55	35
Add Workers	E-SMEs	18	6	14	18	14
	HBEs	33	15	14	37	30
	Total	23	8	14	32	15

On average, HBEs are more responsive than E-SMEs to increases in demand in all response categories and across all locations and sectors (Table 18-12). Urban HBEs were more ready to add workers (33 percent) than were their rural counterparts (15 percent). The results suggest that in the rare cases when HBEs

add workers, urban enterprises rather than rural ones will be primarily responsible for generating the increase in jobs.

Factors Influencing Job Creation. There are several factors influencing the propensity of SMEs to add workers. The first is the high degree of underemployment of SME labor. The majority of E-SME owners consider themselves underemployed, more so in rural (69%) than in urban areas (64%). This is consistent with the finding that most SMEs do not add workers over their lifetime. Service E-SMEs, which are the most likely to add an additional worker, report the lowest level of underemployment.

A second factor related to the propensity of SMEs to add jobs is the intensity with which they use labor (Figure 18-2). The average rural SME has total capital per worker of LE 4,361 (US$1,033), while the average urban SME has LE 7,630 (US$1,808). Overall, therefore, rural SMEs are 47 percent less capital-intensive than urban SMEs, which is consistent with the initial hypothesis that rural SMEs are more employment-intensive than urban SMEs. However, there are important distinctions between the SME categories. While E-SMEs are more labor-intensive in rural areas, just the opposite is true for HBEs. Rural HBEs use twice as much capital per worker as urban HBEs.

It was hypothesized that rural enterprises would be more labor-intensive than urban ones and thus add more labor in the face of increased demand. The results show that only the E-SMEs in rural SMEs are more labor-intensive; the HBEs are not. The results also show that although reported underemployment was about the same in rural and urban areas, rural SMEs were less likely to add workers, and when they did, tended to add fewer workers than urban SMEs. The breakdown in the relationship between labor intensity and the propensity to add workers also applies to E-SMEs in the services sector, which have the highest capital/labor ratios and a somewhat greater propensity to add workers than do trade or manufacturing SMEs.

Another important factor limiting the ability of SMEs to add jobs is the host of constraints they face. Our analysis supports the hypothesis that demand is the most binding constraint facing SMEs on the general level (Table 18-13 and Table 18-14). The four most binding constraints identified by E-SMEs were, in order of most to least severe: low demand (49% of urban and 38% of rural E-SMEs), capital/liquid money (19% of urban and 22% of rural E-SMEs), high tax rates (13% of urban and 17% of rural E-SMEs), and legal and regulatory constraints (13% of urban and 11% of rural E-SMEs).

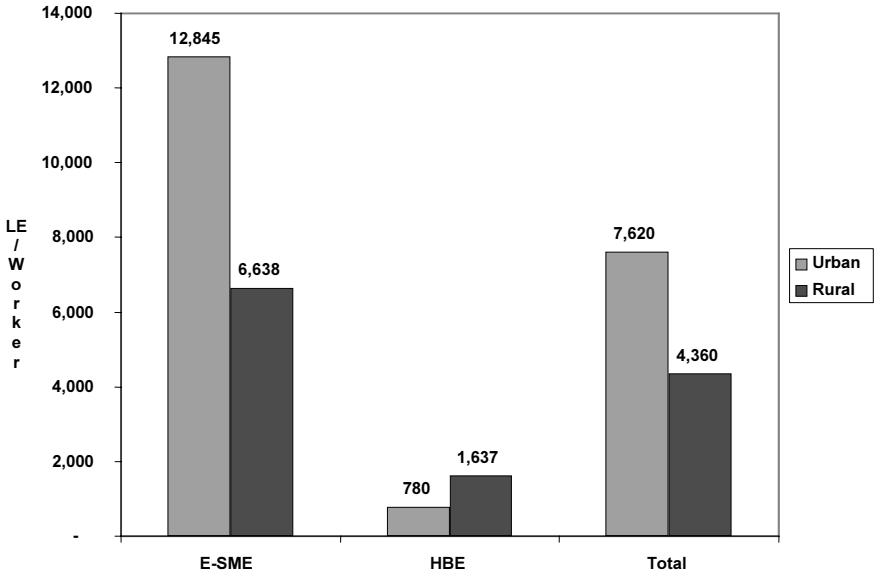

Figure 18-2. CAPITAL/LABOR RATIO, BY LOCATION

Services are the only exception to demand being the biggest constraint. In the case of services, access to capital/liquid money seems to be of greater importance. Trade and manufacturing E-SMEs listed demand as the biggest constraint they face, followed by access to capital/liquid money in the case of trade E-SMEs, and licensing and registration in the case of manufacturing E-SMEs.

HBEs display a similar pattern when it comes to ranking demand as their top constraint. The two most binding constraints are: demand constraints (48% of urban and 53% of rural E-SMEs) and time allocation (19% of urban and 10% of rural E-SMEs). Time allocation is an expected constraint, since a significant number of owners have other jobs. In addition, especially in the case of women entrepreneurs, productive time is tightly interwoven with time devoted to household chores. This particular constraint appears to be most binding among service HBEs, compared to trade or manufacturing.

Interestingly, 15 percent of urban HBEs listed transportation as a binding constraint, compared to only 1 percent of rural HBEs. This, we believe, has to do with the higher self-containment expressed by rural enterprises, in addition to the nature of the economic activity of those urban HBEs, which the analysis revealed were all in the trade sector.

Table 18-13. MAIN CONSTRAINT FOR E-SMES, BY LOCATION AND SECTOR (percent*)

Constraint	Location		Sector		
	Urban	Rural	Trade	Services	Manuf.
Demand	49	36	49	23	46
Capital/liquid money	19	22	22	30	14
Registration	13	11	9	20	16
Employment	0	0	0	0	0
Goods or raw materials	1	3	1	2	3
High tax rates	13	17	15	14	14
Lack of experience	0	4	2	1	1
Others	3	7	3	10	6

*Percent of E-SMEs citing problem as main constraint.

Table 18-14. MAIN CONSTRAINT FOR HBES BY LOCATION AND SECTOR (percent*)

Constraint	Location		Sector		
	Urban	Rural	Trade	Services	Manuf.
Demand	48	53	41	52	83
Lack of liquidity	1	6	5	1	3
Informality	3	1	2	3	0
Lack of capital	1	5	3	2	1
Transportation	16	1	25	0	0
Mentally or physically handicapped	1	1	3	0	0
Lack of Skilled Labor	0	0	0	0	0
Health problems	1	4	0	4	0
Time allocation	19	10	5	27	1
Lack/poor quality of merchandise	0	1	1	0	0
Limited enterprise revenue	3	8	4	5	6
N/A	6	10	11	4	7

*Percent of HBEs citing problem as main constraint.

The vast majority of manufacturing HBEs (83%) complained of demand constraints, followed by limited enterprise revenue (6%) and lack of liquidity (3%) and capital (1%). Trading HBEs, on the other hand, ranked their constraints starting with demand (41%), transportation (25%), in addition to lack of liquidity and time allocation (5%). Finally, HBEs in the services sector had the following ranking: demand (52%), time allocation (27%), limited enterprise revenue (5%), and health problems (4%).

SMEs are extremely small businesses. Although the definition includes enterprises with as many as 15 workers, the average size is 2.4 workers in urban areas and 2.0 workers in rural areas. The sector is likely to respond to increased demand not by growing into *larger* enterprises, but by growing *more* of them.

Evidence of this is seen in Liedholm and Mead's (1987) work, where only 25 percent experience growth in their labor force, chiefly by adding a few workers. In addition, only 1 percent of enterprises that start with fewer than four workers end up hiring more than 10 workers. In the specific case of Egypt, research has shown that net employment growth occurs in the case of 5 percent of SMEs (El-Mahdy and Osman, 2000).

Liedholm and Mead also noted that in times of economic growth and increased demand, SMEs tend to create jobs by expanding. Periods of economic downturn, on the other hand, were generally correlated with a tendency for new SME start-ups (i.e., replication). These periods force people to seek supplemental means of living by establishing new enterprises, the vast majority of which are one-person enterprises that are concentrated in activities with low economic return, and hence low income, compared to that generated from jobs created by expansion (Mead and Liedholm, 1998).

Other studies illustrate the sensitivity of labor markets to demand. A study of some 50 small enterprises (5–15 workers) from Greater Cairo demonstrated how entrepreneurs decreased staff working hours and pay due to stagnation in demand (El-Meehy, forthcoming). In Damietta (a furniture manufacturing cluster in Egypt) demand stagnation, coupled with the introduction of the sales tax, has reportedly led many furniture manufacturers to lay off labor (El-Meehy, 2002). In these very small furniture manufacturers (predominantly micro-enterprises with an average enterprise size of 2.8 workers), the smallness of the enterprise, along with severe structural problems faced by the furniture industry, did not even allow entrepreneurs to reach a compromise whereby they can keep their employees on the payroll at reduced wage rates. These responses to demand shortfalls are likely to be mirrored when demand increases, again depending on the degree of undercapacity and the interplay with other structural factors such as availability of credit. It follows naturally that when asked about the effect of an increase in demand, SME operators would respond first by working harder and by increasing the length of the workday before they reach the point beyond which they must expand their labor force to be responsive to the market demand.

Summary. According to the third hypothesis, demand is thought to be the major constraint to SME expansion, and SMEs are hypothesized to be ready to respond to an increase in demand. SMEs are also presumed to be labor-intensive, and thus respond to increased demand by hiring local labor. Rural SMEs are hypothesized to be more employment-intensive (i.e., use a greater proportion of labor to capital) than urban SMEs and thus more likely to add jobs when demand increases.

The results suggest that these effects may not be as strong as predicted. It is true that demand is a major constraint to SME expansion. Aggregate demand has been growing slowly, and the majority of both E-SME and HBE owners report the shortage of demand to be their most binding constraint. However, it is unclear the extent to which SMEs are ready to respond to an increase in demand. On one hand, many E-SMEs are concerned about capital constraints, while HBEs are concerned about a shortage of transportation and time. There is minimal evidence of seasonal use of labor and considerable excess capacity. When asked how they would respond to increased demand, most SME owners exhibit caution, preferring to work harder and extend their hours before adding workers. In practice, most SMEs did not add any labor over their life spans. On the other hand, about one-third of all SMEs did add labor and greatly increased their average size (because they started out so small). Between 27 and 36 percent of rural and urban SMEs, respectively, added capital. Annual additions to the extremely small capital base ranged from 1 percent to 3 percent, keeping up with per capita increase in GDP growth of 2.6 percent.

But are SMEs "labor-intensive," and do they respond to increased demand by adding labor? Even though SMEs have very few workers, labor seems to be the surplus resource. Most owners report substantial underemployment, and only about one-third actually added workers since the birth of their enterprises. When demand increases, they extend effort and hours before adding jobs.

Capital, on the other hand, seems the more dynamic factor. SMEs are more likely to add capital than labor, and the average increase of capital generally tracks the expansion of the economy. At least for E-SMEs and rural HBEs, capital is cited as an important constraint on their operations. Total capital varies tremendously by type and location of enterprise, far more than the average size of the workforce; so, too, does labor intensity (the inverse of the capital/labor ratio). HBEs are far more labor-intensive than E-SMEs, but rural enterprises are not necessarily more labor-intensive than urban ones. More important, using more labor relative to capital at present does not necessarily mean that a firm will respond to increased demand by adding even more labor. The link between labor intensity and the propensity to create jobs is tenuous. For example, urban E-SMEs are half as labor-intensive as rural E-SMEs, but a higher share report willingness to add workers (15% versus 6%), and a greater share actually did add workers (36% versus 26%). One implication is that SME jobs are more likely to be created in urban areas. So the relationship between current labor intensity, geographical location, and the propensity of enterprises to add labor is complex.

Conclusions

SMEs are traditionally thought of as well poised to respond to increased demand by creating jobs. Study results confirm that SME base employment is very large, SMEs are labor-intensive, and SMEs depend on their localities for labor and other inputs. Furthermore, they have low capital requirements and offer some opportunities for female employment and entrepreneurship.

Job Creation. The potential for rural SMEs to generate employment through expansion must be qualified, however. SMEs are not a homogeneous sector. Throughout the analysis we have shown important distinctions between rural and urban SMEs, HBEs and E-SMEs, as well as between SMEs engaged in services, trade, and manufacturing.

The link between job creation and labor intensity is complex, and depends on the type of firm, its surplus labor capacity, and its location. Even in a strong economy, only some SMEs will add labor. With constrained demand, the majority of enterprise owners preferred to extend hours or work harder, rather than add jobs. Nevertheless, lengthening hours and working harder will translate into greater incomes, and eventually, if demand is maintained, to more positions. In either case, incomes increase.

There is reason to suspect that SMEs may be fairly unproductive at present and perhaps not yet ready to swing into high gear. Many SME owners had held previous jobs (62%) and of those, 25 percent had once been farmers. Twenty percent operate their business concurrently with another job, 64 percent of which are in government. At the same time, few E-SME owners have experience working in another related enterprise. Thus SMEs represent a way for poor households to broaden their earnings portfolio and that movement between occupations might be fairly fluid depending on economic conditions.

The results suggest that there will be a lag between the time that demand increases and the time that SMEs increase wages and add new jobs. This result is consistent with the lag of 2 to 3 years between agricultural growth and the employment response noted by Mellor and Gavian (1999), and pertains to the period during which the SME sector absorbs its excess capacity and gains access to the capital resources needed to expand.

Comparing enterprises by both location (rural and urban) and sector (manufacturing, services, and trade), we can identify certain characteristics associated with SME growth. We have demonstrated that urban E-SMEs and

those active in the services sector (compared to their locational or sectoral counterparts) are characterized by:

- Higher capital intensity (lower labor intensity)
- Higher initial capital
- Higher additional capital
- Higher average number of workers by enterprise

The image of a tiny micro-enterprise that grows in employment and graduates into higher-size categories (small or medium) seems less plausible in light of our findings.

Policy Implications. The lack of demand is a major constraint facing SMEs in the rural areas of Egypt, including their urban centers. Continuing to provide supply-side solutions—though admittedly needed—without expanding the market for their products and services is highly unlikely to generate employment through expansion. Suffering from high underemployment rates—primarily due to the lack of sufficient demand to keep them fully employed—these enterprises will not generate additional employment until after their capacity has been fully utilized.

Only enterprises free of demand constraints will need supply-side solutions like credit. The services sector is a case in point. It suffered least from underemployment, and was the only sector not to list demand as its biggest constraint. Supply-side solutions are more useful when there is demand for products in the first place. Currently, the GOE is expanding its various credit schemes targeting SMEs. Under the prevailing market conditions, however, these are most likely going to end up with high default rates (since demand is insufficient to generate revenues to pay off the loans) and high failure rates for SMEs that, hoping to keep their business afloat with credit, will borrow beyond their—and the market's—capacity. Bearing in mind the magnitude of rural SMEs, together with their reliance on the local rural markets, the strengthening of that market is crucial not only for their expansion, but also for their survival.

The issue then remains: how to stimulate demand for SME goods and services in rural areas where poverty is greatest? The results indicate that the size of the agricultural sector, even in rural areas, may be fairly small relative to the nonagricultural (e.g., SME) and government sectors. But neither of these latter sources of income is robust. Where does the SME income come from in the first place? As long as there is something outside the SME sector that is growing, then the SME-to-SME link gets activated. That growth must come either from government, large businesses, or agriculture. As Egypt continues macroeconomic reforms, government employment should diminish sharply, eroding its direct and

indirect impact on demand for SME products. The private sector role in the economy must expand. The role of the medium and large enterprises in generating employment will be fairly minor because at present, such businesses are only a small part of the economy. Thus, the growth of agricultural incomes and demand will be critical to filling the void and creating new jobs.

References

Arab Republic of Egypt, Central Agency for Public Mobilization and Statistics. *Statistical Yearbook.* June 2001.

———. Central Agency for Public Mobilization and Statistics. *Labour Force Sample Survey.* 1998.

———. Central Agency for Public Mobilization and Statistics. *General Census of Population, Housing and Establishments: Detailed Results of the Establishments Census, Total for the Republic.* 1996.

———. Ministry of Economy. *A Draft National Policy on Small and Medium Enterprise Development in Egypt.* June 1998.

Datt, Gaurev, Dean Jolliffe, and Monhar Sharma. *A Profile of Poverty in Egypt: 1997.* Food Consumption and Nutrition Division Discussion Paper No. 49. International Food Policy Research Institute. Washington, DC. August 1998.

Datt, Gaurev and Dean Jolliffe. *Determinants of Poverty in Egypt: 1997.* International Food Policy Research Institute. Food Security Research Unit of APRP. Draft Report. Cairo, Egypt. June 12, 1998.

Datt, Gaurev and Martin Ravallion. "Farm Productivity and Rural Poverty in India," *Journal of Development Studies*, vol. 34, no. 4, pp. 62-85, April 1998.

Delgado, Christopher L., Jane Hopkins and Valerie A. Kelly with Peter Hazell, Anna A. McKenna, Peter Gruhn, Behjat Hojjati, Jayashree Sil and Claude Corbois. *Agricultural Growth Linkages in Sub-Saharan Africa.* International Food Policy Research Institute. Research Report 107. 1998. Available at the following website on July 24, 2002: http://www.ifpri.org/pubs/abstract/abstr107.htm.

Dollar, David and Art Kraay. *Growth is Good for the Poor.* Research Department Group, World Bank. 2001. Available on February 16, 2002, at http://www.worldbank.org/research/growth/pdfiles/GIGFTP3.pdf.

Eastwood, Robert and Michael Lipton. *Pro-poor Growth and Pro-growth Poverty Reduction: What do they mean? What does the evidence mean? What can policy makers do?* Draft manuscript presented at the Asia and Pacific Forum on Poverty: Reforming Policies and Institutions for Poverty Reduction, held at the Asian Development Bank, Manila. February 2001. Available on February 16, 2002, at http://www.adb.org/Poverty/Forum/pdf/Lipton.pdf.

El-Leithy, Heba, Olaa El-Khawaga, and Nagwa Riad. *Poverty Assessment in Egypt: 1991 – 1996.* Cairo University Economic Research Monograph. Economics Department. Cairo, Egypt. 1999.

El-Mahdy, Alia and Maged Osman. *An Assessment of the Effectiveness of Small and Micro-Enterprise Finance in Employment Creation.* Cairo. July 2000.

El-Meehy, Tamer. (forthcoming) *Small Enterprises in Greater Cairo and the Legal & Regulatory Framework.* Formalization Project, Egyptian Center for Economic Studies & Instituto Libertad y Democracia. USAID. Cairo, Egypt.

———.*Furniture Industry in Damietta: An Overview.* Collaboration for Community-Level Services Project. USAID. Cairo, Egypt. March 2002.

Gavian, Sarah, Tamer El-Meehy, Lamia Bulbul, and Gary Ender. *The Importance of Agricultural Growth and SME Development to Increases in Rural Employment in Egypt.* MVE Unit – APRP, Special Study No. 5. Abt Associates Inc. Cairo, Egypt. July 2002.

Hazell, Peter and Lawrence Haddad. *CGIAR Research and Poverty Reduction***.** International Food Policy Research Institute. Washington, DC. 2000.

Johnston, B. and P. Kilby. *Agriculture and Structural Transformation.* Oxford University Press. New York. 1975.

Lanjouw, J.O. and P. Lanjouw. "The Rural Nonfarm Sector: Issues and Evidence from Developing Countries," *Agricultural Economics,* 26, pp. 1-23. 2001.

Liedholm, Carl and Donald Mead. "Small Enterprises and Economic Development: The Dynamics of Micro and Small Enterprises," in *Routledge Studies on Development Economics.* London. 1999.

Liedholm, Carl and Donald Mead. *Small Scale Industries in Developing Countries: Empirical Evidence and Policy Implications.* MSU International Development Paper No.9, Michigan State University. Lansing, Michigan. 1987.

Mead, Donald and Carl Liedholm. "The Dynamics of Micro and Small Enterprises in Developing Countries," *World Development*, vol. 26, no. 1, pp. 61-74. 1998.

Mellor, John W. and Chandrashekhar Ranade. *The Impact Of Agricultural Growth On Employment In Egypt: A Three-Sector Model.* MVE Unit – APRP, Special Study No. 4. Abt Associates Inc. Cairo, Egypt. July 2002.

Mellor, John W. *Meeting the OECD Poverty Targets Through Growth and Productivity Increase – The Central Role of Agriculture's Employment Multipliers.* APD Research Report No. 3. Prepared for USAID Bureau for Global Programs, Center for Economic Growth and Agricultural Development, Division of Agriculture and Food Security. Abt Associates Inc. Bethesda, Maryland. 2001a.

———. *Rapid Employment Growth and Poverty Reduction: Sectoral Policies in Rwanda.* Prepared for USAID/Rwanda. Abt Associates Inc. Bethesda, Maryland. 2001b.

———. *Pro-Poor Growth – Strategic Elements for CILSS.* Draft Manuscript September 7, 2000.

———.*The New Economics of Growth.* Cornell University Press. Ithaca, NY. 1976.

———.*The Economics of Agricultural Development.* Cornell University Press. Ithaca, NY. 1966.

Mellor, John W. and Sarah Gavian. *Determinants of Employment Growth in Egypt: The Dominant Role of Agriculture and the Rural Small-Scale Sector.* MVE Unit – APRP, Impact Assessment Report No. 7. Abt Associates Inc. Cairo, Egypt. December 1999.

Mellor, J.and U. Lele. "Growth Linkages of the New Food Grain Technologies," *Indian Journal of Agricultural Economics* 18, 10-15 (cited in Adams, 2000). 1972.

Ravallion, Martin. *Growth, Inequality and Poverty: Looking Beyond the Averages.* Policy Research Working Paper 2558. Development and Research Group, World Bank. Washington, DC. 2001.

Thirtle, Colin, et al. *The Relationship Between Changes in Agricultural Productivity and the Incidence of Poverty in Developing Countries.* DFID Report No. 7946. 2001.

Timmer, C. Peter. *How Well Do the Poor Connect to the Growth Process?* CAER II Discussion Paper No. 17. Harvard Institute for International Development (HIID). Cambridge, MA. 1997.

Endnotes

[1]The motivation for the study was offered by Dr. John Mellor, who firmly believes that in Egypt, agricultural growth can—and someday will—have a profound effect on reducing poverty. The challenges of carrying out and analyzing more than 1,800 interviews in such a short time period are formidable. The authors are profoundly grateful for the long nights and sincere efforts devoted by the large team of field enumerators, research staff, computer programmers, and production assistants associated with this work. Without the diligent efforts of researchers Ms. Nemat Guenena and Ms. Abeer Abbas in designing questionnaires, training field staff, and organizing field logistics, the data underlying this analysis would be nothing more than errant electronic bytes. Their efforts were reinforced under arduous field conditions by the hard work and good cheer offered by Ms. Maysa Ayoub, Mr. Shokri Hussein, and Ms. Negah El-Bassoussi. We are grateful to Dr. Heba El-Laithy for laying the statistical underpinnings of the sampling, weighting, and results analysis. We are also indebted to Mr. Mohamed El-Aref and Miss Doaa Mohie as well as Ms. Mona Steffen and Mr. Douglas Fuller, who wrestled late into many evenings with unforgiving computer programs to turn mountains of numbers into analyses and graphics. The study was prepared under the guidance of USAID project officer Dr. Mohamed Omran. Over several years, he has supported the development of the ideas expressed in this as well as companion pieces.

[2] Mellor and Ranade (2002) assume perfect competition, international prices, a ratio of capital between rural tradables (defined in the paper as agriculture) and urban tradables of 0.0345, and a ratio of all capital to urban tradable capital of 1.0345, an agricultural growth rate of 5.6% per year will cause GDP to grow 7.5% per year and add an increment of 1.1 million additional jobs (above the rate of labor force growth).

[3] According to a 1998 IFPRI study summarizing agricultural growth linkages in Sub-Saharan Africa, tradables are goods that "in theory can always be imported or exported at a constant price determined by a reference market outside the region in question," and nontradables are all goods that "at prevailing relative prices, are rarely, if ever traded across the borders of the chosen zone of analysis" (Delgado et al., 1998, p. 1). Mellor and Ranade treat all agricultural goods and services as tradable, while the IFPRI authors classify foods that are bulky (coarse grains) or perishable (e.g., fresh meats) as nontradable.

[4] Note that nonagricultural in Table 18-1 includes the private part of all services and manufacturing (mining, industry), much of which would have been considered the "autonomous sector" in Mellor and Gavian (1999).

[5] Note that the sectors in Table 18-1 are not defined by the source of demand for their products or *drivenness*, as the term was used in Mellor and Gavian (1999). The degree to which increased demand for the products of one sector depends on income growth in another will be empirically established in the section "Rural Jobs, Incomes, and Spending" of the current study.

[6] For full details of sampling and results, see Gavian et al., 2002.

[7] These governorates are Alexandria, Cairo, Matrouh, New Valley, Port Said, Red Sea, North Sinai, South Sinai, and Suez.

[8] These indicators are illiteracy, unemployment rates, dependency rates, family size, crowding (persons per room), as well as the share of families with access to electricity, a main water network, sanitation services, and a kitchen.

[9] No attempt was made to determine how industrious a worker might be. All the time engaged in a given activity was counted toward the full-time equivalent measure, without regard to productivity. Sector-specific standards for the average workweek were computed from survey data for household members engaged in only one job throughout the year.

[10] According to the 1997 data used by Datt, Jolliffe, and Sharma (1998), 39 percent of the households in the rural sector reported any agricultural cultivation.

[11] The exchange rate used for this and subsequent conversions is US$1 = LE 4.22. This is the annual average of the "typical cash rate" daily during the 2001 calendar year taken from Oanda.com.

[12] On a per capita basis, these values were LE 2167 ($514) and LE 2527 ($599) in rural and urban areas, respectively. These income figures are somewhat lower than data derived from the latest household income, expenditure and consumption survey conducted by CAPMAS in 1999/2000 using a different survey methodology with much larger sample size. For the purposes of this study, figures for total income (and expenditures) are being used to determine the importance of the relative components. They should not be taken as absolute estimates of incomes or poverty in Egypt.

[13] The low shares of "unearned" income are consistent with the IFPRI result that net transfers are about 2.2 percent of mean per capita expenditures in Egypt, given the differences in survey methodology and definitions (Datt, Jolliffe and Sharma, 1998). Likewise, that report also suggests that a very small proportion of households actually receive transfers.

[14] In part the tight parallel between income and labor shares is due to the assumptions made during the computation of these figures. It was assumed during a one-shot survey that respondents would be both unwilling and unable to give a full sense of their incomes. The questionnaires therefore focused on consumption from expenditures, gifts, and homegrown produce; the sum of consumption was equated with total household income (column 1 on the schemata in Figure 15 of the Appendix). Total household income was then partitioned among household members based on their share of total household hours worked, thereby assuming equality of wages between household members and income-generating activities. Each individual's income was then partitioned among his or her income-generating activities based on the respondent's declaration of how much income was earned in each of those activities. Then each activity was associated with an economic sector of the economy. The monetary values of the activities were then rearranged by sector and summed up to the household level. The use of hours as a proxy for household member income shares was a necessary simplification due to data collection problems that rendered the information on each individual's share of total household income invalid. To check the potential bias introduced by using time-shares as a proxy for income shares, the results for the two methods of computation were compared for the subset of households that had usable data for both. The differences in sectoral income patterns derived using the two methods were minor and justified by the advantages of being able to incorporate all rather than one-third of the households.

[15] The HIECS survey involved 14,800 households recording their purchased and home-produced consumption daily for a month, whereas the current survey relied on generalized recall.

[16] In more technical terms, this assumes that the marginal budget share is the same regardless of the source of income and further, that it equals the average budget share. Evidence from Delgado et al. (1998) shows the average and marginal budget shares to differ somewhat, depending on the item purchased. For example, the average budget share for food for rural households in their sample varied from 72 to 85 percent, while the marginal budget share was about 10 percentage points lower, varying from 62 to 74 percent.

[17] The expenditure questions did not distinguish between purchases in E-SMEs and HBEs.

[18] The government-to-SME link refers to how household incomes earned from government employment are spent in SMEs. It does not refer to government procurement of SME goods and services.

[19] Note that the Arabic word for "farmer" used in this question (*fellah*) is taken in common parlance to refer to residents of rural areas, and thus may overstate the preponderance of actual farmers (people who earn more than half of their income from agricultural activities) in the client base. The response also indicates the SME owner's best estimation of his or her client's background. The estimates in Table 18-5 provide a more accurate gauge of the importance of agricultural incomes to SME demand.

[20] (Total Capital – Initial Capital)/Total Capital)/Age of Enterprise.

[21] See for example El-Mahdy and Osman (2000) where in more than 85% of the cases, savings or self-finance constituted the primary source of initial capital. The difference in figures can be attributed to her coverage of metropolitan areas where bank coverage is more extensive, and where SMEs may be better off.

[22] Note that the questions were structured so that SME owners could answer yes or no to each one independently. Thus the totals of "work harder," "add working hours," and "add workers" do not sum to 100 percent. Nor are the responses intended to give a strict chronological sequence, although the share of respondents answering affirmatively does suggest a progression in responses.

VI Summary and Conclusion

Overview

This section concludes the book by summarizing important lessons learned from, and the significant impacts of, the APRP policy reform process. It also outlines an agenda for future reform and research. Chapter 19 summarizes the steps in APRP's policy reform process. It describes how APRP maximized the participation of stakeholders, provided analytical support to the development of policy positions, tested reform with pilot activities, and acted as a neutral broker. This chapter also summarizes how APRP achieved sustainability in policy reform by fostering inter-ministry and inter-agency cooperation, building capacity, supporting reform champions to serve as role models, and promoting changes in attitudes and approaches.

Chapter 20 is not so much a repetition of the conclusions of previous chapters as a selective summary and synthesis of major achievements and lessons learned. It also makes some general recommendations based on the APRP experience in policy reform. The focus is on approaches to monitoring and impact assessment, commodity subsector reforms and implementation activities, and achievements in important cross-cutting areas, such as improving agricultural information, defining appropriate public and private roles in the liberalized agricultural economy, and improving management of irrigation water.

Chapter 21 links two agendas: one for future policy reform efforts and one for research. It assumes that the GOE, with or without support from major donors such as USAID, will continue to work in the policy domains that have dominated APRP and APCP. It does not assume that policy reform in a particular area is finished, because the reform agenda will change in response to shifting macroeconomic, international market, and political conditions. Hence, the author does not take the approach that a future reform program will have carte blanche to define policy priorities. Some areas or issues are politically out-of-bounds, and they are not on the policy reform agenda for good reason.

19 Policy Reform as a Process: Benefits and Lessons from APRP

Gary Ender

This chapter draws on points made in previous chapters[1] about the process of policy reform to answer the following questions: What was the Agricultural Policy Reform Program's (APRP) approach to achieving reform, how did the APRP approach to the policy reform process create a valuable legacy, and what further lessons were learned during APRP?

What Was the APRP Approach?

Policy reform is more than issuing decrees, passing laws, and developing regulations. Policy implementation combines both technical and process dimensions. The process dimension of policy reform implementation generally shares a common set of *steps* that are roughly sequential, including the following:

- Policy reform legitimization
- Constituency-building
- Resource accumulation
- Organizational design and modification
- Mobilizing resources and actions
- Monitoring progress and impact

To achieve these steps, APRP had a clear and effective *approach,* which can be summarized as:

- Maximizing the participation and effectiveness of stakeholders
- Providing targeted technical support
- Testing reform with pilot activities
- Acting as a neutral broker in all activities

Maximizing the Participation and Effectiveness of Stakeholders. APRP addressed policy reform legitimization through a process of policy dialogue that took many forms, including direct dialogue with senior officials. Sometimes the dialogue was informal: one-on-one or small group discussions between Egyptian supported by officials and APRP experts, joined periodically by USAID staff. Sometimes it was a more formal exchange through workshops or seminars, often APRP technical studies. APRP formed working groups of key stakeholders, including Government of Egypt (GOE) officials, representatives of the private

sector, and technical assistance personnel, to address specific problems. Project staff were always keen to identify and work with policy champions in both the public and private sectors. In the case of the public sector, this was typically a senior official who was willing to put resources into a reform and take certain risks to implement it. APRP helped these policy champions to succeed by coordinating, catalyzing, and providing technical assistance and other resources. The eventual transfer of tranche funds to particular ministries may also have motivated these officials to collaborate with APRP.

To build constituencies for reform, APRP carried out extensive participatory exercises, often in the form of workshops and seminars. The program emphasized widening the circle of actors who consider the program's targets important and worth achieving. By consciously remaining in the background in public forums, APRP staff facilitated the creation of indigenous constituencies for change.

APRP advanced the role of the private sector in policy implementation monitoring as part of the private-public policy dialogue. Such participation in policy monitoring reinforces the legitimacy of the policy measures being implemented.

Providing Targeted Technical Support. APRP staff provided analytical support to policy reform through the development of issues papers, economic modeling, and other analyses, often in collaboration with working groups. To facilitate organizational design and modification, APRP policy briefs elaborated organizational issues, detailed necessary procedural and structural changes, and offered recommendations. These briefs were widely disseminated among public and private sector stakeholders.

APRP used targeted technical training to ensure that individuals in both the public and private sectors had the knowledge and skills required to implement a reform properly. APRP held workshops and planning meetings to model new behaviors (e.g., to facilitate individuals from the public and private sectors working together in cooperative partnerships). The program created a cadre of Egyptians skilled in designing and managing such workshops and meetings.

Testing Reform with Pilot Activities. When it came time to mobilize resources and carry out reforms, implementation teams—with APRP facilitation, encouragement, and coaching—used pilot tests and demonstration projects to show early successes, refine reform models, and build confidence. Ministries generally extended the applications of the pilots, since they usually proved successful, often with the aid of technical assistance.

Acting as Neutral Broker in All Activities. In its interactions with stakeholders, in providing analytical support, and in agreeing to support pilot testing, APRP was not ideological but rather willing to get empirical results before applying the policy reform nationwide. This demonstrated that the program staff were neutral brokers and contributed to confidence- and trust-building. The APRP team tried

to make stakeholder interactions win-win exchanges, rather than framing them in winner-loser terms.

How Did the APRP Approach to the Policy Reform Process Create a Legacy?

Reform can be implemented in ways that accomplish it and go no further, or it can be done in such a way as to ensure that the reform will be sustained and even encourage further reform. How did APRP achieve such sustainability?

Sustainable Participatory Approach. APRP demonstrated participatory methods by using them itself to develop consensus during benchmark implementation. By the end of APRP, some benchmarks were approved that actually required participation as a general principle in a ministry's operation.

Fostering Inter-Ministry and Inter-Agency Cooperation. In addition to achieving its short-term objectives, some activities created relationships that will endure between individuals in different ministries and, more formally, between the ministries. These relationships will not only support the successful implementation of this program in future years, they might also support effective programs of other types.

In one activity (import inspections), the GOE placed the staff of several agencies (from different ministries) under the supervision of one agency and co-located their laboratories in one building. This is another model of inter-agency reform, the success of which the GOE can easily see and might emulate in other situations.

Building Capacity. APRP transferred knowledge and skills to both public and private sector individuals so that they could implement reforms properly. These skills will survive to support achieving their original purpose, but APRP also consciously trained trainers so that more individuals could receive these skills and knowledge in the future.

Supporting Reform Champions. For a significant policy reform to succeed, it was often necessary to find a champion within the government. The champions APRP assisted provide role models and hard evidence of success that can change the approach of other civil servants, in addition to any further role they may play themselves in future reforms.

Promoting Changes in Attitudes and Approaches. When APRP helped to shift government agencies' roles away from direct service delivery and administrative control of markets and toward provision of a competition-enhancing regulatory framework, this required important changes in agencies' objectives, operating procedures, structures, and staff attitudes and behaviors. APRP benchmarks, which created new official policy, sometimes required public participation in decision-making. Such participation often leads to changes in the attitudes and approaches of officials because it brings new ideas and new information to light.

By consciously remaining in the background in public forums, APRP staff facilitated the creation of indigenous constituencies for change, which have a greater likelihood of sustaining momentum toward results than expatriate-led efforts. Participation of the private sector in policy monitoring, encouraged by APRP, also contributes to maintaining and/or expanding constituencies for change.

What Lessons Have Been Learned from Using the APRP Process?

Pace of Reform and the Need for Focus. The APRP approach of using extensive collaboration and consultation, issue-focused working groups of stakeholders, and pilot tests of reforms sometimes results in "small" steps and conservative approaches to policy change. However, it also provides more frequent successes and encourages the adoption of further change. Thus, one can make significant progress in changing old ways of doing business if patience, assistance, and consensus-building are applied. Clearly, though, progress will require the focusing of resources in certain areas. This argues for the limitation of project activities to those that are deemed most important, as opposed to answering any and all requests for assistance from other projects and those in the private sector.

Importance of Information and Analysis. By tranche V, APRP had made clear the critical role of information in a market economy to many in the GOE who had experienced only the centrally planned approach. In a market economy numerous different actors, from farmers to exporters, need large amounts of current, accurate information. This required major changes on the part of the GOE to upgrade the quality of the data it was collecting, to collect new types of data, and to enhance dissemination.[2] One can see this theme running through a number of benchmarks in the final tranche of APRP (see Table 19-1).

Improving Reform Design. Ideally, the consultative process of developing benchmarks helped to create legitimacy for the reform measures and to build consensus. In practice, this pre-benchmark consensus-building was sometimes truncated because of the requirement to complete a Memorandum of Understanding by a particular date. APRP's technical and process assistance often had to use the benchmarks as "rallying points" to mobilize policy champions and stimulate progress after senior officials had already signed off on them. If the design cycle were longer or more flexible, consensus-building on the reform could go on mostly before the benchmark was agreed to. This would help alleviate two problems encountered in some benchmarks: (1) design was based on insufficient understanding of the problem, how it could be solved, and by whom; and (2) there was not really consensus in the GOE to implement the reform.

Demand Side of Policy Reform Is Critical. Government commitment and ability to supply reform is significantly enhanced when reforms are backed by pressure from the private sector and civil society, analogous to the economic principle of demand-pull leading to increased supply. However, private sector

demands are not always the same as donor-supported reforms. There are many actors who want government to do more than simply provide a "level playing field" for economic competition, along with statistics. Technical assistance can make suggestions and demonstrate arguments to their counterparts in favor of particular policies, but cannot force their acceptance. This lesson highlights the need for donors to maintain commitment for the long term, even when host-country constituents make policy choices with which they do not agree.

Table 19-1. PREVALENCE OF INFORMATION THEME IN POLICY REFORM BENCHMARKS OF TRANCHE V OF APRP

Benchmark	New Policy	Relation to Information Theme
D.2	CATGO publishes HVI test results	Potential traders and clients get access to complete information on key characteristics of cotton.
D.4	Publication of trade data and agreements	Potential traders get access to detailed information on imports and exports, and thus on potential markets.
D.7	E-trade	Cotton lint/yarn traders urged to share information on their products through use of electronic technology.
D.8	Vegetable seed "screening"	Seed producers allowed to import samples for testing to acquire information about suitability in Egypt.
D.9	Technology commercialization	Private companies gain access to embedded genetic information in seeds and other ARC discoveries.
D.10	Transparency in decision-making	MFT shares information with stakeholders on potential impacts of new regulations.
D.11	Fish export regulations	SPS standards for fish, when enforced by GOE, are information valuable to EU importers, who then need not verify the information directly themselves.

Challenge of Scaling Up Pilots. APRP demonstrated the utility of testing approaches with pilot programs based on a new policy, and then expanding the program steadily after modification based on the pilot experience. Scaling up the pilots will be critical to generating intended program impacts, but scaling up to cover the entire country will face a number of key challenges. First, will there be the resources to facilitate the expansion? Second, nationwide expansion will confront political factors that are likely to constrain implementation. If fully implemented, some of these reforms would lead to downsizing of the public sector and layoffs. Historically, the GOE has been reluctant to downsize, and given the

current economic downturn, that reluctance has, if anything, increased. The effects of interest-group politics can be mitigated to some extent in smaller pilot tests, but they may become more important as reforms are scaled up.

Policy Reform is a Long-Term Activity. The GOE's gradualist policy implementation strategy has led to a series of short-term successes, reflecting the positive elements of incremental reform, where it can be easier to deal with stakeholder opposition, effects can be tracked over time and mid-course corrections made, and action plans fine-tuned. However, the gradualist strategy posed some problems for APRP teams seeking to help build constituencies and consensus because gradualism may convey ambivalence and hesitation. Some stakeholders have doubts that the GOE is sincere about reform, and thus are not sure they want to get involved. To achieve long-term results in Egypt, reformers and their donor partners need to "stay the course."

Endnotes

[1] See in particular chapters 2, 9, and 16.

[2] See chapter 14 for details of APRP assistance in this area.

20 Summary of Impacts, Lessons Learned, and Recommendations

John S. Holtzman

Approaches to Monitoring and Impact Assessment

At the outset of the Agricultural Policy Reform Program (APRP), the Monitoring, Verification and Evaluation (MVE) Unit carried out open and consultative exercises designed to establish systems of monitoring and impact assessment. The initial monitoring consultancy (El Hawary and Ender, 1998) raised a large number of possible indicators that would be potentially useful in tracking some of the short-term effects of policy reform. These indicators were thoroughly discussed in several working meetings with APRP collaborators and staff from the United States Agency for International Development (USAID). Ultimately, the MVE Unit settled on a fairly narrow range of indicators for which data could be obtained (though not always easily) and that were judged to be meaningful measures of reform progress. The MVE Unit's impact assessment program similarly began with broad consideration of priority topics and approaches, but narrowed to a more manageable set of emphases and methods. From an academic standpoint, the MVE Unit's impact assessment can be considered modest, but from a development practitioner's standpoint, much was accomplished.

Some of the *important lessons* of the Unit's experience in monitoring and impact assessment were as follows:

- Since many APRP reforms were subsector-specific, it was judged useful and germane to carry out baseline, interim, and endline studies for key commodity and input subsystems. The advantage of this approach was that it could be used to show the effects of subsector-specific policy and regulatory reforms on the intended beneficiaries and on various other subsector participants. The disadvantage of this approach was that it was a partial equilibrium approach.[1] Subsector analysis did, however, allow the MVE Unit to examine the dynamics of a changing policy and regulatory environment from one year to the next. The cotton subsector in particular was the subject of numerous year-to-year adjustments in the rules of cotton marketing. Formal modeling techniques were not appropriate for capturing how subsector participants responded to these adjustments and what the subsector performance outcomes were. Formal modeling did prove useful, however, in forecasting how changes in agricultural productivity would lead to increased incomes and

employment in non-agricultural rural industry and services, and how this could unleash higher multipliers than investments in urban-based industries (see chapter 17).

- Many of the monitoring indicators tracked changes in public and private shares of output and market participation. These indicators, prepared in time series from 1990 on, provided a good snapshot of how well liberalization was proceeding in key industries, such as fertilizer distribution; cotton trading, ginning, and spinning; and wheat milling. This emphasis on public/private shares was appropriate in a slowly liberalizing agricultural economy, in which the public sector had once completely dominated all marketing, processing, and trading.

- Impact assessment methods and outputs must be scaled to the sophistication of the intended audience. An important objective of the impact assessment program was to provide periodic feedback to policymakers on the actual progress of reform implementation and its effects on a wide range of beneficiaries—not only producers and consumers, but also traders, processors, and exporters/importers. Subsector studies, such as surveys of farmers, traders, processors, and rural enterprises, and structured informal interviews with these food system participants, government officials, and managers of public companies were deemed appropriate methods for gauging and reporting on impact and their results could be easily interpreted. The MVE Unit's goal was not only to maintain intellectual rigor, but also to communicate readily understandable applied research results to a wide range of stakeholders (most of whom were not economists or statisticians).

- Impact assessment methods and outputs must take into account the availability and quality of agricultural and economic data. The MVE Unit conducted initial data quality reviews (Morsy et al., 1998 and 1999) that showed serious deficiencies in the Ministry of Agriculture and Land Reclamation's (MALR) statistics. Based on these assessments, the Unit devoted considerable resources to improving data quality, particularly for agricultural production statistics. Time series data that would be needed for modeling impacts were also of poor quality, or simply unavailable, for various agricultural prices (e.g., producer, wholesale, and consumer).

- As MALR, the Ministry of Water Resources and Irrigation (MWRI), the Ministry of Foreign Trade (MFT), the Cotton Arbitration and Testing General Organization (CATGO), and other agencies' investments in improved data collection systems mature, and as internally consistent time series data are generated, it will be more appropriate to use formal modeling procedures.

Commodity Subsystems

Subsector-specific policy and regulatory reforms had positive impacts on the performance of the cotton, rice, wheat, horticultural, and fertilizer subsectors. By the end of APRP, there was more private sector participation in these subsectors, public shares had declined (with the notable exception of the 82% wheat marketing channel), and producers had more market alternatives than they had at the end of the Agricultural Production and Credit Project (APCP). Nevertheless, public sector participation remained strong in all these subsectors except horticulture, and the Government of Egypt (GOE) continued to intervene in setting prices (cotton, wheat, and rice to some extent), administering market shares (cotton, wheat, and fertilizer to some extent), providing finance on favorable terms to public or quasi-public companies (cotton, wheat, and rice), and generally changing the rules of the game to favor public participation over private enterprise. Over time, however, the power of the GOE to control these commodity markets has declined. In Egypt, most commodity subsystems have reached the point where liberalization is irreversible, the private sector has strong advocacy organizations that exercise considerable voice, and policy backsliding and reversals will not be tolerated.

In that sense, the gradualist model of agricultural policy reform has worked quite well in Egypt, though serious, intractable problems remain, particularly in the cotton subsector, where many people are employed by poorly performing, money-losing public companies. The wheat subsector remains segmented into three distinct channels (82% flour, 72% flour, and rural processing) by a patchwork of administered rules, designed to keep domestically produced and imported wheat separate and prevent leakage of domestic 82% flour into the more profitable, private sector–dominated 72% flour channel. The rice subsector has become almost entirely liberalized, though unprofitable employee stakeholder association (ESA) rice milling companies are still propped up by the GOE, particularly the Food Industries Holding Company, which micro-manages their operations and guarantees access to cheap credit. The fertilizer subsector suffered a serious reversal from 1995/96 to 1996/97, which nearly undid years of concerted APCP efforts, and GOE rules regarding fertilizer imports and exports (and prices) appear to be arbitrary and subject to administrative change, but the private sector fertilizer distribution system was firmly established by the end of APRP.

Some of the significant *lessons learned* from nearly six years of subsector policy reform and implementation activities on commodity subsystems are listed below. Each lesson has a built-in recommendation for future policy reform and implementation.

1. Consistent, gradual policy reform can work if there are no policy reversals that lead the private sector to question the GOE's commitment to the reform process. Such policy reversals can set back the reform process several years.

2. Changing the modus operandi of senior GOE officials from issuing edicts without prior consultation with the private sector to a more open, transparent, and consultative model of policy and regulatory change is beginning to have significant, positive payoffs, although not all officials have "bought into" this model.

3. Strengthening commodity and business associations is an excellent way to develop policy advocacy capacity in the private sector. Strong associations can exercise countervailing power against public agencies that establish rules that favor public companies and penalize private firms. Strong associations can also work closely with government to establish a workable regulatory framework that includes acceptable and enforceable grades and standards. The best example of this is APRP's experience working with the Egyptian Association of Traders in Seeds and Pesticides to develop safe pesticide handling practices.

4. Serious privatization efforts must follow market liberalization initiatives with a lag of only 2–3 years. At least 2 years of liberalization are sufficient to convince the private sector that the government is serious about liberalization and is likely to stay the course. At that point, private entrepreneurs are ready to consider making costly investments in processing (rather than just inexpensive, lower-risk investments in trading enterprises), and they will take a hard look at privatization opportunities (as in the case of cotton ginning and spinning). If privatization programs take longer to emerge, private entrepreneurs will make their own processing investments (as in the case of the rice subsector), and the government will have difficulty with later privatizations (e.g., the GOE could only use the incomplete, ESA route to privatize rice milling companies).

5. Continuing to support weak, indebted public companies, rather than using economic criteria to perform triage, has a high opportunity cost. Resources used to prop up the weakest public companies could be better allocated to restructuring the stronger companies with the best long-term privatization prospects.

6. Privatization stalled by 1999 and is not likely to restart without a willingness on the part of the GOE to accept lower returns for selling public companies, to deal decisively with the problem of redundant labor, and to treat the land issue as a separate question (lease the land, unbundling it from any privatization transactions).

7. Larger, better-financed private companies focus on export opportunities, rather than on the domestic market (where purchasing and profit-earning opportunities are limited). The GOE needs to provide a positive enabling environment for export development that provides incentives for the private sector to make investments in improved technology, organization,

management, communications, and market intelligence. Enabled to do this, the private sector will provide leadership and innovation to export commodity systems, which the public companies cannot provide.

Cross-Cutting Issues and Areas

APRP work on improving agricultural production and marketing system information, defining appropriate public and private roles in the liberalized agribusiness system, and improving the distribution of irrigation water was critical to the overall success of APRP and had significant positive impacts. Timely, accurate, and thorough information on crop area planted and yields is valuable for both government policymakers and marketing system participants (producers, traders, processors, and exporters/importers). APRP invested significant technical resources to improve forecasts of crop yields, estimates of area planted to major field crops, and the quality of farm survey data on production costs and returns. The reliability of this information has improved, but broad and timely dissemination has lagged. Although GOE officials have access to this information, it has not yet been made broadly available to interested private sector parties. APRP provided assistance to strengthen public market information on key commodities such as cotton and rice. The APRP work with CATGO, which publishes frequent bulletins on cotton marketing and grading and posted some of this information on its website in 2002/03, has proved most successful. APRP efforts to develop better rice market information, using a MFT web site, have not been sustained.

Some of APRP's biggest successes came in promoting appropriate public and private roles in the emerging, liberalized agribusiness system. The best example is cotton pest management, where the GOE no longer sprays cotton fields for pests but instead provides a regulatory framework for registration and licensing of private firms to provide pest control services to farmers. APRP and the Cotton Sector Promotion Program played key coordinating, facilitating, and training roles in this process. APRP support to commodity and trade associations, and to the Agricultural Commodity Council structure of commodity-based subcommittees, was critical to building policy advocacy capability in the private sector, as well as the capacity to monitor the progress of policy reform (and to protest backsliding).

Irrigation water is the most critical input into Egyptian agriculture, without which crop production would not be possible in this arid country. Improving the management of this scarce resource was a key priority of APRP, which established a separate unit (and contract), the Water Policy Reform Program (under the EPIQ contract), to provide assistance to MWRI and its Water Policy Analysis Unit. Important achievements included better coordination, or matching, of irrigation water supplies with actual cropping patterns and demand. APRP helped MWRI and MALR develop a sustainable system for generating planting intentions forecasts at the village level (developed by MALR extension agents), passing this information to MWRI officials who managed irrigation command areas, analyzing both MALR data and MWRI telemetric data on water levels and flows, and using

this information to time the releases of water from the Aswan Dam (MISD information transfer system). Other accomplishments included strengthening Water User Associations (WUAs), institutionalizing the Irrigation Advisory Service, introducing techniques to reduce irrigation water use on sugarcane, increasing the productivity of rice per unit of water, applying the process of intermediate drainage reuse, revising Law 12 and Law 48, and increasing MWRI capacity to develop and implement policy change.

Important *lessons learned* from these cross-cutting efforts are as follows:

- Donor-funded investments for strengthening agricultural data and market information must focus on technical assistance and training and on limited equipment and financial resources over at least several years. Elaborate, donor-conceived systems are rarely sustained. Collaboration with government agencies that are charged with operating and sustaining information systems is key.

- Efforts to improve public market information require the ongoing support and interest of a government technocrat who sees the value of better information (in support of a liberalized agricultural economy) and is willing to fight for government resources to implement this vision. The sustainability of donor-supported programs for improving agricultural information hinges on the ability of a key technocrat to obtain government funding.

- Ensuring that better forecasts, estimates, and market information are well-disseminated to public and private users is challenging in many developing country contexts, where public sector retention of information of potential value to the private sector conveys power. Dissemination typically lags improvement in data collection and processing by a significant amount of time. The needs of private information users are generally very different from those of public officials and analysts. While private users require rapid, widespread dissemination of information in easy-to-understand formats, public users are more likely to require additional data analysis.

- Using public agencies to meet the needs of private users will generally not satisfy the latter, as public agencies have a different set of objectives and have difficulty providing timely information. To the extent that private entities can generate, process, and publish statistics of value to the private sector (as in the case of the Alexandria Cotton Exporters Association with cotton lint exports), the private sector will be better served by privately funded sources of market information. Developing countries' main private clients for better market information are producers, cooperatives, and small traders. Larger traders, processors, exporters, and importers typically have several sources of private and international market information and do not rely on government estimates.

- Establishing appropriate public and private roles in the agribusiness system must be an open, consultative process. It also needs to be given a high priority early in a policy reform program. Changing the roles of government officials and agencies that have operated in a command-and-control economy for many years requires patience, government policy champions, and private sector leaders willing to use a slow, long process rather than resort to the business-as-usual approach of one-on-one pleas to senior government officials.

- Changing the role of many public agencies from direct service providers to one of regulation, monitoring, and enforcement requires a significant change of mindset. Some public officials who have spent their whole careers in socialist systems may be incapable of making the transition and need to be co-opted, isolated, reassigned, or encouraged to take early retirement. If these individuals continue to occupy positions of power they can prevent the transition of a public agency to a new role. In such cases, donors and donor-funded projects are advised to avoid working with such individuals and agencies, as progress will be painfully slow and disappointing relative to the heavy technical and financial inputs required. In Egypt, certain subsectors (oilseeds and sugar) have been avoided by donors for precisely these reasons.

- Support to private advocacy groups, such as business and trade associations, should be limited to technical assistance in identifying and developing agendas and policy positions, training in association management and technical subject areas, strengthening market intelligence, and using trade shows to promote (Egyptian) products. Heavy, ongoing financial support would undermine longer-term prospects for sustainability, and to the extent that domestic capacity and resources are not developed, results tend to be disappointing. The APRP approach to trade association development was focused on key policy and technical issues; APRP did not provide excessive financial resources. This approach worked better for this program than it has for some other USAID-funded projects.

- APRP concentrated on issues of water supply management and distribution, rather than on demand and pricing issues. This was a strategically sound approach in a country that was not, and is still not, willing to ration scarce irrigation water through the price mechanism. While notable achievements were made in improving irrigation water supply and quality, and certain groups (WUAs) were empowered to work with local irrigation managers, demand and pricing issues will need to be addressed in the longer term, particularly as upstream Nile River Basin users demand (and obtain access to) more irrigation water. Water demanded for industry and human consumption in Egypt will increase steadily and will compete with water needed for irrigated agriculture.

- Success in resolving issues related to irrigated agriculture in Egypt requires a strong collaborative working relationship among several parties: central office

and field staff of MALR and MWRI, WUAs, cooperatives, and other producer groups. Good cooperation and communication among managers and users of this scarce resource is essential for its proper stewardship.

General Recommendations

Many sound recommendations emerged from the individual studies that served as the basis for chapters of this book. Several are highlighted here:

- Multi-year programs of policy reform are well served by an initial investment in quality analysis of key issues and agribusiness system constraints, and some attempt to rank order the reform priorities. Some targets of opportunity (or "low-hanging fruit") are worth pursuing to generate enthusiasm for policy reform and to achieve easy, early successes. A rigorous, priority-driven policy reform framework is essential for a multi-year, sector-wide program, however.

- While monitoring and evaluation should not capture a disproportionate share of a policy reform project's resources, technically sound, rigorous, and timely monitoring and evaluation can provide valuable information to those who design and implement policy reform about progress, problems, and areas for improvement. The design of achievable, clear, and verifiable indicators can also prove invaluable to policymakers and long-term policy advisors who wish to improve the design of specific policy reforms and to set the bar high, but not too high.

- APRP efforts were most successful when it developed a sequential, multi-year set of policy reforms around a specific policy constraint or reform domain, such as research and extension. This provided continuity and a feasible series of achievable policy reform steps, an approach that was well-tailored to Egypt's gradualist approach to reform.

- Although donors like far-reaching and significant policy reforms, policy reform does not have to be bold and dramatic to succeed. Incremental improvements, while less bold, are more likely to be supported by stakeholders, implemented, and sustained. Over time, in a gradualist reform culture, seemingly modest reform steps lead to significant and irreversible changes.

References

Emad El Hawary and Gary Ender. *Progress Indicators for APRP.* MVE Unit – APRP, Monitoring Report No. 1. Abt Associates Inc. Cairo, Egypt. October 1998.

Kherallah, Mylène, Hans Lofgren, Peter Gruhn, and Meyra M. Reeder. *Wheat Policy Reform in Egypt: Adjustment of Local Markets and Options for Future Reforms.* IFPRI Research Report No. 115. IFPRI, Washington, D.C. 2000.

Lofgren, Hans and M. El-Said. *Food Subsidies in Egypt: A General Equilibrium Analysis of Alternative Scenarios.* IFPRI Discussion Paper No. 48. IFPRI. Washington, D.C. 1999.

Endnote

[1] IFPRI used CGE modeling in part of its analysis of the bread subsidy program (Lofgren and El-Said, 1999) and in analyzing the potential impact of alternative wheat policy scenarios in Egypt (Kherallah et al., 2000).

21 Agenda for Future Policy Reform and Research

John S. Holtzman

This chapter presents some options for future policy reforms and for applied research that is designed to inform, monitor, or evaluate those future reforms. It does not consider the broader issue of agricultural policy gaps or overlooked policy domains, such as oilseeds, sugarcane, and livestock.

Table 21-1 identifies some recommended future policy reforms and applied research priorities for commodity subsystems. Table 21-2 identifies reforms for important crosscutting issues and implementation areas. Neither table is exhaustive, but rather they highlight selected reforms and research priorities.

Commodity Subsectors

Several common issues need to be addressed across subsectors. One issue is to *continue market liberalization by removing restrictions and quotas, and freeing up prices at different levels of the domestic marketing system*. The policy constraints have been well-specified under APRP; the required applied research comprises monitoring prices and market shares in the cotton, rice, wheat, and fertilizer subsectors. Such a monitoring effort could be part of an *improved agricultural production and market information system*, which is the second major recommendation. In a liberalized agricultural economy, policymakers, producers, marketing agents, and processors need better-quality, more reliable, and more timely information to make their decisions, whether about regulations, enforcement, buying, storage, processing, or selling decisions.

Policymakers also need to track the progress of reforms in key subsectors if they are to identify implementation shortcomings and new constraints that emerge (when one set is resolved). They must then take the appropriate steps to alleviate these constraints, whether they are related to policies, regulations, business climate, infrastructure, or other areas. Developing this capacity to conduct monitoring and evaluation, using high-quality production and marketing information, requires a change in mindset for most GOE public officials, who are not used to adjusting policies and regulations periodically to reflect market realities.

Improved methods of collecting data on area planted to major field crops and of forecasting and estimating crop yields need to be implemented nationally (in the case of cotton and wheat) and developed and initially pilot-tested for other field

Table 21-1: SUMMARY OF POLICY REFORM AND RESEARCH PRIORITIES FOR KEY COMMODITY SUBSECTORS

Policy Reform Priorities	Research Priorities
Cotton Subsector	
Ensure greater private sector and industry input into determination of varietal mix and varietal map.	Conduct market research to determine international demand for cotton lint, yarn, and fabric. Consider production of medium-staple cotton to meet needs of domestic spinners. Monitor private sector input.
Ensure greater private sector participation on Cotton Supervisory Committee.	Monitor membership and composition of Supervisory Committee. Interview private sector members regarding their participation and influence.
Disseminate and announce cotton production and marketing information.	Continue to improve methods used to forecast (and estimate) area planted, yields, prices, and market flows.
Limit production of cotton for seed to meet real requirements.	Review past and recent experience and determine area requirements for producing seed.
Further liberalize seed cotton trade to private sector participants.	Monitor private, cooperative, and public sector market shares, and Ministry of Finance follow-up.
Allow for free market pricing.	Monitor prices paid and received by producers, trading companies, and cooperatives for seed cotton and lint at different levels of marketing system.
Reduce cotton lint carryover.	Monitor carryover by variety.
Privatize public ginning, trading, and spinning companies.	Monitor Egypt's privatization program for state-owned agribusiness companies.
Rice Subsector	
Reduce the tariff on imported rice.	Monitor tariff rate reductions proposed by MFT, deliberated by the High Commission on Tariffs and Trade, and approved by the Ministry of Finance.
Allow ESA rice mills to operate more as independent entities.	Monitor FIHC management of ESA mills, its guaranteeing of finance for mills, as well as mills' paddy procurement and rice sales practices.
Allow for free-market pricing.	Monitor paddy, domestic rice, and export prices; MALR announcements about floor prices; Rice Subcommittee proposals on paddy procurement.
Abandon administrative controls on area planted to paddy.	Monitor actual area planted to paddy relative to administratively recommended area.

Table 21-1. SUMMARY OF POLICY REFORM AND RESEARCH PRIORITIES FOR KEY COMMODITY SUBSECTORS (CONT'D)

Wheat Subsector	
Privatize public milling companies.	Monitor privatization progress.
Restrict public milling companies to the production of subsidized flour.	Monitor milling of 82% and 72% flour.
Allow public milling companies to use private importation, transport, and storage services.	Monitor public milling companies' use of outside service providers.
Bring the subsidized flour milling fees in line with actual costs.	Periodically survey wheat millers to obtain information about their costs and returns.
Fully and rapidly implement the wheat-maize mixing program.	Obtain annual data from GASC and public wheat mills about maize purchases and production of mixed flour.
Review and modify the wheat flour subsidy program.	Update IFPRI work on costs and leakages of the subsidy program.
Fertilizer Subsector	
Adjust domestic prices periodically in light of world prices.	Monitor domestic and world prices, and analyze trends and differentials.
Reduce the 30% tariff on importation of nitrogen fertilizer to 0% to 10 %.	Monitor tariff levels, any reduction in tariffs, and how these reductions affect domestic prices.
Strengthen market information.	Set in place a system to collect, process, and analyze fertilizer market information.
Make PBDAC pay same ex-factory price as other buyers and be responsible for strategic storage, not trade, in fertilizer.	Continue to monitor market shares and prices paid for fertilizer of PBDAC and other buyers.
Horticulture Subsector	
Formulate a long-range strategy and plan for horticulture subsector development.	Develop a long-range strategy with HEIA, EAGA, ESAS, other associations, and the GOE.
Improve use of grades and standards, especially sorting by size, quality, and condition.	Conduct in-depth survey of traders and end users on current and preferred grades and standards for selected horticultural products.
Innovate in marketing institutions and practices.	Conduct cross-country comparative study on marketing institutions and practices that improve price discovery and transparency, even out supply peaks, lower price volatility, reduce marketing losses, and increase leverage of smallholders and their groups.
Greater frequency, accuracy, and diffusion of relevant statistics and other information on matters of production, marketing, and trade.	Conduct studies of the quality and reliability of domestic horticultural production and market information, and recommend improvements.
Final enactment and full implementation of 1997 Seed Law.	Monitor its effect on the seed trade.
Remove disincentives to use domestic truckers for carrying produce destined for export.	Conduct study of use and costs of domestic and foreign trucking by horticultural traders and exporters.

Table 21-2. SUMMARY OF POLICY REFORM AND RESEARCH PRIORITIES FOR KEY CROSS-CUTTING ISSUES

Policy Reform Priorities	Research Priorities
Irrigation Water	
Adopt revised Law 12 and revised Law 48.	
Pilot-test and expand irrigation cost-sharing by farmers.	Conduct willingness-to-pay studies of producers and producer groups.
Consider privatization programs.	Prepare feasibility and valuation studies for selected privatizations.
Formulate urban wastewater treatment policies and implement treatment controls.	
Develop policies and procedures for demand-driven irrigation with volumetric releases.	
Production and Market Information	
Establish a policy that commits resources to MALR data collection and analysis units to support operations and training.	Conduct survey of the data analysis skills and gaps of MALR staff that collect, process, and analyze agricultural data.
Give higher priority to domestic market information and develop capacity to generate and analyze it.	For selected commodities that are traded domestically, conduct user surveys to determine user needs, priorities, dissemination vehicles, and willingness to pay.
Improve and broaden dissemination of important market information.	Examine the costs and coverage of dissemination, using multiple media, as well as user preferences and willingness to pay.
Incorporate better production and marketing information into extension broadcasts, materials, and messages.	Do a critical review of the Egyptian experience and compare to what other developing countries have done.
Review current procedures and establish a policy regarding governorate review and modification of production estimates.	Monitor whether MALR governorate offices continue to review and massage agricultural data collected at lower levels.
Establish a policy that commits MWRI and MALR to devote significant resources to estimating water requirements.	Monitor MWRI and MALR estimates of planting intentions and the process by which this information is shared and used.
Establish a MALR policy to produce estimates of farmer income on an annual basis.	Analyze existing datasets to produce estimates of farm income for earlier years. Ascertain extent to which estimates are comparable. Develop data processing routines and analysis methods for determining farm income for representative farm types in representative governorates.

Table 21-2. SUMMARY OF POLICY REFORM AND RESEARCH PRIORITIES FOR KEY CROSS-CUTTING ISSUES (CONT'D)

Public and Private Sector Roles	
Establish mixed public/private marketing systems that are competitive yet meet GOE employment objectives.	Examine cross-country comparative experience and propose marketing system configurations that might work well in Egypt (with implicit privatizations or liquidations of some public companies).
Strengthen the capacity of private stakeholders to advocate policy reform.	Analyze factors driving or limiting success in Egypt and other developing countries. Apply lessons learned in the Egyptian context.
Strengthen Egyptian capacity to do applied policy research and analysis.	Assess the strengths and weaknesses of existing organizations (e.g., ECES, universities).
Reform the customs service and procedures that hinder trade.	Document the most vexing and costly customs-related bottlenecks and propose solutions to resolve them, based on worldwide best practices.
Methods of Impact Assessment (Policy Research and Analysis)	
Strengthen the capacity of MALR and other public sector agencies to conduct policy research and analysis.	Identify priority research topics, in collaboration with Egyptian analysts, and carry out collaborative research with them. This would provide training under the supervision of project staff.
Strengthen capacity of existing applied economic research institutes to analyze agricultural policy and the agribusiness system.	Review the background, staffing, and strengths and weaknesses of alternative institutions, including trade associations.

crops (rice and maize). The MALR also must be able to produce credible farm income statistics for representative farm types that are based on reliable enterprise cost and return data. This will require national application of improved data collection on enterprise costs and returns, as well as a greater investment in data analysis. A donor-funded policy project could provide formal training in analysis of farm-level data, as well as on-the-job training and supervision of Egyptian analysts in preparing estimates of enterprise costs and returns and farm incomes.

A third need common across subsectors is to *remove barriers to international trade*, particularly restrictions on imports that prevent world market conditions (supply and prices) from being transmitted to domestic marketing systems. The research required here is to monitor import levels and prices and determine how imports influence domestic markets and the behavior of market participants. For example, removing the tariff on imported rice could lead to the closure of some rice mills. Reducing the tariff on fertilizer would lead traders to seek out the cheapest source of supply; currently, most of their supplies (particularly the nitrogenous fertilizers) are sourced domestically. Although Egypt has excess capacity in domestic production of fertilizer, lowering the duty will help ensure that farmers pay the lowest price possible.

A final common issue concerns *further progress in privatization*, which stalled in the late 1990s and must be revived to complete the market liberalization process in the cotton and wheat subsectors. The nominal privatization in the rice subsector, which created ESA milling companies, should be monitored to ensure that ESA mills do not receive unfair advantages and that they soon operate as autonomous business units. Privatization of public wheat milling companies has been partial, as private investors have been permitted to take only minority stakes in public companies. This has merely diluted the GOE's ownership and has had no impact on management or company operations.

Crosscutting Issues and Themes

The crosscutting issues and implementation areas include irrigation water, production and marketing information, public and private sector roles, and methods of applied policy research on the agricultural sector (Table 21-2). A key crosscutting theme is enhancing the quality, accessibility, and analysis of information on the agricultural sector and agribusiness system.

Analysis has been a weak feature of agricultural production and marketing information systems in Egypt, as has broad and timely dissemination of information and analysis. It is important to assess the demand for policy analysis among key stakeholders, including GOE policymakers and analysts, farmers, private sector marketing agents, and donors. In a command-and-control economy, there is essentially no demand for independent, objective information and analysis. In these economies, bureaucrats develop production plans and allocate output at administered prices; market signals are irrelevant. These economies must be insulated from world markets, and that has become increasingly difficult in the post-GATT/Uruguay Round world. As trade barriers fall in Egypt and as more countries become GATT signatories, policymakers will be unable to run autarkic economies. Liberalized economies need large amounts of timely and accurate information to function effectively; supplies and prices of commodities are subject to change, and producers, processors, and marketing agents must be able to respond quickly and decisively to these changes.

In a country like Egypt, where the economic system is in gradual transition to a private sector-driven, free-market system, some public officials feel they do not need better information and analysis, and that they would not know what to do with better information and analysis if they actually had it. In such cases, surveying GOE officials about their information and analysis needs may not generate much usable input. However, both Egyptian and expatriate analysts can provide illustrative analyses, based on their best judgment as to the value and utility of alternative analyses and analytical techniques, that policymakers might find useful. In such a situation, a supply of useful, clear, and effectively conveyed policy analysis can help to create demand among policymakers for more analysis. Using Egyptian researchers in more of a collaborative research mode, under the

close supervision of project staff, could also increase the chances that policy analysis information does reach Egyptian officials and is put to good use.

Beyond conducting better analysis, the GOE needs to demonstrate a *greater commitment to broad dissemination of agricultural production and marketing information*, as well as applied research results. Even in cases where APRP improved data quality and recommended ways to speed up data processing and analysis, GOE agencies did not always disseminate production and marketing information quickly or broadly. If USAID were to fund a follow-up policy reform project, it could consider using tranche funds for policy benchmarks that require faster and wider distribution of market information and applied policy analysis.

In chapter 9, Keith recommends several policy reform priorities for irrigation water. He suggests conducting *pilot tests of irrigation cost-sharing schemes* with groups of farmers. This would begin to bring demand for water into farmers' thinking and cropping choices, which would complement APRP's work on water supply management and on coordinating water deliveries with actual cropping patterns. Keith also recommends that the GOE modify Laws 12 and 48, consider privatizing certain irrigation management functions, formulate urban wastewater treatment policies, and implement treatment controls.

Another set of crosscutting issues concerns *public and private sector roles* in the evolving Egyptian agricultural economy. One strategic issue is the extent to which the GOE is willing to keep mixed public/private agricultural marketing and processing systems in place, despite the obvious opportunity costs of continuing to subsidize so many poorly performing public companies. Privatization progress has stalled, and breaking the impasse requires tough political choices that will likely have some negative short-term social and economic consequences for laid-off public sector workers. Applied research on the privatization experiences of other developing countries could provide useful lessons for the GOE, which could experiment with alternative privatization strategies and ways to co-opt or compensate losers.

A last crosscutting problem area is *customs*, whose time-consuming and often contradictory procedures are maddening for private exporters and importers. Documenting the most costly and vexing customs-related problems for the GOE would be useful and could be used to initiate a national debate about how to reform the customs service so that customs procedures do not impede trade (and thus lower potential increases in national income).

Conclusion

In follow-up projects to APRP, the GOE and project implementers may decide to address policy issues that were not considered by APRP. There is likely to be a whole complex of issues to address in the livestock and feed subsectors. The public sector-dominated oilseed processing industry has resisted privatization and liberalization. APRP touched on the sugar subsector, though mainly from the

perspective of irrigation water management. The World Bank produced a sugar subsector review in the early 1990s (World Bank, 1994), but price policy and trade issues have not been openly discussed and debated for a decade.

Much remains to be done in liberalizing the Egyptian agricultural economy. APRP continued work on leading field crops that were subject to restrictions and distortions in the 1980s and 1990s. APRP was built upon and logically followed APCP and a prior water policy project funded by USAID (i.e., the Water Resources Strategic Research Activity). APRP emphasized several new policy areas, in which groups of related policy benchmarks[1] were formulated:

- Policy reform in the horticultural subsector
- Making agricultural research and extension more market-driven
- Pesticide industry regulation

Water supply management was also improved by MWRI and far better coordinated by MALR and MWRI. Although work on managing irrigation water delivery was not new, the collaborative process that APRP led was innovative in Egypt, and resulted in more precise timing of water deliveries to Delta command areas. This set of policy reforms and implementation activities became a model for inter-agency cooperation in the GOE.

Most other policy reform areas (liberalization of the cotton, rice, and fertilizer subsectors; reform of cooperatives; privatization) had been addressed by APCP or earlier USAID-funded projects. The degree of emphasis on improving agricultural production and marketing information by APRP was a hallmark of the program. IFPRI's work on the wheat subsector, bread subsidies, and food consumption patterns expanded greatly upon earlier IFPRI contributions, although the GOE and USAID decided not to tackle thorny issues related to reforming the food subsidy schemes in Egypt.

In addition to undertaking challenges in new policy areas and expanding significantly upon earlier USAID-funded programs of policy reform, APRP enhanced private sector participation in policy dialogue. This dialogue helped to increase the responsiveness of the GOE to private sector concerns and positions in support of a competitive market environment. At the same time, the GOE deserves credit for becoming more willing to respond to private sector positions and the policy and regulatory demands of a more liberalized agricultural economy. This was an impressive achievement for a government that had essentially dictated policies, set cropping patterns, and administered prices and market shares for nearly 30 years before USAID began working with the GOE on agricultural sector policy reform under APCP.

Other Recent Studies

An *Assessment of Egypt's Agricultural Competitiveness*, conducted in the first half of 2002, provides some additional ideas about a future agricultural policy reform and implementation agenda (Development Alternatives, Inc. and Abt Associates Inc., 2002). Assuming that USAID resources for policy reform and agricultural development in Egypt will decline in coming years, the study team argues that policy reform be targeted to the following priorities:

- Increasing agricultural incomes to stimulate increased rural non-farm employment
- Improving the productivity and competitiveness of smallholders
- Broadening the horticultural development strategy to diversify crops and markets, enhancing the role of small growers in supplying exporters, and integrating the fresh and processed segments of the industry
- Improving the smallholder livestock sector to increase agricultural incomes, especially for women

The study team identified several priority policy issues for USAID action, including the following:

- Policies that constrain the productivity and competitiveness of agriculture
- Policies that have broad impact on agriculture, such as water policies
- Policies that affect the productivity and competitiveness of specific commodity subsystems

A key message from this study is that USAID should focus on a selected number of commodity subsystems, such as horticulture, livestock, and cotton, as well as on a manageable set of macro and crosscutting issues, such as the exchange rate[2], water policy, WTO, and trade agreements.

The World Bank conducted its own strategy study on agricultural export competitiveness (World Bank, 2001), though this drew heavily on APRP analyses and benefited from significant direct contributions from APRP analysts. This study identifies the cotton and horticultural subsectors as those most likely to benefit from comparative advantages in trade, and then identifies the main impediments to export growth. The World Bank proposes a framework for action to increase cotton production, quality, and exports that stresses liberalization of the seed cotton market, tied to a workable floor price scheme. The World Bank recommends that liberalization begin with ELS cotton varieties, which are largely exported. It is argued that successes in liberalizing the market and prices for ELS cotton will hasten the adjustment of farmers and traders to a free-market environment for all cotton varieties grown in Egypt. The World Bank recommendations for increasing horticultural crop exports focus on improving product quality to meet international standards, as well as on establishing a legal framework for promoting contract farming between small farmers and larger commercial farmers and exporters.

It is hoped that the GOE, possibly in collaboration with one or more donor agencies, will use the findings and recommendations of these two major studies, as well as the conclusions of this book, to formulate the next generation of agricultural sector and agribusiness system policy and applied research priorities.

References

Development Alternatives, Inc. and Abt Associates Inc. *Assessment of Egypt's Agricultural Sector Competitiveness.* RAISE IQC Contract. Bethesda, Maryland. June 2002.

World Bank. *Arab Republic of Egypt—Toward Agricultural Competitiveness in the 21st Century: An Agricultural Export-Oriented Strategy.* The World Bank. Washington, D.C. 2001.

World Bank. *Arab Republic of Egypt Sugar Subsector Study.* Agriculture Operations Division, Country Department II, Middle East and North Africa Region. Report No. 132-08-EGT. World Bank. Washington, D.C. December 1994.

Endnotes

[1] APRP's new benchmarks were not limited to these three areas, though there was a critical mass of benchmarks, spread over several tranches, targeted to these three policy domains.

[2] Note that the GOE announced that it would begin floating the Egyptian pound in January 2003, which led to an immediate devaluation to $1 = 5.5 LE. Since that point, the pound floated down to an exchange rate of $1 = 5.95 LE as of early June 2003. By allowing the pound to float, the GOE has undertaken exchange rate reform recommended by many donors and analysts. This should contribute to expanded agricultural exports, as the dollar or euro cost of Egyptian products has been lowered.

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