Assessment of Egypt's Agricultural Sector Competitiveness

Volume II: Analysis, Principal Findings, and Recommendations

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ACRONYMS AND ABBREVIATIONS

Abt	Abt Associates Inc.
AgLink	Agricultural Linkages for Egypt Project
ALCOTEXA	Alexandria Cotton Exporters Association
ALEB	Agriculture-Led Export Business
APRP	Agricultural Policy Reform Project
ARC	Agricultural Research Center
ATUT	Agricultural Technology Utilization and Transfer Project
BASA	Business Association Strengthening Activity
CAC	Cotton Allocation Committee
CBI	Centre for the Promotion of Imports from Developing Countries
CBS	Center for Business Support
CIF	Cost, Insurance, and Freight
CLE	Crop Life Egypt
DAI	Development Alternatives Inc.
DRC	Domestic Resource Cost
EAGA	Egyptian Agribusiness Association
EATSAP	Egyptian Association of Traders of Seeds and Agricultural
ECCA	Egyptian Cold Chain Association
ECRI	Egyptian Cotton Research Institute
EEA / ExpoLink	Egyptian Exporters' Association
EEPC	Egyptian Export Promotion Center
ELS	Extra Long Staple Cotton
EMPA	Egyptian Milk Producers Association
ERSAP	Economic Reform and Structural Adjustment Program
ESAS	Egyptian Seed Association
EU	European Union
EUREGAP	The Global Partnership for Sustainable Agriculture of the European Retailers Program
EUROSTAT	European Union Statistical Database
FAO	UN Food and Agricultural Organization
FAOSTAT	Food and Agriculture Organization of the United Nations Statistical Database
FEI	Federation of Egyptian Industries
GAFRD	General Authority for Fish Resources Development
GAP	Good Agricultural Practices
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GOE	Government of Egypt
GTZ	German Aid Agency
HACCP	Hazard Analysis Critical Control Points
HAD	High Aswan Dam
HEIA	Horticultural Export Improvement Association
IARC	International Agricultural Research Centers

ICAC	International Cotton Advisory Committee
ICLARM	International Center for Living Aquatic Resources Management
IDRC	International Development Research Centre
IESC	International Executive Service Corps
IQF	Individually Quick Frozen
IRRI	International Rice Research Institute
ITC	International Trade Center, UNCTAD
LE	Egyptian Pounds
LS	Long Staple Cotton
M&E	GTG Monitoring and Evaluation Unit
MALR	Ministry of Agriculture and Land Resources
MFA	Multi-Fiber Agreement
MFN	Most Favored Nation
MLS	Medium Long Staple Cotton (check with Lamb)
MVE	Monitoring, Verification and Evaluation Unit
MWRI	Ministry of Water Resources and Irrigation
NARIs	National Agricultural Research Institutions
NARP	National Agricultural Research Project
NGO	Non Governmental Organization
NRC	National Research Center
NTAE	Non-Traditional Agricultural Exports
NTR	Non-Tradeable
NTRV	Non-Tradeable Value
PBDAC	Principal Bank for Development and Agricultural Credit
	Pesticides
REC	Research and Extension Councils
SDT	WTO Special and Differential Treatment
SME	Small and Medium Enterprises
TPRM	WTO Trade Policy Review Mechanism
TR	Tradeable
TRV	Tradeable Value
USAID/Egypt	U.S. Agency for International Development, Egypt Mission
USG	U.S. Government
WPRP	Water Policy Reform Program
WTO	World Trade Organization
YLCV	Yellow Leaf Curl Virus

TABLE OF CONTENTS

EXECUTIVE SUMMARY **xi**

CHAPTER ONE
INTRODUCTION **1**
What Did USAID Ask The Assessment Team To Do? 1
Organization of this Assessment 1
What Did The Assessment Team Do? 2
The Team's Methodology and Approach 2
About Competitiveness 3
About Priorities 4

CHAPTER TWO
USAID INTERVENTIONS IN THE AGRICULTURAL SECTOR **5**
EVOLUTION OF USAID PROGRAMS 5
ILLUSTRATIVE PAST INTERVENTIONS 5
The 1980s 6
CURRENT USAID-SUPPORTED AGRICULTURAL PROGRAMS 8
The 1990s to Date 8
LESSONS LEARNED 13
Lessons Learned by Large-Scale Projects 14
Lessons Learned by Smaller-Scale Projects 15
Lessons Learned by Egyptian-Led Projects 16
Is There an Ideal Approach? 16
Opportunities for Improvement 17

CHAPTER THREE
ALTERNATIVE GROWTH STRATEGIES **19**
THE GENERAL RELATION BETWEEN AGRICULTURAL GROWTH AND EMPLOYMENT 21
HISTORICAL GROWTH RATES OF GDP AND AGRICULTURE 23
Target Growth Rates by Commodity Group 24
Comparative Advantage in Agricultural Commodities 29
KEY CONSTRAINTS FOR SPECIFIED COMMODITY GROUPS 30
Cotton 30
Cereals 30
Other Field Crops 31
Horticulture 31

Livestock 31
Efficiency of Input Use-Fertilizer 31
Efficiency of Input Use-Water 32
Achieving the Aggregate Agricultural Growth Rate 33
THE EMPLOYMENT IMPACT OF THE TARGETED GROWTH RATES 33
Base Data 34
Growth Rates 34
Employment Impact of Rapid Agricultural Growth 35
ALTERNATIVES TO AGRICULTURE-LED GROWTH 35
De-emphasizing Agriculture Generally 36
De-emphasizing Specified Commodity Groups 37

CHAPTER FOUR
ANALYSIS OF SELECTED COMMODITIES AND THEIR SUPPLY CHAINS 39
OVERVIEW OF EGYPTIAN AGRICULTURE 39
OVERVIEW OF CEREALS 39
Wheat 41
Maize 48
Rice 52
Cereals Sector Issues and Recommendations 56
COTTON 57
Production 58
Ginning and Marketing 66
Exporting 69
Comparative and Competitive Advantage 73
Opportunities for Growth 73
HORTICULTURE 75
Non-Traditional Export Crops 76
Production 76
Marketing 78
Competitive Advantage 80
Opportunities for Growth 82
Sector Specific Constraints 83
Traditional Crops 85
Production 85
Tomato 86
Potato 87
Orange 88
Marketing 88
Competitive Advantage 88
Opportunities for Growth 89
Sector Specific Constraints 90
Domestic and Export Growth Potential 92

PROCESSED FOOD AND AGRICULTURAL PRODUCTS 95
Production 96
Marketing 98
Exports 98
Comparative and Competitive Advantage 100
Constraints 100
Opportunities for Growth 102
SUGAR 103
Production 103
Processing and Handling 105
Marketing 108
Comparative and Competitive Advantages 108
Opportunities for Growth 108
Sector-Specific Constraints 108
FISHERIES AND AQUACULTURE 108
Overview 108
Fish Production 109
Supply Chain 112
Fisheries vs. Crop Production 116
Recommendations 118
LIVESTOCK AND POULTRY 118
Overview 118
Dairy 120
Red Meat 125
Poultry 128
Inputs 131
Recommendations 134

CHAPTER FIVE
POLICY AND POLICY IMPLEMENTATION ISSUES CRITICAL TO EGYPTIAN AGRICULTURE **137**
OVERVIEW 137
MACROECONOMIC ISSUES 138
Trade Policy 138
State Trading 142
Exchange Rate Policy 143
Natural Resources Policies 144
Sectoral Policies and Regulations 145
Institutional Issues 147
Legal Issues 155
Infrastructure Issues 158
POLICY AND REGULATORY RECOMMENDATIONS 160
Recommendations 161

CHAPTER SIX
THE ROLES OF THE PRIVATE AND PUBLIC SECTORS 163
PUBLIC-PRIVATE COOPERATION—KEY TO AGRICULTURAL PROGRESS 163
Egypt's Private Sector 163
The Public Sector 173
RECOMMENDATIONS—PRIVATE SECTOR 175
RECOMMENDATIONS—PUBLIC SECTOR 176

CHAPTER SEVEN
RECOMMENDED AREAS FOR FUTURE USAID INTERVENTION 177
DISCUSSION OF ALTERNATIVE STRATEGIES 177
REAFFIRM COMMITMENT TO AGRICULTURAL DEVELOPMENT 179
CONTINUE POLICY REFORM AND IMPLEMENTATION ACTIVITIES 180
CONTINUE AND BROADEN SUPPORT FOR THE HORTICULTURE SECTOR 181
DEVELOP A SUBSTANTIAL TECHNICAL ASSISTANCE PROGRAM IN THE LIVESTOCK SECTOR 181
CONTINUE SUPPORT FOR PROCESSED FOODS AND AGRICULTURAL PRODUCTS 182
CONTINUE TO SUPPORT THE DEVELOPMENT OF PRIVATE SECTOR TRADE ASSOCIATIONS AND NGOS 183

ANNEX A: HORTICULTURE A-1

ANNEX B: REFERENCES B-1

ANNEX C: FISHERIES AND AQUACULTURE REFERENCES C-1

LIST OF TABLES AND FIGURES

Tables

3-1 Growth Rates for GDP and Agriculture, 1980-1990 and 1990-1999, Egypt 23
3-2 Target Agricultural Growth Rates by Commodity Group, Egypt, 1999 Base 24
3-3a Target Sources of Growth, by Commodity, Hypothetical, Egypt 24
3-3b Demand Growth under High, Balanced Growth Scenario, Egypt 25
3-4 Egypt Compared To Selected Countries, Yield Of Specified Crops, 2001 27
3-5 Domestic Resource Cost, Various Commodities 29
3-6 Domestic Resource Cost, Livestock Products 30
3-7 Three Hypothetical Situations of Agricultural Growth 32
3-8 GDP and Employment Proportion, By Sector, Egypt, Hypothetical 34
3-9 Employment and GDP Growth Rates, By Sector, Egypt, Hypothetical 35
3-10 Jobs Generated in the Rural and Urban Sub-Sectors, Fast and Slow Growth in Agriculture, 2002 36
3-11 Impact of Individual Commodity Groups on Employment Decline, Difference Between Fast and Slow Agricultural Growth 37

4-1 Wheat Production Costs and Returns 43
4-2 Maize Returns and Costs of Production 50
4-3 Maize Simulation Results 52
4-4 Returns and Costs of Production for Rice 53
4-5 Simulation Results for Rice 55
4-6 National Cotton Yields For Selected Countries 61
4-7 Strawberry and Table Grape Production, 1997-2001 77
4-8 EU Import Data—Table Grape and Strawberry, Crop Years 1999-2000 (metric tons) 78
4-9 Egyptian Production, Export, Domestic Consumption Data, Strawberry & Table Grape, 1997-2001 (000 metric tons) 79
4-10 Major Production Areas, Selected Crops, 2000 86
4-11 Growth in Domestic Consumption of Horticultural Products, 1991-1999 92
4-12 Egyptian Horticultural Exports, 1990-1999 93
4-13 Export Growth Rate Projections, 2002-2007, 2012 94
4-14 Trends in the Production of the selected Crop-based Semi-Processed Products in Egypt (1991-2001) 96
4-15 Trends in the Production of Selected Livestock-based Semi-Processed Products in Egypt (1991-2001) 96
4-16 Area Harvested for Selected Horticultural Crops in Egypt (1991-2001) 97
4-17 Production of Selected Horticultural Crops in Egypt (1991-2001) 97
4-18 Exports of Selected Processed Foods by Volume (1996-2001) 98
4-19 Exports of Selected Processed Foods by Value (1996-2001) 99
4-20 Sugar Cane Revenue and Cost Structure 105
4-21 Beet Revenue and Cost Structure 107

4-22 Fish production and import during 1992-2000 ('000 tonnes) 110
4-23 Fish Consumption During 1992-2000 ('000 tonnes) 113
4-24 Livestock Inventory, 1999 119
4-25 Livestock /Poultry Consumption Data 120
4-26 Milk Supply, 1990, 1997-2001 120
4-27 Livestock production, Fertility, and Mortality Data, 2000 121
4-28 Red Meat Supply, 1990, 1996-2000 125
4-29 Trade in Live Ruminants, 1995-2000i (Head) 125
4-30 Poultry Meat Supply, 1990, 1997-2001 (000 mt) 129
4-31 Table Egg Production (000mt) 129

5-1 Average Agricultural Support, 1998-2000 (U.S. Dollars) 142
5-2 Policy Matrix by Topic and Commodity 162

7-1 Differences among Recommended USAID Intervention Areas 178

Figures

4-1 Egyptian Crops in 2000/01 39
4-2 Changes in Area for Cereals and Cotton 40
4-3 Changes in Yield for Cereals and Cotton 40
4-4 Changes in Production for Cereals and Cotton 41
4-5 Domestic Production and Farm Gate Prices 42
4-6 Wheat Subsector 44
4-7 U.S. Gulf Wheat Prices 47
4-8 Distribution for Wheat NPC/D8 48
4-9 Distribution for Wheat EPC/D9 48
4-10 Quantity and Value of Wheat and Maize Imports 51
4-11 Area Planted to Cotton in Egypt 59
4-12 Egyptian Cotton Production 60
4-13 Average Annual Yields in Egyptian Cotton 61
4-14 Egyptian Cotton Production by Category 64
4-15 Cotton Revenue and Cost Structure 66
4-16 Extra-fine Cotton 67
4-17 Trends in Stock, Exports, and Consumption of Egyptian Cotton 68
4-18 Export Volumes of Egyptian Lint Cotton by Type 70
4-19 World Production of Major Types of Cotton 71
4-20 Worldwide Production of Extra Fine Cotton 71
4-21 Worldwide Exports of Extra Fine Cotton 72
4-22 In-Country Consumption of Extra Fine Cotton 72
4-23 Price Relationships for Selected Export Crops between the EU, Gulf Countries, and Local Markets 81
4-24 Sugar Cane and Beet Production 103
4-25 Sugar Cane Area and Yield 104
4-26 Beet Area and Yield 104

EXECUTIVE SUMMARY

This report assesses the key opportunities and constraints for increasing the agricultural sector contribution to economic and employment growth in Egypt. USAID/Egypt is in the process of reviewing its Agricultural sector strategy in light of anticipated reductions in overall funding and the completion of two major agricultural projects within the next six months. This report provides the analytical basis and recommendations for developing and implementing new interventions in the sector that are consistent with USAID/Egypt's 2000-2009 Strategy to promote a "Globally Competitive Economy Benefiting Egyptians Equitably".

Key Assumptions

USAID's commitment to both equitable growth and increased competitiveness sets important parameters for this assessment. The principal consequence is the significance that rural farm and non-farm employment has in our analysis and resulting recommendations. Briefly stated, this assessment is based on an economic model (described in detail in the assessment) that shows that the greatest employment gains in the Egyptian economy arise from the high multiplier effects from increased agricultural incomes. To achieve these increases in rural agricultural incomes requires paying special attention to the constraints affecting smallholders. Furthermore, since some commodity sectors offer greater comparative advantage (e.g., cotton), market potential (e.g., horticulture) or opportunity for productivity increases (e.g., livestock) than others, the Team places greater emphasis on these commodity systems than on others such as sugar or cereals.

The second major factor conditioning our analysis and recommendations is the assumption that USAID/Egypt will have fewer resources, perhaps significantly fewer, to devote to achieving its development goals in Egypt over the near to mid-term (see Terms of Reference in Annex 1). The major consequence of this assumption is the prioritization and ensuing limitations on our recommendations for future interventions in the agricultural sector. This has been a useful parameter for the assessment, as it focused attention on those actions and activities that the Assessment Team believes will have the greatest impact. While there are innumerable constraints to be addressed and opportunities to seize to improve the productivity, value added, and competitiveness of the Egyptian agricultural sector, the Team's findings lead to a few high priority recommendations for USAID action.

Why Agriculture?

Agriculture represents a significant (17 percent of GDP) but by no means dominant sector of the Egyptian economy. Yet, development research across a broad array of countries suggests that rapid agricultural growth results in the quickest employment growth, so it is the best entry point for ensuring that economic growth is broadly participatory and hence equitable. The difference between rapid (4.8 percent per year) and slow (2.8 percent per year) growth in

Egyptian agriculture represents over 300,000 more jobs per year. Somewhat less than 20 percent of those additional jobs are in agricultural production, about one-quarter in the agribusiness input and output marketing activities, and nearly two-thirds in the rural non-farm consumer goods and services sector.

The rural non-farm sector is almost entirely a producer of non-tradable goods and services and occupies 44 percent of the labor force. Agriculture is the dominant source of increased demand for the rural non-farm sector. Without rapidly rising farm incomes the essential increased demand for the goods and services provided by the employment-intensive rural non-farm sector will not exist.

This report documents how agricultural growth can be accelerated to achieve nearly a five percent growth rate through increased productivity, efficiency, and competitiveness. Such a growth rate, with its profound impact on employment growth, requires major acceleration in each of five commodity groups delineated in our analysis. We find that improved policy is critical to each of the commodity groups so we first delineate a means of setting priorities for policy change, then discuss the means of implementing priority changes and associated cash transfer payments and finally suggest a significant set of development interventions designed to further that end. We also project a high rate of return to technical assistance throughout the value chain in the horticulture and livestock sectors (which together account for nearly three-quarters of increments to fast growth in agriculture.)

Why Emphasize Agriculture Now?

This is an unusually propitious time for USAID to provide major assistance to accelerating agricultural growth. There is momentum in its past programs in policy reform and export development. The employment problem in Egypt has become increasingly acute, particularly as rationalization in urban employment dumps even more people onto the unemployment roles. Opportunities and threats are expanding rapidly with an increasing globalization of food and fiber markets and the enactment of WTO conditions.

What is New?

This assessment outlines a program to support Egyptian agriculture that builds on USAID past experience but presents new approaches to address the needs and realities of 21st century agriculture in Egypt. The five key elements are:

1. Increasing agricultural incomes to stimulate increased rural non-farm employment.
2. Improving the productivity and competitiveness of smallholders to achieve increased incomes.
3. Broadening the horticultural development strategy to diversify crops and markets, enhance the role of small growers as suppliers to exporters, integrate the fresh and processed segments of the industry, and expand the use of good agricultural practices in domestic horticulture.

4. Improving the smallholder livestock sector as a means to increase agricultural incomes, especially for women who dominate this sector.
5. Targeting policy reform and implementation linked to the achievements of points 1-4.

POLICY REFORM AND IMPLEMENTATION

Findings

Policy reform and implementation in Egypt is a gradual process, but one that has seen important changes in the structure and operation of the agricultural sector. Egyptian agriculture is now more responsive to domestic and international market forces, less constrained by GOE involvement in production and marketing decisions and more open to competition than ever before. Much of this progress is due to USAID's commitment to high quality policy analysis and reforms, constructive interaction with the government and private sector, and detailed monitoring and evaluation. However, it is clear that policy constraints continue to prevent Egypt from fully realizing the comparative advantage that it has in most commodity systems. The challenge of reform is not completed.

The environment in which policy reform and its implementation occur is changing rapidly in Egypt. Several factors account for this evolution. First, as Egypt becomes more integrated into the global economy, its policies must conform to the requirements of WTO and other trade agreements. Second, global competition places a premium on policies that could reduce production and marketing costs through more efficient customs services, efficient use of natural resources such as water, and access to low cost production inputs. Third, the growing role of the private sector is the most dramatic change affecting how policies are formulated and implemented. Business and trade associations, with significant assistance from USAID, are becoming a major force in the policy process. However, these associations are not yet capable of fulfilling this policy advocacy role entirely on their own. Finally, given this assessment's emphasis on fast growth in agriculture as a prerequisite for large increases in farm and rural non-farm employment, the lack of a policy focus on the productivity and competitiveness of smallholders is a serious shortcoming.

Given this context, the Team identified a set of priority policy issues for USAID action. They are:

- Policies that seriously constrain the productivity and competitiveness of agriculture, as well as other sectors of the Egyptian economy. WTO readiness, exchange rate policy, reform of the Customs Service, and reduction of State involvement in trading are the top issues.

- Policies that have impacts on agriculture as a whole or multiple commodity systems. Water policy, including megaprojects such as Toshka, is the most significant.

- Policies that affect the productivity and competitiveness of specific commodity systems. Current cotton policies create major distortions in this system and deserve USAID's continued engagement. Other significant policies include sanitary standards in livestock that are not science-based and those that impede the importation and registration of cultivars in horticulture

Recommendations

- USAID should orient Policy Reform, Implementation and Monitoring to focus on the policy priorities based on the strategy of stimulating fast growth agriculture as the means to increase smallholder income and rural non-farm employment.

- USAID should target policy activities on a select number of commodity systems (horticulture, smallholder livestock and cotton) and a manageable number of macro and cross cutting issues (exchange rates, water policy, WTO and trade agreements).

- Policy reforms in macro-economic areas, such as exchange rates and cross cutting issues, such as water should be coordinated with other USAID offices to reinforce USAID influence.

- Building on USAID's efforts to monitor and verify policy implementation, additional efforts should be made to ensure that implementation occurs at operational levels in commodity systems. Continued support to trade associations in their policy role is one promising way to focus attention on the execution of policy reforms.

- USAID should make a concerted effort to transfer policy analysis capabilities to Egyptian institutions, public and private, over the next five years. The progress of trade associations holds promise as one element of this strategy. However, by their nature these groups are not disinterested, objective sources of policy advice. Neither is the MALR. Other institutional options should be examined.

HORTICULTURE

Findings

USAID's programs promoting high value non-traditional agricultural exports (NTAE) have initiated a new era in Egyptian horticulture. While exports of the major traditional products—potato, orange, and dried onion—have declined, NTAE products introduced by USAID are being successfully commercialized. They are projected to account for more one-half of total horticultural exports by mid-decade, and to increase in importance as production increases, new products are introduced, and additional markets are entered. A USAID-supported program has established a product/market development system that provides a strong foundation for this growth by delivering an appropriate mix of production, post-

harvest, and marketing support to the growers and shippers who have committed risk capital to establish an NTAE sub-sector. The Horticultural Export Improvement Association, an association of growers, exporters, and service organizations is providing marketing information and support, technical services, and policy analysis and advocacy for continued improvements in the enabling environment. Another USAID-supported program has successfully upgraded plant and food safety systems, raised processing efficiency, improved products and export marketing strategies, and ultimately raised the competitiveness of client enterprises. However, the capabilities established through these programs, and the numbers of enterprises assisted, have not yet reached the critical mass required to be self-sustaining.

The on-going establishment of a vibrant NTAE sub-sector has important implications for Egypt's more traditional, domestically oriented horticultural sector. Agricultural innovations, cold chain facilities, and transport improvements basic to NTAE success can have spillover effects in the national-level supply chain. Yet the creation of an integrated, sustainable total horticulture sector that is globally competitive and benefits Egyptians equitably requires that direct attention be given to the special needs of the more traditional sub-sector. The sheer size of the traditional sub-sector provides an opportunity to reach hundreds of thousands of small and medium-holders. Large exporters need additional sources of supply from different production areas. Small producers need additional outlets capable of absorbing volume increases and peak supply, thereby buffering price volatility. It follows that the best long-term growth strategy for the horticultural subsector is to work to expand the domestic and export markets for both fresh and processed products (especially through value-added innovation), while simultaneously upgrading the quality, safety, and consistency of supply of small, medium and larger operators.

Recommendations

The Team believes that USAID should continue, but broaden its support to Egypt's horticultural sector.

- Interventions should encompass both domestic and export, and traditional, non-traditional, and new product and market opportunities simultaneously. In the NTAE sub-sector, USAID's assistance should focus on solidifying the success of products already in the system, adding value through innovation, introducing and commercializing new products, incorporating small- and medium-holder participation where feasible.

- In the traditional sub-sector, USAID's assistance should focus on developing and delivering appropriate technologies for production and post-harvest handling using innovative private and public-sector delivery mechanisms, and also on improvements in the domestic distribution and marketing systems.

- For processed horticultural products, emphasis should be given to introducing cultivars and Good Agricultural Practices that are tailored to the needs of processors, while reinforcing supply relationships between contract growers and the processing companies,

and fostering greater integration between the fresh and processed segments of the industry.

LIVESTOCK AND FISHERIES

Findings

Livestock and fisheries together comprise 24 percent of value added in the agricultural sector. Production is predominantly on small farms, although there is a modest sized large-scale sub-sector. Livestock represent about two-thirds of that total and within livestock, milk and associated meat account for over half of the livestock sub-sector. Women dominate livestock production and marketing and diary animals are distributed far more equitably than land. There is a powerful interaction of livestock and crop production, with substantial area devoted to the principal high quality roughage, berseem. Rapid growth in livestock will increase the demand for maize as feed. Maize is already an important import.

Although a domestic resource cost of one or less indicates a comparative advantage in livestock, particularly on livestock production based on berseem, the levels of efficiency and productivity in the sub-sector are low. There is immense scope to reduce costs of production and increase competitiveness. The private sector marketing and feed distribution channels and facilities are poorly developed, as are the support systems for improving technology development and application.

Livestock and dairy in particular is the number one opportunity in the whole Egyptian economy to have an impact on women's incomes and to developing their entrepreneurial capabilities. There are probably over two million rural women playing a major role in livestock production. Particularly smallholder dairy production is highly labor intensive.

Recommendations

The team recommends a substantial technical assistance program in smallholder livestock.

- The program should cover the full supply chain, with its first priority to the smallholder milk production sector and its associated meat production. Special emphasis should be placed on private sector growth and development in marketing, including chilling plants, and production services from mixed feeds to veterinary services. Given the already dominant role of women in this sub-sector special effort must be made to enable them to expand their livestock enterprises through access to credit, advisory services, and other mechanisms.

- The USAID processed food project has found export potential for specialty dairy products, particularly to the Gulf States. There should be an interaction of that project with this recommended program.

CHAPTER ONE
INTRODUCTION

What Did USAID Ask The Assessment Team To Do?

USAID separated the Assessment into four inter-related tasks:[1]

- **Task 1:** Review select past and present USAID interventions and assistance mechanisms that promoted or promote a more competitive Agricultural Sector.

- **Task 2:** Identify a) alternative growth scenarios for the sector and select the one that has the best chance to bring about increased agricultural sector competitiveness, strengthened agricultural investments and exports and b) key policy, institutional and technical constraints to achieving that scenario and key opportunities that need to be seized.

- **Task 3:** Identify appropriate roles for the public and private sector that address these constraints and how these public and private sector roles can be achieved

- **Task 4:** Assuming limited USAID staff and declining budget, identify and prioritize alternative options for USAID interventions in the next 5 years.

In addition, USAID raised numerous specific questions and issues for the Team to examine and respond to.

Organization of this Assessment

The Assessment is presented in three volumes.

Volume I contains a condensed version of the Team's analyses, findings and recommendations. It begins with an Introduction and Executive Summary and ends with a Summary of Principal Recommendations for Future USAID Interventions.

Volume II contains the analytical support for Volume I. Each of the four tasks assigned to the Team by USAID is explored in considerable detail. Annexes are located in this volume.

Volume III consists of the slides prepared for the Team's presentations to officials of USAID and the GOE during the course of the Assessment.

Each of the volumes is intended to be a freestanding document that may be read independently of the other two.

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[1] From USAID Statement of Work for Agricultural Sector Assessment, Jan. 2002.

What Did The Assessment Team Do?

The contractors, Development Alternatives (DAI) and Abt Associates (Abt) assembled a team of agricultural economists, agronomists, agribusiness consultants and business managers—all with extensive experience working with USAID and with both public and private agriculture in Egypt.

The team:

- Obtained and analyzed an enormous volume of data.
- Read and analyzed dozens of documents from USAID, USAID-funded activities, other donors and, of course, the Government of Egypt (GOE).
- Conducted three presentations to stakeholder audiences of USAID and GOE officials.
- Conducted multiple interviews with private and public sector leaders, contractors, USAID officials, and leading business support organizations.

This report relies heavily on the information and insights obtained through this process.

The Team's Methodology and Approach

The Team's work was carried out both in Egypt and in the US during the period from February 1, 2002 through May 15, 2002. The Team was guided by five overarching objectives:

- Protecting and building on the achievements of the past twenty-five years of USAID assistance to Egyptian agriculture.
- Increasing the overall competitiveness of the sector.
- Raising productivity for both domestic and export markets.
- Creating employment.
- Increasing the net income of smaller farmers as a means of helping to alleviate rural poverty.[2]

[2] Throughout the three volumes of the Assessment, the Team has used the following definitions of small, medium and large farms. For livestock, small farmer owns less than 3-5 heads, medium 5 to 10, and large more than 10. For crops, the small farmer owns less than 1-3 feddans, medium 4-10, and large, more than 10.

Recognizing the importance of private enterprise as the principal engine for growth in a liberalized agricultural sector, the Team reasoned that to fully understand and analyze the opportunities and challenges facing Egyptian agriculture, it should adopt a commodity-by-commodity approach, examining the supply chains for each major commodity produced by the sector. The principal objectives of this approach were to:

- Identify the constraints in these supply chains that could limit the optimization of higher production and fuller employment.
- Suggest approaches to overcoming these constraints.
- Identify opportunities for growth in each commodity chain.

The team then examined USAID interventions, past and present, to identify the major achievements and principal lessons learned from each.

Simultaneously, the Team developed a number of alternative growth scenarios, calculated their employment, income and other implications, and identified the trade-offs likely to arise from each approach. This informed the team regarding their presentation of alternative options for USAID interventions.

Throughout the Assessment, the Team remained mindful of two other threads that ran through all of its work:

- Many of the constraints inhibiting the full realization of agriculture's potential are policy-related. While significant progress has been made in liberalizing the country's enabling environment, there remain major policy issues not yet undertaken. There also remain many public policy initiatives successfully enacted but not yet implemented.
- USAID cannot by itself transform Egyptian agriculture. This will require the participation of other donors, the Government of Egypt, and the country's private sector. Moreover, over the next decade, USAID's resources—both financial and human—will be gradually diminishing. For the Team, this has meant recommending those relatively few USAID interventions most likely to optimize the use of these diminishing resources.

About Competitiveness

In the Scope of Work, the word "competitiveness" is used numerous times, including in the title of the Assessment. In this report, it is used sparingly. The reason is that competitiveness is intrinsic to and implicit in an increasingly successful agriculture sector. The Team sees Competitiveness as the key filter through which all potential interventions must pass. Absent competitiveness, the export sector cannot sell into global markets. Absent competitiveness, those who produce for the domestic market will be unable to face the imports that will appear in increasing varieties and volumes with the implementation of globalization under the WTO. Absent competitiveness, low income farmers will remain low income farmers, perhaps even

poorer, and their potential to generate rural non-farm income will be lost. Absent competitiveness and tariff protection, Egypt's agricultural sector faces dramatic contraction, with the concomitant loss of jobs and much-needed foreign exchange. Both the public and the private sectors have equally important roles to play in promoting competitiveness. But the team sees the private sector as the primary engine of growth for increasing the competitiveness of Egyptian agriculture.

About Priorities

Going forward, USAID faces an embarrassment of needs. The successes achieved through its current interventions must be sustained and built upon. Exports must be increased. Technologies must continue to be introduced and transferred. New public policies will be required. Many public policies and regulatory constraints will need to be removed and their removal actually implemented to create a truly pro-private sector enabling environment. And, far from least important, jobs in rural areas must be created, which inevitably means increasing smallholder income.

Achieving the goals recommended by the Team will be neither tidy nor easy. Nor will change happen quickly. Egypt's agricultural sector faces formidable challenges as it struggles to move into the era of globalization. Success will require the participation, commitment, resources, steadfastness and political will of every segment of Egyptian society. The rewards to the country lie in the realization of the considerable opportunities that are possible for the agricultural sector to greatly increase it contributions to the country's economic and social well being.

CHAPTER TWO
USAID INTERVENTIONS IN THE AGRICULTURAL SECTOR

This section describes a number of past and current USAID projects in the agricultural sector. The purpose is threefold: (1) to document the evolution of USAID's support for Egyptian agriculture, (2) to identify important achievements and effective implementation approaches, and (3) to provide a context and a historical perspective for the priority program areas that this assessment recommends.

EVOLUTION OF USAID PROGRAMS

USAID has supported agriculture-related programs in Egypt for more than twenty-five years. During this period, USAID has provided $1.3 billion in assistance to Egyptian agriculture. USAID's involvement has facilitated major changes in the industry and in the enabling environment in which it operates.

USAID interventions have included:

- Assistance to small farmers;
- Support for the processed food sector;
- Encouraging technology transfer to the farm community;
- Promoting agricultural exports;
- Encouraging the formation of trade associations; and
- Working with the GOE on reform of agricultural policies.

USAID's assistance has always been focused on providing resources to support the GOE's own agricultural strategies. In the 1980s, and even earlier, the objectives of USAID programs in support of GOE strategy were to increase productivity and institute policy reforms, particularly those related to decreasing government controls on farmers. In 1990s, USAID's assistance to agriculture focused on demand-driven horticultural production, innovative post-harvest and marketing technologies, productivity of staple food crops, agricultural biotechnology, and continuing policy reforms. Today, USAID continues to support policy, institutional and regulatory reform to improve agricultural competitiveness, and to provide technical assistance to increase production, productivity and incomes.

ILLUSTRATIVE PAST INTERVENTIONS

Following are examples of selected past and current interventions.

The 1980s

The "California Project"

The 'California Project' was formally entitled Agricultural Development Systems (ADS). It was known as the California Project because it was managed by the University of California / Davis. Its objective was to introduce new fruit and vegetable cultivars to improve stock and to provide material for varietal development by the ARC. The program had two components: Agricultural Economics and Horticultural Research.

While the project did not introduce any new crops, it was successful in introducing new varieties of open field tomatoes, grapes, and strawberries. It also made significant scientific advances in rice seed multiplication by small farmers, plant pathology, plant virology, and nematology.

Tomatoes were notably successful. The variety known as UC Tomato led to dramatic increases in yields. Egypt is still growing high yield tomatoes, based on the UC varieties as well as others from Israel, introduced under the trilateral research activity, funded by USAID. Unable to work on citrus directly because of USG regulations, they nevertheless assisted this subsector by working on soil and water management.

At the time of the California Project, the Egyptian fruit and vegetable industry was not at all quality- or cost-conscious. By convincing Egyptians that they could grow competitive varieties, the project laid the foundation for later generations of projects, including current projects such as ATUT. The California Project also worked closely with the GOE on policies required to increase horticultural competitiveness. It thus paved the way for the consensus-building mechanisms and approaches that have led to the reforms proposed and supported by APRP and its policy reform predecessors.

Farmer-to-Farmer Program

The objective of the Farmer-to-Farmer Program was to increase private sector agricultural investment, productivity and income. The program used US volunteer technical assistance, US and local participant training, and outreach activities to provide Egyptian farmers and MALR extension agents with improved farming technologies and farm management techniques.

The Farmer-to-Farmer program built on the legacy of an earlier program, the Small Farmer Production Project (SFPP). Implemented in the 1980s, it provided technology transfer with credit packages to increase rural incomes and productivity.

The program, carried out by ACDI/VOCA, operated in 16 of Egypt's governorates. It worked with a core group of 600 farmers, and reportedly reached more than 12,000 other farmers indirectly. It was also the largest program working with graduates in the new lands.

The program's person-to-person approach and multiple interventions helped farmers to increase yields, decrease costs, and improve the quality of their produce.

One of the main successes of the project is that it strengthened the incentive among farmers to share successful experiences and led to the establishment of at least three farmer associations. The current AgLink project in the livestock sector (also implemented by ACDI / VOCA) was later to build on the successful methodology of Farmer-to-Farmer.

The National Agricultural Research Project (NARP)

NARP, which operated from the mid-1980s until the mid-1990s, represents the largest agricultural research development project ever undertaken by USAID in Egypt, and perhaps the largest of any in the developing world. The $205 million undertaking was directed at improving Egypt's adaptation and use of modern technology to strengthen agricultural production.

In 1986, the project's goal was to improve the capacity for state-of-the- art agricultural research in Egypt. The accomplishments of the project over its eight year life span include: capacity building, human resources development, seed policy, agricultural engineering, research system improvement, research management and administration, as well as improving the capability of the agricultural research and technology transfer system, including ARC, Universities and National Research Center (NRC).

Among NARP's principal accomplishments was human resource development in agricultural research. More than 6,000 Ph.D., M.Sc. and B.Sc. holders participated in research under NARP. In addition, 90 students obtained their Ph.D. degrees from US universities, 20 obtained their M.Sc. degrees, and 2,150 traveled to US universities for post-doctoral training and exchange visits. This cadre of agricultural scientists is now serving in leadership positions in public and private sector institutions in the agricultural sector.

The NARP project also had an Agricultural Policy Analysis Component (APAC). Its principal objective was to provide technical assistance to strengthen the planning, policy analysis and monitoring capabilities of the Ministry of Agriculture and Land Reclamation and the Ministry of Public Works and Water Resources. This was the analytical tool used to help develop benchmarks for the policy reform component under APCP. It therefore was one of the predecessors of later programs such as APRP. It also built the foundation for later programs such as Agricultural Data Collection and Analysis (ADCA).

While NARP was terminated prematurely—reportedly because of a disagreement between its two client Ministries—its legacy provided a basis for a number of future USAID programs in agriculture. The best illustrations of NARP's achievements are:

Egypt's agricultural research capability was enhanced, and resulted in the high yields of most crops, and the narrowing the food gap, despite the continuous increases in population;

The foundation for ongoing policy reform was constructed, facilitating further policy reform efforts such as those of APRP.

CURRENT USAID-SUPPORTED AGRICULTURAL PROGRAMS

The 1990s to Date

Current USAID-funded projects cover the spectrum from policy analysis to smallholder livestock development to association capacity building. The portfolio includes:

- Agricultural Technology Utilization and Transfer (ATUT)
- Agriculture-Led Export Business (ALEB)
- Agricultural Policy Reform Program (APRP)
- Agricultural Linkages for Egypt (AGLINK)
- The AgReform Project (CARE)
- Center for Business Support (CBS)(IESC)
- Horticultural Export Improvement Association (HEIA)
- Egyptian Exporters Association/ ExpoLink (EEA)

The missions and principal achievements and challenges of these programs are described below:

Agriculture-Led Export Businesses (ALEB)

ALEB builds on the legacy of many prior USAID-funded programs, including the California project and NARP. It also provides an example of a program that seeks to move agriculture up the value chain through product transformation, and thus create what is virtually a new industry in Egypt.

The project provides technical assistance and support to Egyptian food processing companies, ancillary service firms, and trade associations. Its objective is to enhance global competitiveness and increase exports of processed foods. It does so by collecting, analyzing and disseminating market information; integrating new food processing technologies; improving adherence to international food quality and safety standards; enhancing marketing and business skills; strengthening associations; and forming strategic alliances.

In recent years, the demand for processed foods in major markets has steadily increased, in line with consumer demand for convenience foods. Egyptian processed foods have been far from a major beneficiary of the benefits of this trend; processed foods make up a tiny proportion of Egypt's exports. Yet ALEB is attempting to capitalize on Egypt's unexploited export marketing potential, particularly in the European Union and the Gulf and Middle East. It addresses many of the competitiveness challenges that will affect Egyptian agriculture over the next decade.

Moreover, as the skills ALEB helps to develop in processed food exports move backward along the supply chain, they will more easily be transferred to producers who sell only domestically. High quality processed foods manufactured locally will help enable Egyptian processors to meet the growing demand from the domestic market and compete more successfully with imports, which are certain to increase with the advent of the WTO.

Agricultural Technology Utilization and Transfer (ATUT)

The ATUT Project has two program areas: 1) the identification and transfer of improved horticultural production, post harvest and marketing technologies to the private sector; and 2) the development of a carefully focused, improved collaborative research program aimed at resolving the major constraints to increased productivity of selected staple food crops such as rice, corn, wheat and fava bean.

The objectives of the project are to:

1. Increase the volume and value of selected Egyptian fresh fruit and vegetable exports.

2. Increase the adoption of technologies by small, medium and large Egyptian private sector producers and exporters to improve the production and quality of horticultural crops.

3. Increase marketability of new horticultural crops and resolve constraints to increasing the value of horticultural exports while lowering the production costs through on-farm water management.

4. Forge a partnership among the Ministry of Agriculture, Egyptian University agricultural researchers, and the Egyptian private sector, to identify and introduce improved and more profitable technologies.

The project's accomplishments include the following:

- Selected crops in which Egypt has a competitive advantage in export markets were identified and moved to commercial scale.

- A product/market development system that provides a foundation for further growth has been established, but is not yet self-sustaining.

- An effective mix of production, post-harvest, transportation, and marketing support has been delivered to selected growers/shippers.

- A reasonably effective association of growers, exporters, and export support organizations (HEIA) has been established. However, HEIA is not yet self-sustaining.

- The success of ATUT's growers/shippers has given them confidence to compete in export markets.

Agricultural Policy Reform Project (APRP)

The Agricultural Policy Reform Program builds on the legacy of many of the policy components of previous USAID-funded projects, including The California Project and NARP. It has addressed a wide range of policy issues and fostered the participation of public and private stakeholders in the process. It has developed the capacity to analyze broad cross cutting-issues such as trade policy and gender, while addressing sector-specific policy constraints affecting cotton, cereals and other commodities. And it has done so by building positive consensus between the GOE and the private sector. APRP has laid the groundwork to cover a similar scope of policies in the future. Moreover, this assessment asserts that progress must be made in all of Egypt's commodity sectors to achieve fast growth in agriculture, and that the policy and regulatory environment will play a critical role in achieving this progress. Therefore, continuation of policy formulation and implementation is essential.

Cash transfers under APRP have played a significant role in engaging the GOE in policy reform, though the transfers may not have been as significant in policy implementation. Given anticipated reductions in USAID's capacity to employ cash transfers in a similar manner, APRP's success in monitoring and validating policy implementation provides an important set of tools that will likely be in demand in the future.

APRP helped open the door to private sector and academic community involvement in the policy dialogue and formulation process. Its work with HEIA is a good example of education, training and collaboration with an important private sector constituency. It is also a prime example of the importance of sector-specific policy analysis. However, APRP's autonomy from MALR and the private sector is valuable. Though agribusiness associations need more help to develop their own policy analysis and advocacy capabilities, the independence and objectivity of an APRP-type unit can help push for the policy reforms and implementation required by the fast growth scenario.

Agribusiness Linkages for Egypt (AgLink)

AgLink's mission is to build building stronger commercial ties between the United States and Egypt, with special emphasis on the Egyptian livestock industry. Project activities have focused on three sub-sectors of Egypt's livestock sector: dairy (production and processing), meat (production and processing) and feed and farm supply. The project promotes linkages between farmers and agribusiness firms within Egypt, as well as among a broad network of agribusiness contacts in the United States.

A primary goal of AgLink is to bring Egyptian companies up to a level where they are prepared to receive foreign private investment and enter export markets. The project has helped establish two major industry associations, beef and dairy, which are flourishing and expanding.

AgLink is continuing to develop associations, expand trade linkages and provide technical assistance, but is now also expanding the initial program area to include Upper Egypt (Minya), where 44% of the nation's livestock are located. New target groups, such as small commercial farms and firms, and small livestock holders are being included so that improved techniques may be applied to a wider clientele. In addition to the establishment of sustainable livestock associations, the project is training Ministry of Agriculture & Land Reclamation livestock extension agents in order to institutionalize project services, helping ensure the sustainability of the project.

The AgReform Project—CARE

AgReform is designed to increase incomes among economically marginal farm households in Upper Egypt by improving their access to new markets and appropriate new agricultural production technologies. AgReform, initiated in the governorates of Fayoum, Sohag and Qena, in March 1996, continues to use the FarmLink Project strategy (1990-95) that directly links community-selected innovative farmers to sources of agricultural information.

AgReform is based on the FarmLink experience, and has adopted most of its concepts, terminology, approaches, and data collection instruments. FarmLink successfully pioneered a participatory linking approach to agricultural extension in the horticultural sector.

As of September 30, 2001, AgReform has worked with 6,320 community-selected innovative farmers to create linkages that improve agricultural practices, 7,928 small farmers through the strengthening of 111 local agricultural and marketing groups, and the enhancement of local livestock services for 4,250 small livestock producers. In addition, the project collaborated with local government agencies in each governorate to enhance and strengthen the extension services' capacity to better meet the small farm household's needs and to manage and replicate AgReform activities beyond the life of the project. 292 Government Extension Workers have been involved in the project.

In 2001, the AgReform grant was amended to add the farmer NGO component. To date, twelve farmer NGOs have been created and training is being provided to strengthen their capacity to coordinate the dissemination of marketing information for exports.

Center for Business Support—(IESC)

In June 2000, IESC was awarded a three-year USAID grant to manage the Center for Business Support (CBS) in Egypt. The CBS program works with companies in three sectors: Information Technology, Tourism and Agribusiness. It has been working with companies in the food-processing sector since the program's inception. Client companies receive subgrants to acquire technical consultants, attend trade shows, participate in trade missions, and develop websites. In the agribusiness sector, it has completed one major food processing trade mission event in cooperation with the USAID-funded Agriculture Led Export Business (ALEB) program.

Egyptian Exporters Association (EEA)

The EEA, and its operating arm, ExpoLink, is the successor to a long line of private sector general export promotion organizations[3] funded by USAID. In previous incarnations it was known as the US Export Promotion Organization (USEPO) and the Trade Development Center (TDC). Today it provides services to firms in most of Egypt's export-oriented sectors including IT, apparel and textile, furniture, fresh and processed foods, footwear and tanned leather, and marble.

ExpoLink prepares firms to exhibit at international trade shows, provides technical assistance consultants, disseminates market information, prepares company literature and, latterly, advocates for policy reforms.

The organization reports the following achievements in the agricultural sector during the period from 1997 to 2001:

The total number of agriculture-sector clients served since the inception of EEA in October 1997 to June 2001 is 522. The total number of fresh and processed foods clients served since 1997 is 142 (27.2%). The total number of clients served in the fourth year is 64. The total number of fresh and processed foods clients served in year 4 is 14 (21.9%).

The type of information disseminated to fresh and processed food clients this year included new regulations for importing meat into Saudi Arabia, markets for herbs and spices in Malaysia and Indonesia, honey and honey wax in Holland; dairy and meat products, beverages, soups and dry mixes in Poland and Romania, herbs and spices in Japan, and the organic market in Europe.

While EEA is an association in the legal sense, it did not begin to operate as an association until relatively recently. Now it is actively working to build membership, though there is no evidence of members voting for the Board of Directors. In a 2000 evaluation, the organization was criticized for its lack of transparency, and for deploying a disprortionate amount of its funds on trade fair participation, while not taking advantage of other marketing tools. The quality of its market information and delivery mechanisms was also questioned, as was the lack of either sector-specific or general hands-on export experience among many of its staff. In annual Client Satisfaction Reviews carried out by the USAID-funded GTG Monitoring and Evaluation Unit, the majority of clients found EEA services too expensive and of questionable value. While policy advocacy was part of its Grant Agreement, it did little in this area until recently. The organization has in the past concentrated on larger companies over medium and smaller companies.

However, there are now positive signs that EEA is gradually correcting a number of these shortcomings. This is reflected in the most recent Client Satisfaction Review, where a preponderance of EEA clients expressed satisfaction with the services they received. Further,

[3] There is also an export promotion unit within the GOE. It is the Egyptian Export Promotion Center.

EEA is now becoming more positive—and transparent—in its policy advocacy activities. An example is a recent seminar on Customs Service Reforms attended by Customs Service officials, and senior USAID representatives. EEA has also begun to set up a network of representatives in major export markets; their task is to feed market-level information to EEA, which, in turn, makes it available to their clients.

Horticultural Export Industry Association (HEIA)

HEIA is a trade association, originally spawned by ATUT. It is now a direct beneficiary of USAID funding. It is described in detail in Section VI, The Roles of the Public and Private Sectors.

LESSONS LEARNED

A number of critical lessons from USAID's current and past projects may be used to craft interventions to achieve faster growth in the Egyptian agricultural sector. Some of these lessons:

- When providing services to individual firms, they need to be customized in content and delivered in doses, rather than in generic, cookie-cutter fashion.

- Not all firms within an industry deserve assistance just because they appear to be needy. A judgment has to be made regarding their absorptive capacity and the chances that they will be able to apply what they hear.

- When USAID decides to assist a supply chain, it should be defined in broad terms, i.e. not just the economic actors that form the core but also upstream suppliers of inputs, equipment, services and information who sustain the chain, and the exporters, importers, distributors and so on who benefit from it downstream.

- In a country as large as Egypt, it is probably not enough to operate on vertical industries at the national level, because sometimes the national centers are too divorced in distance or understanding or urgency to really be the best vehicles for delivering meaningful assistance.

- Financial sustainability for nascent associations will never be possible if the main source of revenue is the members themselves, since their membership and capacity is easy outstripped by the need to offer services before the payback can be expected, and also to service new member.

- Although it is inevitable and to some degree desirable that directors play a major role in getting associations started, especially in shaping vision and services, building membership and gaining credibility, the challenge over time is to achieve a staff-

managed yet member-driven association that will allow members to participate in and benefit from the association, while not doing harm to their own businesses.

- USAID and other donors should have realistic expectations regarding how long it takes to establish an effective association, how quickly it can play a serious advocacy role, how much policy work it can do without external funding and technical resources, and the need for grant-writing capacity as the main source of income for the first ten years or so.

Lessons Learned by Large-Scale Projects

Since these projects absorb the bulk of USAID resources, their achievements and limitations have a great deal of significance for the future of USAID agricultural program. They are, to a large extent, the investment on which USAID will build.

NARP

The National Agricultural Research Project created a strong agricultural research and production technology capability. Since yield and productivity increases are a fundamental requirement to achieve the fast agricultural growth scenario called for in this assessment, the scientists and technicians trained under NARP must be harnessed to attain these goals. The increasing emphasis on private sector-led agriculture means that new institutional arrangements will be needed to link this public sector wealth of knowledge to the evolving needs and demands of the domestic and export market. Extension services is one area where the disconnect between research and markets is pronounced.

APRP

Perhaps the most significant general lesson learned by APRP is that working with agencies of the host government as well as with the private sector in a spirit of partnership and cooperation is an attainable goal – but one that requires patience, creativity and diplomacy.

Relative to achieving success in specific policy reforms, APRP sums it up as follows:

- **For a significant policy reform to succeed,** it is very often the case that it must have a champion within the government—a senior official who is willing to put resources into it and take certain risks to implement it. These champions provide role models and hard evidence of success that can change the approach of other civil servants, who often strive mostly to not "rock the boat".

- **The most challenging task of any project that depends on fostering change is changing long-held opinions and attitudes.** APRP has promoted changes in attitudes and approaches by requiring public participation in decision-making via benchmarks, and by using participatory methods to develop consensus during benchmark implementation.

- **There is a major difference between effecting a formal reform (benchmark) and implementing that reform.** Egyptian law is littered with laws and decrees signed by Ministers but never implemented. APRP has recognized this reality by instituting benchmarks that included implementation as mandatory components.

- **Fostering inter-ministry and inter-agency cooperation is difficult but often essential.** APRP found that cooperation at several levels between the staff of the MALR and MWRI was essential in the issue of irrigation of supply and demand. A pilot program was first implemented to explore the constraints and possibilities of this cooperation at the local level. Through this process, consensus was built.

ATUT and ALEB

The Agricultural Technology Utilization and Transfer Project and the Agricultural-Led Export Businesses project have focused on establishing the horticulture as an export growth commodity sector. They have made significant progress in demonstrating the importance of responding to market demands for quality and price competitive products. In addition, these projects work closely with the Egyptian private sector at the individual firm level as well as with industry associations. This emphasis on building a commonality of interests among a wide range of business in the sector can be a model for other Egyptian commodity groups.

Capacity building has become one of the major goals and principal accomplishments of ALEB and ATUT and, in fact most of the current USAID-funded programs. The capacity of the GOE has been enhanced by its partnership with APRP. The development of Egyptian-led business associations has been successfully undertaken by ALEB, ATUT, APRP, AgLink, and others. These accomplishments will be an important legacy for USAID.

Neither ATUT nor ALEB is designed to focus on smallholders or to address the domestic horticulture market. However, since approximately 96% of all horticultural production is destined for the domestic market, improvements in domestic horticulture are a significant component of growing the agricultural sector and rural incomes. ATUT and ALEB can be important bridges to a more inclusive approach to horticulture sector development. Some of the projects described below may serve as models for improving smallholder participation in export and domestic horticulture markets. ATUT's collaboration with Africare's Wadi el Saayda project is an excellent example.

Lessons Learned by Smaller-Scale Projects

USAID's support for smallholders in the horticulture and livestock sectors is carried out, for the most part, by not-for-profit organizations such as Africare, CARE, and ACDI/VOCA. The size of these efforts is modest in comparison the aforementioned projects. They may be viewed as incubators of new approaches or pioneers operating in new or underserved areas.

In this regard, these projects have the potential to inform the direction and scope of future initiatives.

The common characteristic among projects such as AgReform/CARE, and AgLink, is their direct delivery of technical assistance to smallholders. The fact that these projects work with farmers in the horticulture and livestock sectors, primary growth targets according to this assessment, means that the experience of these project implementers is worthy of close examination. In particular, their work with producer associations, intensive extension services, and training to meet market standards, are all essential aspects of increasing productivity, creating value-added opportunities and enhancing the competitiveness of farms and businesses in the sector.

The fact that several of these projects operate in Upper Egypt and work with graduates and other settlers on new lands provides additional elements to examine for determine future activities. One of the critical issues concerns the scale of the projects themselves. In order to achieve the employment goals envisioned, the impact of USAID efforts will be need to be expanded well beyond the 1-2,000 people affected by these projects.

Lessons Learned by Egyptian-Led Projects

The category includes two Egyptian associations, HEIA and EEA,[4] which are receiving direct financial assistance (versus funds channeled through projects such as ATUT) from USAID. These projects should be considered experiments in fostering the sustainability of business associations. A good deal of importance is being placed on the capacity of the private sector to represent its own interests in the formulation and implementation of policies and regulations that affect their businesses. These projects can serve as pilot cases to determine how USAID can best accomplish this goal. Likewise, these associations have an opportunity to continuously broaden the range of services they provide to their members, and the efficiency of the delivery mechanisms employed to reach clients.

Is There an Ideal Approach?

If development activities in Egypt and throughout the developing world reveal anything, it is that one size does not fit all. Each project needs to construct its mix of services, delivery systems, and personnel according to objectives it is mandated to achieve and the cultural environment in which it will operate.

For example, transfer of technology to small rural farmers works best when there is a hands-on, in-the-field approach by people who are perceived to understand the problems of the small farmer. That is the approach used by projects such as Farmer-to-Farmer, ATUT, AgLink and AgReform.

[4] Both these projects are also discussed in Section VI, The Roles of the Private and Public Sectors.

Technical Assistance at the firm or farm level seems to work best when it is delivered not only by knowledgeable consultants, but also by those who enjoy a high degree of cultural sensitivity.

This is true of policy reform as well. But, in addition, those who are trying to generate sustainable reform need the skills to put themselves in the position of those resisting reform, and understand why. The simple principles first set out in the book "Getting to Yes" should be required reading for USAID consultants. It is perhaps too soon to state with certainty that policy reform has become institutionalized; one of the tests of that will come when cash transfers are reduced. But it is the view of the Assessment Team that the process of liberalization has gained considerable momentum over the twenty-five years of USAID support for agriculture; that it may now be un-stoppable; that compliance with WTO and other international trade agreements will provide added impetus; but that change will always be resisted by some and will result in fewer accomplishments over more time.

Opportunities for Improvement

Information dissemination. This is a problematic area. Frequently, constituencies are not properly defined or enumerated, resulting in communications that reach only a smallish segment of the beneficiary population. Sometimes, project management does not take account of the level of sophistication and the literacy skills of their constituencies. This has often resulted in excellent materials that can't be read or understood by many recipients. More often now than in the past, information from USAID-funded projects are being produced in Arabic. Some activities have produced elaborate CDs for audiences that don't own computers. The same applies to project websites. However, the growth in computer literacy in Egypt makes cyberinformation a potentially valuable communications and marketing vehicle.

The nexus between science and agriculture. The scientific aspects of agriculture have been the subjects of numerous donor projects. Many have been successful and have become institutionalized. All have attempted to attract the interest of both the government and the academic community, as well as more recently, the private sector. The ARC and AGERI are examples. But in general, it can be said that the private sector is not making sufficient use of the academic community. This subject is explored in greater detail in Section VI, Roles of the Private and Public Sectors.

Training. Almost all USAID-funded projects sponsor some type of training. Sometimes this is formal, classroom-type training. In other instances, training takes the form of workshops, conferences and seminars. In many cases, training is informal, such as the hands-on technology and best practices training provided to small farmers.

But one of the most significant gaps in training in Egypt – in every sector – is "Management 101". USAID has devoted significant financial and human resources to management training, and it has proved to be a slow and tortuous process. In a vast preponderance of Egyptian firms, in all sectors, still operate by the rules of the "Pharaonic School of

Management". This construct is characterized by a very steep organizational pyramid, with the chairman or owner at the top. Delegation is still largely unknown in Egypt, though some larger companies are the exception to the rule, and other larger companies are at least beginning to pay lip-service to it. Aside from the impossibility of the chairman or owner knowing everything about everything and making every large and small decision, there is an even more threatening downside to this practice. It is that the future generation of managers is not being equipped to take over. They may have nominal responsibility. But responsibility without authority is a recipe for management disaster.

Donor coordination. Another gap is the almost total lack of donor coordination. Sometimes this occurs because donors do not wish to coordinate, much less cooperate; the EU's former Private Sector Development Program (PSDP) an example. In other instances, while there is a formal body of donors intended to exchange information about their respective activities, this information rarely finds its way to the CTO or project management level. In a number of studies conducted by the GTG Monitoring and Evaluation Unit, donors were found to be conducting virtually the same programs and competing for the same beneficiary constituencies. USAID's Growth Through Globalization Program and the EU's PSDP is an example. The best that can be said of donor coordination is that, for example, USAID knows that GTZ, the German AID agency, is working on cotton, USAID does not have to use scarce resources in the same area. Notwithstanding that benefit, the duplication of effort among donors often represents a waste of resources and possible confusion among beneficiaries.

USAID project cooperation. It has been USAID's policy for many years to encourage collaboration between and among USAID-funded projects. But it is only recently that such collaboration has taken place in any meaningful way. The past two or three years have seen multiple examples, and the Assessment Team hopes that this collaboration will expand further.

Gender issues. All USAID programs reviewed for this Assessment are conscious of the importance of gender issues in agriculture. A number of projects have carried out gender studies and workshops, e.g. ALEB, AgReform, APRP, etc. But gender does not appear to be a top priority for any of them. In the small farmer livestock program recommended in this Assessment, gender is decidedly a priority issue, since most small farms are either managed or worked on by women.

Child labor. Many Egyptian children work in agriculture. Sometimes they have to out of economic necessity. Sometimes, their small hands are ideal for certain tasks such as picking cotton. But child labor has become a widely publicized issue among United Nations agencies such as the ILO, Western activists, and consumers. Criticism has been particularly vocal regarding the apparel and footwear industries. This has led to boycotts of certain agricultural derivatives, such as clothing made of cotton picked by children and then exported. For some, these actions have led to significant losses in revenue, and have compelled manufacturers to rethink and revise their policies vis a vis child labor. Egypt would be well advised to focus on these signals from some of its major markets.

CHAPTER THREE
ALTERNATIVE GROWTH STRATEGIES

Although agriculture directly accounts for only 17 percent of Egypt's GDP, in a rapid, balanced growth scenario it would account annually for 61 percent of employment growth. That disproportionately large employment impact occurs because agriculture's modest direct effect on employment is greatly enhanced by powerful multipliers to the highly employment intensive, non-tradable, rural non-farm sector. When growth is rapid, four-fifths of agriculture's employment impact is from its demand stimulus to that rural non-farm sector, one fifth is directly in agricultural production.

It is growth in farm incomes that provides the purchasing power to drive rural non-farm employment. Increased farm income is associated in large part with increased farm output. But, that increased output must be generated by increased competitiveness associated with lower costs of production and increased efficiency in processing and marketing agricultural commodities. Growth in farm incomes is further accelerated by switch to higher value crops as they are made more competitive through improved production and marketing practices. To be fully effective in increasing employment, agricultural production must not only meet rising domestic market demand, but also, it must achieve even higher growth rates through increased exports.

To compete on dynamic international markets, Egypt must increase competitiveness through constant reduction in costs. The requisite changes in Egyptian agriculture will be implemented by the private sector. That is the only efficient means of moving such a huge sector with so many complex interactions. However, there is an important complementary role for public action, ranging from small NGO's to trade associations to government agencies. That role and how it complements the private sector by raising returns to investment are discussed at length in the commodity chain analysis.

This report emphasizes the importance of small farmers to employment creation. That is because small farmers are fully integrated into the market town/village complex and spend most of their income locally, stimulating the rural non-farm sector that lacks export capabilities. In that sense, a small farmer is one who is integrated into the village and market town life. Large farmers are thus defined as having consumption patterns based largely on tradable goods and services, largely absentee, living in the major metropolitan centers and reflecting an urban way of life. Medium farmers are more commercialized versions of the small farmer, but still village oriented.

This section of the report describes the commodity composition of a high growth rate for agriculture. That lays the groundwork for later sections that discuss the investment, institutional development, and policy requisites of such a growth rate. The exposition proceeds from delineation of the commodity components of a high agricultural growth rate to the impact of such a growth rate on employment. The latter analysis builds upon work on

agriculture's employment multipliers that is part of the USAID financed MVE component of APRP.

Rapid agricultural growth is in part dependent on balanced growth. The export driven urban sector must grow rapidly not only for its important contribution to GDP growth, but also to help provide effective demand for large non-tradable elements of the agricultural sector. The rest of this chapter quantifies the prerequisites for rapid agricultural growth and its impact on employment. In the context of rapid growth of the urban sector, it also measures the impact on employment of an alternate strategy that results in rapid growth of the urban sector but slow growth of agriculture. The chapter also discusses alternate strategies that de-emphasize various commodities groups in agriculture.

Farmers make decisions about resource allocation among specific commodities. Much of investment, institution building, and policy are also commodity specific. Of course, there are complementarities among commodities and hence total farm production is reflected in a system that includes several commodities. Thus, analyzing growth potentials by commodity group represents a simplification. Because data are available by commodity it is a helpful simplification in quantifying growth rates. In this analysis, groups of similar commodities are grouped and the treatment is of the commodity groups. Nevertheless, attention will also be given to issues that cut across commodity groups. This analysis is not by sets in a rotation because those sets change with changing technology and price relationships.

The importance of each commodity group in the overall growth rate is a function of two factors: (1) the base weight; and, (2) the growth rate. Very high growth rates are often possible for commodities that have only lightweight in the base. In those cases, even a high growth rate has little effect on the over-all growth rate. The five agricultural commodity groups into which agriculture is divided, for this report, are (1) cotton; (2) cereals; (3) horticulture; (4) livestock; and (5) other crops. Miscellaneous is a mixture of diverse crops ranging from sugar cane, to oilseeds, to berseem (which is in effect covered by livestock.) The commodity chain analysis treats each of the four commodity groups and will demonstrate the need for integrated policies specific to each commodity group. Hence our recommendation is for USAID emphasis on an integrated approach to two of the commodity groups, horticultures and smallholder livestock. Those two groups represent well over half of value added in agriculture and a much higher proportion of employment. They are in particular need at present for integrated technical assistance that cuts across both the production and marketing functions.

Increased input use is generally a significant source of growth. Two inputs, water and fertilizer, are particularly important and cut across commodity groups. Egypt has been increasing the irrigated area at a rapid pace. The Government plans to continue that rapid expansion. Even when adjusted for loss of cultivated area to non-agricultural uses, that expansion will account for 15 percent of a rapid expansion of agriculture. Fertilizer is already used at very high rates in Egypt. There is no scope for a major increase in production from radically increased rates of fertilization. But there is scope for significant increase in farm incomes through increased efficiency of fertilizer use even as total usage increases

modestly. Increasing the efficiency of fertilizer use will favor higher farm incomes as well as being environmentally sound.

As stated, this analysis sets forth indicative growth rates for each agricultural commodity group that will be difficult to achieve, but feasible. For each commodity group somewhat different judgments are made about the composition of that growth. In this section, the broad rationale for those judgments is presented. Later sections, specific to each commodity group, present the critical details for achieving those rates in a manner that reduces cost of production, increases marketing efficiency and raises overall competitiveness. Shortfalls in some commodity groups can in theory be made up by increased growth in others. But, that will be difficult.

Achieving these growth rates will require optimal investment allocations, substantial institutional development, including technical assistance, and major policy reform. Without such effort the growth rates will not be achieved. If those growth rates are not achieved, employment will not grow at the rates needed to solve Egypt's complex social and political problems. Of course, the actual growth outcome will be the product of entrepreneurial reactions to market forces. But those market forces will be influenced by forward-looking decisions. The more those decisions, both in the private and the public sectors, conform to the ex poste market situation, the more effective they will be. The main body of this report is an effort to get those decisions right.

THE GENERAL RELATION BETWEEN AGRICULTURAL GROWTH AND EMPLOYMENT

Later in this chapter specific data will be presented relating agricultural growth in Egypt to employment growth. That sets the stage for understanding the need for and the means of achieving competitiveness for Egyptian agriculture. Those data will be clarified as well as become more plausible if the generality of the relationships is better understood. Hence this section digresses from Egypt to look more broadly at the relation between agricultural growth and employment. In this discussion employment increase and poverty reduction are used interchangeable since it is increased employment that is the means by which growth reduces poverty.

A tremendous amount of research has been done on the linkages between changes in agricultural productivity and poverty levels. Thirtle et. al (2001) summarize the literature as follows:

"The literature provides overwhelming theoretical and empirical evidence that agricultural growth is essential, especially in the poorer developing countries. It identifies the diverse roles that agriculture plays in the process of growth and development on the one hand, and the link between economy-wide growth and poverty alleviation on the other. Agricultural productivity growth has an impact on GDP growth, both directly and through agriculture's linkages with the broader economy, that generate increases in non-farm income. Both agricultural growth and GDP growth have impacts on inequality poverty, and nutrition."

Two sector models, such as Matsuyama (1992), multi sector models, such as Irz and Roe (2000), input-output models, such as Rangarajan (1982), and dynamic general equilibrium models, such as Wichman (1997) all demonstrate important relations between agricultural growth and overall economic growth, and most also show a close connection to poverty reduction.

The World Bank has made frequent use of an average relationship between over-all growth and poverty reduction. On average a 2.1 percent decrease in poverty levels is associated with a one percent increase in the economic growth rate (Deininger and Squire 1996.) It follows from calculations based on the average elasticity that achieving on the order of a seven percent growth rate in GDP will eliminate Egypt's employment/poverty problem in a 10 to 15 year period. However, there is a great deal of variability in the relationship between growth and poverty reduction. Using an average elasticity may be very misleading for individual countries.

We now know that it is the structure of growth that explains much of the variance in poverty decline. Within structure, it turns out that it is agricultural growth that is the prime explanator. In a large intertemporal, cross-national statistical analysis, Peter Timmer (1997) shows that 84 percent of poverty decline is explained by agricultural growth. In his studies and those of Martin Ravallion and colleagues (Ravallion 1995, Datt and Ravallion 1998), as well as earlier work by Mellor (1976), it is consistently changes in the agricultural growth rate that explain poverty decline.

Hans Lofgren (2001) of IFPRI, using a computable general equilibrium model for Egypt finds that compared to pro-manufacturing policies, pro-agricultural policies have a more positive impact on household welfare in general and the poor in particular. He also finds that improved market access for agricultural exporters and reduced transaction costs in foreign trade reinforced the effect of generally positive policies towards agriculture. Following up, El-Said, Lofgren and Robinson (2001) examined a set of economic options and found that what they termed agricultural demand-led-industrialization produced the highest growth rate in GDP and the fastest growth in rural household income.

At first glance, the finding of the important role of agriculture in poverty reduction is counter-intuitive. After all, agricultural growth occurs largely through technological change that not only raises yields per unit area of land, but also raises labor productivity. Typically a ten-percent increase in agricultural production provides no more than a three to six percent increase in employment (Mellor 1976.) Also, farmers are not the poorest people in rural society. Increased agricultural production provides benefits roughly in proportion to the amount of land a farmer controls. Adams (2001) elaborates this point to conclude that emphasis on agriculture increases income inequality and argues emphasis on the rural non-farm sector. The analysis in this chapter shows that the two are causally related.

Consistent with Adams, the poorest people are massed in the rural non-farm sector. However, they largely produce non-tradable goods and services. For the rural non-farm sector, expanding local demand is essential to growth and to increased employment. That is particularly true of the unskilled labor class that Adams states should receive the most

emphasis. Prospering farmers spend a high proportion of increased income on locally produced, non-tradable, employment intensive, goods and services (Delgado et. al. 1998, Hazel and Roell 1983, and Mellor 1976.) Raising farm incomes – which can be achieved through the processes of technological change and globalization – increases the demand for output and hence for labor in the massive rural non-farm sector that is home to the bulk of the poor and underemployed. That is why agricultural growth is not only important to growth in national income, but also absolutely vital to growth in employment and reduction of poverty.

There is another source of rural demand – remittances from employment in Egyptian cities and foreign countries. In Egypt, that income is about one-third as large as farm income. It is generally believed that remittances over-all are not growing rapidly. That is particularly true of those from foreign sources, for which the Gulf is the dominant element. In this report we show how agriculture can grow rapidly providing the essential demand basis for a dynamic rural non-farm sector. Of course, members of the rural non-farm sector also buy from each other – but such buying from each other cannot by itself be a stimulus for growth. The carpenter cannot increase her purchases of bakery goods unless farmers increase their incomes from production for outside the community and spend some of that income on the carpenter. That creates not only demand for the carpenter's output, but her consequent increased expenditure provides further increased demand for other rural non-farm producers. The initiation of those multipliers comes from increased agricultural incomes.

HISTORICAL GROWTH RATES OF GDP AND AGRICULTURE

This Report is concerned with achieving a high growth in Egyptian agriculture. Table 3-1 shows the growth rates for GDP and for Agriculture in the 1980's and the 1990's. Growth has been very slow. Indeed the growth rate of GDP per capita in the 1990's was only 2.2 percent. The only favorable point to be gleaned from that record is that the agricultural growth rate did increase in the more recent period. But, it was still very slow. Assuming no net out migration from agriculture, per capita farm incomes could only have grown at less than one pert cent per year. The agricultural growth rate was above the average for the period in the late l990's and below the average in the early years of the decade. The pick-up represents the favorable effect of the policy reforms. However, the incidence of the reforms was such as to reduce the growth rate of the higher value crops relative to lower value crops, which in turn reduced the growth rate of value added. The thrust of this report is that further reforms and a more targeted development strategy will allow a major acceleration in the growth rate of each of the sectors and hence a high over-all growth rate.

Table 3-1: Growth Rates for GDP and Agriculture, 1980-1990 and 1990-1999, Egypt

Years	GDP, percent per year	Agriculture, percent per year
1980-90	5.4	2.7
1990-99	4.4	3.1

Source: World Bank, World Development Indicators, 2001, Washington, D.C. 2001

Target Growth Rates by Commodity Group

Table 3-2 states the base weights of each of five commodity groups as a percent of agricultural GDP and target growth rates for each commodity group. The weighted average of the growth rates is 4.8 percent. That is an agricultural growth rate consistent with a 7.1 percent rate of growth of GDP as well as with rapid increase in employment (Table 9.) It is far higher than Egypt has achieved in recent decades. That growth rate, as is shown in Table 9, and discussed in the next section, will increase employment at a rate more than two percentage points faster than the labor force growth rate. It would be expected to provide rapidly rising real wage rates within 10 years.

Table 3-2: Target Agricultural Growth Rates by Commodity Group, Egypt, 1999 Base

Commodity Group	Base Weight	Growth Rate	Proportion of Growth
Cotton	6	9.0	11
Cereals	23	3.0	7
Horticulture	31	6.0	45
Livestock/Fisheries	24	5.3	27
Other Field Crops	16	3.0	10
Total/ Weighted Average	**100**	**4.8**	**100**

Source: Value added proportions from MALR; for growth rates see Table 3 and text.

Simplistically, with the nuances taken up below, the commodity groups are differentiated according to whether they are tradable commodities (the market is global) or non-tradable (the market is domestic)(Table 3-3a.) Cotton, Cereals, and Other Field Crops are designated tradable commodities. In theory, for these crops, demand at current prices is not a constraint, since the global market is available, either in the form of exports or displacement of imports. In that case production forces determine growth. Of course, as will be discussed at length in the commodity chapter, even on the international market there are complex marketing problems that must be solved, including reducing transaction costs and providing the product quality demanded in the international market.

Table 3-3a: Target Sources of Growth, by Commodity, Hypothetical, Egypt

Commodity Group	Agricultural GDP, percent	Growth Rate (percent)	Yield Growth Rate	Area Growth Rate	Unit Value Growth Rate
International Demand					
Cotton	6.0	9.0	4.5	2.5	2.0
Cereals	23.0	3.0	3.0	0.0	0.0
Other Field Crops	16.0	3.0	3.0	0.0	0.0
Domestic Demand					
Horticulture	31.0	6.0	3.0	2.0	1.0
Livestock/Fisheries	24.0	5.3	4.0	1.3	0.0
Total/Weighted Average	100.0	4.8			

Note: Area expansion roughly equal to new land additions. Data from Table 2 and as explained in text.

In the case of non-tradable commodities, it is growth in domestic demand that sets a rough ceiling on output growth. Horticulture and Livestock/Fisheries are classified in table 3a as non-tradable. Lower consumer prices are required if consumption growth is to exceed the growth rate of domestic demand. The production target for livestock is consistent with the demand growth rates and that for horticulture assumes sufficient relative price decline to allow consumption growth one percentage point faster than demand growth.

Classifying horticulture is difficult. Exports now comprise an insignificant three percent of production. While exports are targeted to grow rapidly, the bulk of production is at present unsuitable for export markets. Thus, the determining constraint on output growth is domestic markets. As success is achieved on export markets, horticulture will become increasingly a tradable commodity with demand not constrained by the domestic market.

Livestock/Fisheries (due to very rapid growth over the past decade, fisheries now comprise about one-third of the total) is clearly non-tradable. Yes, there are imports, but they are only a small percent of domestic production and concentrated in specified sub-sectors. The difference between import parity prices and export parity prices are large due to costs of marketing associated with bulk and perishability

In Table 3-3b domestic demand growth is estimated for Horticulture and Livestock/Fisheries. The domestic demand is calculated as a function of the population growth rate, per capita income growth, and the income elasticity of demand. The income elasticities of demand are for Egypt as a whole and are derived from an IFPRI household survey. The growth path stated here is weighted towards growth in rural incomes and of low-income people. Hence using Egypt wide data tends to understate the elasticities significantly.

The per capita income growth estimate is based on the GDP growth rate of 7.2 percent (as calculated in Table 9), and only slightly higher than the 7.0 percent rate taken by the World Bank as a reasonable future target, population growth rate of 2.2 percent, and a 20 percent marginal savings rate on the per capita income. That provides a per capita income growth rate of 4.0 percent. That of course is very high compared to the past. However, this exercise is intended to come up with feasible growth rates that will have a substantial effect in raising employment growth rates. This is a conservative estimate, given the assumption of a fast growing agricultural sector, the strong multipliers to the large, employment intensive, rural non-farm sector, and a high, export driven growth rate for the urban sector.

Table 3-3b: Demand Growth under High, Balanced Growth Scenario, Egypt

Demand Component	Horticulture	Livestock/Fisheries
Population Growth, percent/year	2.20	2.00
Per Capital Income, percent/year	4.00	4.00
Income Elasticity of Demand	0.69	0.77
Shifter from Lower Prices	1.00	
Demand Growth (calculated from above)	6.00	5.30

Sources: Population, CAPMAS; Income, assumed; Elasticities, IFPRI, 2000

Table 3-2a shows a plausible breakdown of sources of output growth for achieving the targeted growth rates. Output growth is decomposed into yield, area, and increased unit value, largely because they relate to different sets of interventions. For the tradable commodities, such estimates of what can be achieved on the production front indicate the volume for which marketing problems must be solved. That of course cannot be taken for granted and is treated at length in the commodity chapter.

Yield

The Ministry of Agriculture and Land Resources (MALR) has estimated past yield increases (out put per unit area of land) at only 0.4 percent per year for the crop sector. Table 3-3a targets much higher growth rates in yields: 4.5 percent for cotton and 3.0 percent for each of the other crop commodity groups, and 4.0 percent for livestock (output per animal.) A technologically mature country such as the United States can expect continuing research and its application to provide on the order of a 1.5 percent rate of growth of yields. However, even though high in general, Egyptian yields lag well behind what can be achieved with current technology. Thus, an additional 1.5 percent rate of growth of yields is posited, in a sense representing catch-up with the current global state of technology. That would only close the yield gap with more advanced countries by 16 percentage points in 10 years. Nevertheless, to achieve this objective requires a substantial effort and focusing of the agricultural research effort. It probably also presumes a significant foreign private sector input.

In the case of cotton research, it has for over 20 years only maintained yields. Yields have not surpassed the levels of the early 1980's. The rest of the world has experienced steady increase in cotton yields. Thus, an additional 1.5 percentage points of catch-up growth is postulated. That comes to a very rapid 4.5 percent rate of growth. At that rate it would take nearly 9 years to reach the current Israeli level of cotton production, by which time Israel would have moved onto substantially higher yields. To achieve this high growth rate in yields is not possible with a business as usual approach to cotton research. Considerably greater focus and expenditure is needed. The present research system has been effective in maintaining yields in the face of the usual forces tending to reduce them. It must now focus additionally on what is needed for rapid yield increase.

Table 3-4 shows for four commodities Egypt's yield per hectare and that of a selection of countries with dry, sub-tropical climates, similar soils, and irrigation that have substantially higher yields. The yield differentials run from 17 percent higher than Egypt for rice to 45 percent higher for cotton.

Table 3-4: Egypt Compared To Selected Countries, Yield Of Specified Crops, 2001

Crop	Country	Yield (hg/ha—index
Maize	Egypt	76,800—100
	Israel	133,846—174
Seed Cotton	Egypt	27,551—100
	Israel	40,000—145
Wheat	Egypt	63,566—100
	Namibia	79,987—126
Rice, Paddy	Egypt	81,538—100
	Australia	95,308—117

Source: FAOSTAT 2001

Livestock production is shown to grow largely by increased productivity per animal, implying a doubling in animal productivity over an 18-year period. That is important to increasing competitiveness of the sector and is treated in the commodity chapter. Increasing production per animal would also increase feeding efficiency. In addition, there would be an increase of concentrate feeding, quite possibly from increased imports. Thus, what happens to the berseem area is indeterminate, particularly since berseem yields should also be presumed to increase at a three percent rate, as for the other field crops. With that rate of yield increase for berseem, some relative increase in concentrate feed use and an increasing feeding efficiency it is unlikely that berseem area would have to expand to match the livestock growth. Again, however, there is a heavy burden placed on productivity increasing research and its application to small farms. Livestock output is in terms of value added, that is net of the feed consumed.

Area

Area expansion is targeted as important for cotton and for horticulture: 2.5 percent rate of growth of area for cotton and 2.0 percent for horticulture. In effect, it is assumed that those increased areas are comparable to the increased area from new lands that the government targets, net of losses of land to agriculture from urbanization and such forces. Thus, compensating decline in area of these crops is not shown. That in effect means that something on the order of 0.75 percent points, or 15 percent, of the 4.8 percent growth rate is attributable to the new lands. The importance of new lands is even greater, given the significant loss of land to non-agricultural uses that is netted out of the new lands in these calculations.

Analysis by the Government of Egypt project cotton area increasing by one-third in the near future and rice area declining commensurately. For that to happen will require major policy changes. A low point in cotton area was reached in recent years at less than half the area planted in the early 1980's. Last year saw some recovery from those low points, but recovery of past peaks would represent a nearly two-thirds increase in area from present levels. Reaching the commonly quoted government objective of one million feddan planted to cotton would require a one third increase from present levels. Of course, the decline in area planted is a response by farmers to the relative profitability of cotton, particularly relative to rice. That is despite the very strong comparative advantage of Egypt in cotton production.

Thus, there is obviously much that needs to be done with respect to policy if these targets are to be reached. It should be noted that cotton generates a far higher value added per unit area of land than the other field crops, so raising cotton production is important to the overall growth rate and to employment.

Horticulture uses rather little land relative to its value of output, thus increasing area at the rate shown is not a substantial constraint if farmers find the crop profitable.

Unit Value

For two of the commodity groups, shift towards higher value components is a significant share of the growth rate of overall value added. In the case of cotton it is assumed that Egypt will develop its absolute and comparative advantage in finer grades of cotton and increase the share of output from those higher value components. Egypt has a strong comparative advantage in extra long staple cotton. Demand in the world is moving strongly towards high quality products and to some extent to natural products as well. That is a favorable environment for market development for extra long staple cotton. In the case of horticulture there may be shift to higher value components.

Reduced Prices

It should be noted that the high-income elasticities assumed for livestock and horticulture are mirrored by high price elasticities. That means that if the production and marketing constraints are not removed the consumer price will rise and consumers will shift readily to other, largely non-agricultural commodities. Given the labor intensity of livestock and horticulture and the strong employment multipliers, that lost opportunity will be paid largely in the form of less employment growth and less poverty decline.

Conversely, if production costs can be reduced substantially, that benefit can be shared with consumers with the lower prices increasing consumption and providing scope for a higher growth rate than shown. International competitiveness requires steady, substantial reduction in production costs. That is factored into Table 3-2b as a one percent addition to the growth rate of horticultural consumption.

Marketing

Growth in farm incomes of the magnitude required for rapid growth in employment cannot occur without large increase in farm output. The preceding text and tables show how that might be achieved. However, the marketing of that increased production, even in global markets, will not occur automatically. In both the global and the domestic markets there are myriad complex marketing problems that must be solved. For that reason, much of the exposition of later Chapters of this report deals with marketing problems.

Comparative Advantage in Agricultural Commodities

Egypt has highly productive agricultural resources that are reflected in high crop yields. Such conditions are normally highly responsive to the new opportunities offered by technological advance and the forces of globalization.

A common means of measuring comparative advantage is to compute the domestic resource cost of production. The commodity chapters present DRC's (Domestic Resource Cost) computed specifically for this report and summarized in Table 3-5. A country has a comparative advantage if DRC is less than one. All the crops in Table 3-5 show a DRC of less than one.

The two horticulture crops, potato and tomato, undoubtedly are representative of a wide range of vegetables and fruits, reflecting extremely high comparative advantage. They also show by far the highest returns to water. Hence, the future is bright for major expansion in these commodities. The proportion of area planted to these crops is very small compared for example to Southern California's with its quite comparable climate, soils, and water.

Cotton and wheat show very low DRC's of 0.61 and 0.65. Short season berseem, which is in part a proxy for livestock shows an exceptionally low DRC of 0.37. Maize also shows a highly competitive DRC of 0.81. Rice, Sugar Cane and Sugar Beet also show competitive DRC's, comparable to that of Maize. However, as shown in the last column of Table 3-5, the returns to water for these very water using crops is very low, at a third or less that of cotton. At such time as water becomes more scarce than at present, these high water consuming low returns to water crops will become less and less competitive for resources. An area of rice much less than at present, but nevertheless substantial, will remain competitive because it is grown on very heavy soils, ill suited to other crops, and much less demanding in water use.

A separate calculation in a World Bank study, for livestock shows DRCs of 1.0 or lower for poultry, both home and commercial, buffalo and exotic cattle (table 6.) It is notable that Baladi (local) cattle show negative returns—but that is most likely a reflection of farmer's willingness to take well below market wages for work on cattle. That suggests that the real profitability of cattle to farmers is much higher than shown in Table 3-6.

Table 3-5: Domestic Resource Cost, Various Commodities

Crop	Domestic Resource Cost	Value Of Water (LE/1000M³)
Wheat	0.65	0.39
Short Berseem	0.37	0.51
Maize	0.81	0.17
Rice	0.83	0.09
Cotton	0.61	0.34
Potatoes, summer	0.18	1.10
Sugarcane	0.81	0.11
Sugar beet	0.77	0.06
Tomato, winter	0.19	1.13

Source: Calculated by Tyner for this Report, see Commodity text.

Table 3-6: Domestic Resource Cost, Livestock Products

Animal	Domestic Resource Cost	Domestic Resource Cost Berseem*
Cattle, Exotic	0.8	0.7
Cattle, Baladi	Na	6.5
Buffalo	1.0	0.9
Poultry, Home	1.0	Na
Poultry, Comm	1.0	Na

Source: World Bank 1995
*DRC where farmer grows the Berseem, rather than buys it as marketed input.

Note that the two commodity groups recommended for USAID support represent 72 percent of incremental agricultural growth, and are the most labor-intensive commodities. Horticulture has by far the strongest comparative advantage of all the commodities.

KEY CONSTRAINTS FOR SPECIFIED COMMODITY GROUPS

The next Chapter provides extended discussion of opportunities and constraints for each commodity group. The following brief exposition points out critical differences among the commodity groups in constraints to be removed.

Cotton

In the target growth rates presented in Table 3-2, cotton accounts for only 11 percentage points of the increments to agricultural production. That is because of its low weight in the base of production and that in turn is because the area and production of cotton have declined precipitously over the past few decades. That decline does not represent lost comparative advantage (as shown by the DRC's in Table 3-6) but rather very unfavorable policies. Thus, the 9.0 percent growth rate for cotton is very rapid by normal crop growth standards, but not unreasonable considering how powerful the negative policy effects have been. Note that Pakistan, also a large producer of cotton under conditions similar to those of Egypt sustained a 16 percent growth rate in cotton production for well over a decade in the 1970's and 1980's (JMA, 1995.)

Cereals

Cereals account for 7 percent of incremental growth in the scenario set forth. In the recent past, rice has expanded its area substantially at the expense of cotton. That would be reversed by change in policy. Yield growth depicted requires attention to research and extension.

Other Field Crops

This catchall sector is depicted as growing at three percent per year, entirely because of increased yields.

Horticulture

A growth rate of six percent for horticulture will not be easy to achieve. First, a vigorous research and extension effort is needed to bring down cost of production. Second, massive barriers to competitive marketing must be removed. Thus, while the large-scale farms on the new lands can blaze a path, the large number of smallholders in the Delta must be included. That very much affects the approach to both extension and marketing. Finally, while the bulk of horticulture production will continue to be non-tradable on quality and transaction cost grounds, the export sector must grow quickly and increase the proportion of total production made suitable to the export market. In the long run, a high proportion of the Delta needs to be brought under horticulture production and that means small holders must be brought into the process.

In Egypt, 18 percent of the cropped area is under vegetables and orchards. That compares to more than twice that proportion in the San Joachim Valley counties of California.

Livestock

Livestock are largely produced on small farms and women play a major role in livestock production and marketing. Smallholder livestock is highly labor intensive. There is some view that the smallholder sector is inefficient. That is partly an image problem because the small farmer uses less capital and much more labor in the production process. It is also a reality because smallholders do not receive significant research, extension, and market development attention. But, with 27 percent of incremental value added coming from livestock, and that only matching demand growth, it is essential to income and employment growth that this potential be realized.

Efficiency of Input Use-Fertilizer

Typically in high-income countries value added in agriculture rises more rapidly than gross value of output. In contrast, in low-income countries the reverse is the case. That is because of rapid increase in fertilizer use with little attention to the management intensive practices that increase the productivity of fertilizer. Table 7 illustrates three hypothetical cases, the third of which represents Egypt. Because the efficiency with which fertilizer is used is decreasing with growth in use, value added grows substantially less rapidly than total output. The countries that achieve faster growth in value added than in gross value of production have substantial research and extension programs focused on increasing input efficiency.

Table 3-7: Three Hypothetical Situations of Agricultural Growth

Year	Gross Value Output	Situation 1		Situation 2		Situation 3	
		Cost of Inputs-	Value Added-	Cost of Inputs-	Value Added-	Cost of Inputs-	Value Added-
1	100.00	25.00	75.00	25.00	75.00	25.00	75.00
2	105.00	26.25	78.75	25.75	79.25	26.75	78.25
3	110.25	27.56	82.69	26.52	83.73	28.62	81.63
4	115.76	28.94	86.82	27.32	88.44	30.63	85.14
5	121.55	30.39	91.16	28.14	93.41	32.77	88.78
6	127.63	31.91	95.72	28.98	98.65	35.06	92.56
7	134.01	33.50	100.51	29.85	104.16	37.52	96.49
8	140.71	35.18	105.53	30.75	109.96	40.14	100.57
9	147.75	36.94	110.81	31.67	116.08	42.95	104.79
10	155.13	38.78	116.35	32.62	122.51	45.96	109.17
11	162.89	40.72	122.17	33.60	129.29	49.18	113.71
Growth Rate	**5.00%**	**5.00%**	**5.00%**	**3.00%**	**5.60%**	**7.00%**	**4.25%**

Source: JMA 1995
Note:
Situation 1: Growth rate of cost of inputs=Growth rate of gross value of output
Situation 2: Growth rate of cost of inputs<Growth rate of gross value of output
Situation 3: Growth rate of cost of inputs>Growth rate of gross value of output

It is value added that matters to farm incomes which in turn drive rural employment. Thus Egypt, which uses fertilizer at rates far higher than typical low-income countries (but of course still less than in the high income countries) has considerable scope to increase the productivity of fertilizer. It should be noted that in effect the employment impacts shown below presume that value added will grow as rapidly as gross value of output, situation 2 in the table, which in turn presumes an effective effort to improve the management of inputs, especially fertilizer.

Efficiency of Input Use-Water

The targeted growth rates presume that the cultivated area will continue to expand at about the same rate as in the past few decades. In those calculations the government's targets for new irrigated area have been accepted, and then the historical rate of loss of agricultural land netted out; that leaves a net growth rate of about 0.75 percent. There is an implicit assumption that new lands will be allocated optimally and will be comparable in quality to past additions. It is also assumed that sufficient increase in water use efficiency will occur to meet the rapidly growing urban needs without productive loss in agriculture.

These are all heroic assumptions. For them to become reality will require continuing attention to water use policy and the making of hard decisions as to where new water will be allocated. In this context, difficult conflicts between the best allocation for employment and national income growth and broader national objectives will have to be resolved.

Achieving the Aggregate Agricultural Growth Rate

The assumptions stated above provide an agricultural growth rate of 4.8 percent. That is in the mid range of the four to six percent growth rates typical of the high growth rate countries (Mellor, 1992.) That is a reasonable position for a country of Egypt's highly biological technology responsive agricultural resources. As is shown in the next section, that growth rate makes a major contribution to employment growth and poverty reduction. The contribution of agriculture is a function of the per capita rate of agricultural growth. Thus, with a 2.2 percent population growth rate and a 4.8 percent agricultural growth rate, reducing the agricultural growth rate by one percentage point reduces the total output growth rate by about 20 percent but the growth rate per capita by nearly 40 percent. Thus, there is urgency to finding the means to meet the high growth rate target. The comparative advantage is there. The need is for the investment, the institutions, and the policies delineated in detail in the following sections.

If this high agricultural growth rate is to be achieved, specific investment, and institutional development efforts must be made in each commodity group. This report recommends that USAID play an important commodity specific role in the two most important commodity groups for achieving the high growth target—horticulture and smallholder livestock.

Of perhaps even greater importance than the commodity specific efforts is a large, continuous effort to realize the policy changes that are needed at the macro level, at the general agricultural level, and the specific commodity level. That effort requires continuous analysis of the changing policy needs, related to the priorities for achieving the overall growth rate, an effective implementation of policy change, and continuous monitoring and evaluation of progress made. The latter is of special importance because of the dynamic nature of the changes and the need to understand the shifting policy priority needs in the context of a dynamic technological and commodity growth situation.

THE EMPLOYMENT IMPACT OF THE TARGETED GROWTH RATES

Timmer (1997) shows that 84 percent of poverty reduction, and by implication employment growth, is associated with the rate of growth of agriculture. That work is consistent with that of Ravallion (1995) and earlier work by Mellor (1976.)

The Timmer and Ravallion work also show substantial lags between growth in agriculture and reduction in poverty. That is consistent with the agricultural impact occurring substantially through the indirect effect of providing a demand stimulus to the rural non-farm sector. Those same analyses show that when the income from farming is extremely unequal the poverty reduction/ employment effect is greatly reduced. That is an important finding in its own right and is consistent with the agricultural impact being indirect, through increased demand for rural non-farm products. Very rich landowners will not stimulate the labor intensive, non-tradable rural non-farm sector as much as peasant farmers. That is of course an argument for realizing the efficient growth potentials in the smallholder-farming sector.

The following data are consistent with those international findings. In Egypt as for most countries, national statistics are not categorized according to the tradable and non-tradable sub-sectors, even though that is the most relevant categorization for analyzing employment growth. Thus, the following data rely on micro studies and considerable extrapolation.

Base Data

National income accounts show 17 percent of GDP in agriculture and the most recent CAPMAS labor force survey shows 66 percent of the labor force as rural (Table 3-8.) Based on expenditure data it is calculated that the rural non-farm non-tradable sector is the same proportion of GDP as agriculture. The CAPMAS labor force survey states 23 percent of the labor force as farm labor force. The same data shows that employment in the rural non-farm sector is 43 percentage points of the total employment and total rural employment is 66 percent of total employment.

Table 3-8: GDP and Employment Proportion, By Sector, Egypt, Hypothetical

Sector	GDP Proportion	Employment Proportion	GDP Employment Ratio
Agriculture	17	23	0.74
Rural Non-tradable	17	43	0.39
Subtotal	(34)	(66)	(0.52)
Urban Tradable	56	14	4.00
Urban Non-tradable	10	20	0.50
Subtotal	(66)	(34)	(1.94)
Grand total	100	(100)	(1.0)

Source: GDP, Agriculture from National Income Accounts, rest extrapolated from data on small and medium scale business; Employment, Agriculture, Rural Subtotal, Urban subtotal from CAPMAS 1998 Labor Force Survey; rest extrapolated from breakdowns in that survey and from SME data.

It is estimated, consistent with survey and GDP data, that the urban informal or non-tradable sector is about 50 percent larger than the urban tradable sector in labor force but less than one-fifth as large in terms of share of GDP. These numbers are consistent with estimates of factor share to labor, capital and land in the respective sectors.

Growth Rates

The agricultural GDP growth rate is taken from the preceding analysis as 4.8 percent (Table 2.). The rural non-tradable growth rate is calculated as 1.5 times the agricultural growth rate per capita plus the population growth rate and therefore comes to 6.1 percent. The Urban formal and non-formal sectors are assumed to grow at a quite rapid rate of eight percent.

Employment growth rates are calculated from the GDP growth rates and the employment elasticities. A weighted average growth rate for employment and for GDP is calculated, as is

the proportion of employment in each sector (Table 3-9.). That latter number is a function of the employment growth rate and the initial size of the sector.

Table 3-9: Employment and GDP Growth Rates, By Sector, Egypt, Hypothetical

Sector	GDP Growth Rate	Employment Elasticity	Employment Growth Rate	Proportion of Incremental Employment
Agriculture	4.8	0.5	2.4	12
Rural Non-tradable	6.1	0.9	5.5	49
Subtotal	(5.5)	(0.7)	(4.4)	(61)
Urban Tradable	8.0	0.4	3.2	9
Urban Non-tradable	8.0	0.9	7.2	30
Subtotal	(8.0)	(0.48)	(5.6)	(39)
Grand Total	(7.2)	(0.7)	(4.8)	100

Sources: GDP growth; agriculture from tabled 2; rural non-farm calculated as Agr. GDP growth rate per capita times multiplier of 1.5, plus population growth rate; Urban tradable assumed high rate; urban nontaxable, assumed same as urban tradable; Employment Elasticity; agriculture from Rao 1986; Rural Non-tradable, marginally less than one; Urban tradable, standard for LIC industrial; urban non-tradable same as rural non-tradable; Employment growth equals GDP growth rate times the elasticity; Proportion calculated as average of employment growth rate weighted by the employment proportion from table 7.

Employment Impact of Rapid Agricultural Growth

With fast growth assumptions given, employment grows at 4.8 percent per year, nearly twice the population and labor force growth rate. If there were an underemployed pool of labor equal to 11 percent of the labor force, that pool would be absorbed in a little less than five years, at which point real wage rates would begin to rise. In this fast growth scenario agriculture and the sector driven by agriculture provides 61 percent of incremental employment growth and the urban sector provides 39 percent. That is in contrast to 66 percent of GDP in the urban sector and 34 percent in the rural sector.

If employment grows at 4.8 percent and the labor force at 2.8 percent (CAPMAS estimate) then it would take five years to absorb 10 percent unemployment of the labor force. Taking the CAPMAS estimate of the total labor force at 21 million, then somewhat over 400 thousand jobs would be created beyond the labor force growth.

ALTERNATIVES TO AGRICULTURE-LED GROWTH

Alternatives growth strategies include de-emphasizing agriculture generally, de-emphasizing specified commodity groups within agriculture, and de-emphasizing specific policies within commodity groups. The first two are discussed below, the third in the individual commodity sections. Throughout it has been emphasized that solving employment problems requires balanced growth. In that context, a very high growth rate in the urban sector is assumed. Thus, as alternatives for lower agricultural growth are examined, it is not assumed that urban growth could be increased in compensation. It is already set at growth rates far above the present. Those growth rates will be difficult enough to achieve, let alone even higher ones.

De-emphasizing Agriculture Generally

The preceding discussion states commodity group targets that sum to a 4.8 percent growth rate for agriculture and then calculates the impact that growth rate will have on employment, when combined with a high growth rate in the urban tradable and non-tradable sectors.

Table 3-10 examines the situation if in each category in Table 3-1, the growth rate dropped in half, except for cereals for which the growth rate would be maintained at 3 percent per year, increased new lands, but reduced yield rate growth. The overall growth rate would be 2.7 percent—comparable to the growth rate in previous slow agricultural growth periods and a level just keeping up with labor force growth. The difference in impact between the 4.8 percent and the 2.7 percent growth rates is depicted in Table 3-10.

Table 3-10: Jobs Generated in the Rural and Urban Sub-Sectors, Fast and Slow Growth in Agriculture, 2002

Sector	GDP–fast	GDP–slow	Incr. Empl –fast (000)	% Empl –fast	Incr. Empl slow	% Empl –slow	Employ. Reduction
Agric	4.8	2.7	121	12	68	10	53
Rural non-tradable	6.1	2.7	494	51	218	34	276
Subtotal	(5.5)	(2.7)	(615)	(63)	(286)	(44)	(329)
Urban Tradable	8.0	8.0	91	10	91	15	0
Urban notable	8.0	8.0	302	27	302	41	0
Subtotal	8.0	8.0	(393)	(37)	(393)	(56)	0
Grand Total	7.1	6.3	1,008	100	679	100	329

Source: Calculated from table 8; base employment from CAPMAS 1998 Labor Force Survey. Total labor force is 21 million.

The growth rate of GDP would fall rather little: by only 12 percent from 7.2 to 6.3. That is not surprising because agriculture is a small part of the total economy. However, most important, 329 thousand fewer jobs would be created. Job formation would decline by 33 percent, compared to the decline in GDP growth rate of 11 percent. Since it is assumed that the growth rate would not decline in the urban sector, 56 percent of job formation would be in the urban sector, primarily in the metropolitan areas that are dominant in exports, and only 47 percent in the rural areas. Rural urban migration would be much greater than under the fast agricultural growth scenario.

It should be noted that the rural economy would be devastated by slow agricultural growth. With agriculture growing at 4.8 percent and high employment growth the farm population would decline on the order of 0.5 percent. Farm incomes would rise by a full five percent per year; they would double in 14 years. With 2.7 percent growth and slow growth in employment the farm population would probably increase by nearly the amount of population growth and hence farm incomes would not increase at all.

With the low growth rate, rural areas would experience both stagnant farm incomes and 329 thousand fewer jobs created each year. The consequent rural urban income differentials would certainly result in massive rural urban migration. Many of those migrants would flood into urban slums and wait for considerable periods for the better paying urban jobs. That would be one of the most important causes of increased urban poverty and slums.

If agriculture grows at only the labor force growth rate, and the urban sectors grow as above, then the overall employment growth rate drops to 3.4 percent or by nearly 30 percent—barely above the labor force growth rate. It would then take nearly 17 years to absorb the same pool of underemployed as would be absorbed in 5 years in the fast agricultural growth strategy. It should be noted that with so much of the urban tradable sector in the public sector and believed to have large quantities of redundant labor that in fact the employment elasticity for the urban tradable sector may in the short run be close to zero.

De-emphasizing Specified Commodity Groups

A very rough estimate can be made of the impact of decreasing growth in each commodity group by simply multiplying the total loss in employment from slower agricultural growth by the share of that commodity group- in total agricultural output. Table 3-11 makes that rough calculation. The employment impact of the slowdown in agricultural growth is substantially understated for cotton, horticulture, and livestock, each of which is far more labor intensive than the average for all commodities. Even with this underestimate, a slowdown in agriculture would eliminate over 150 thousand jobs per year in the horticulture and livestock sectors along.

Table 3-11: Impact of Individual Commodity Groups on Employment Decline, Difference Between Fast and Slow Agricultural Growth

Commodity Group	Base Weight (percent)	Employment Decline (000
Cotton	6	20
Cereals	23	75
Other Crops	16	53
Horticulture	31	102
Livestock	24	79
Total	100	329

What comes though most clearly in the preceding exposition is that the solution to Egypt's employment problem can come only through major efforts on several fronts. Accelerated growth of the urban, tradable goods and services sector is essential not only because it is so large and therefore accounts for substantial employment, but also because it is important to growth of the non-tradable sub-sectors of agriculture—particularly livestock, but to a substantial extent horticulture as well. On the other hand, agriculture's small share of GDP looms large as a share of employment. In turn, each commodity group within agriculture has a significant role to play in employment growth. Failure to move any one brings a significant effect on employment growth, but none is so dominant that one can concentrate on only that.

Thus, the place for priorities is emphasizing the large components within each sub-sector and diagnosing the few priorities for moving each sub-sector. The ensuing exposition does just that, so that a manageable number of priority actions come through. Of course, priority setting for USAID is somewhat different to priority setting for the Government of Egypt. USAID needs to analyze not only what needs to be done in Egypt but also its own comparative advantage within that range. The following exposition addresses that issue. That there is a lot to do strengthens the argument for making hard decisions about comparative advantage and priorities among sub-sector specific actions.

What does come through from this analysis of alternatives is the importance of a strategy that does set priorities and a policy environment favorable to succeeding in those priorities. USAID has a powerful comparative advantage in policy analysis complementary to rapid agricultural growth to meet both production and employment objectives.

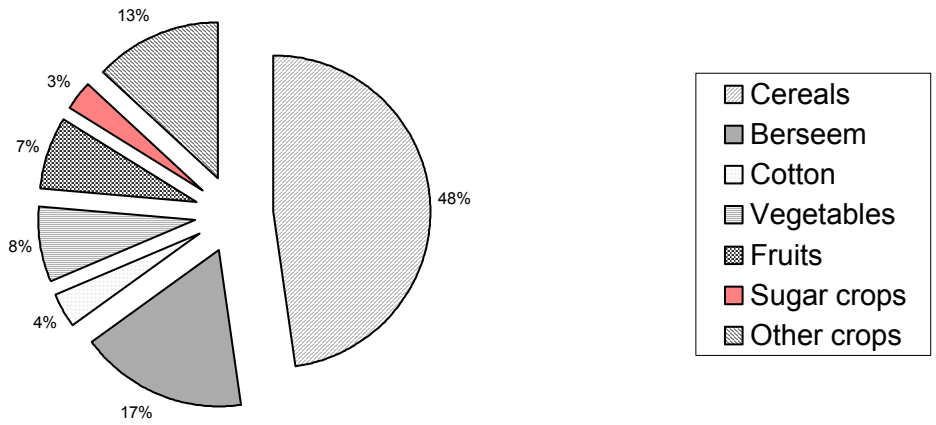
The following sections take up, commodity group by commodity group, the investment, institutional development, and policy requisites of achieving the high agricultural growth rate that can make a significant dent in the employment problem.

CHAPTER FOUR
ANALYSIS OF SELECTED COMMODITIES AND THEIR SUPPLY CHAINS

OVERVIEW OF EGYPTIAN AGRICULTURE

Egypt has a long and rich history of agricultural production both for domestic consumption and export. The agriculture is entirely irrigated, and thus is not subject to the large annual fluctuations in yields characteristic of most countries dependent on annual rainfall to nourish the crops. In 2000/01 Egypt had 13.9 million feddans of crop production. The total agricultural area is 7.8 million feddans, so the cropping intensity was 178 percent. The makeup of the crop production is depicted in Figure 4-1. About half the area is used for cereals with wheat representing about 18 percent, maize 14 percent, and rice 11 percent. Berseem (a kind of clover) constitutes 17 percent. Together, cereals and berseem represent two-thirds of the cropping area. Wheat and berseem are the major winter crops, while cotton, rice, maize, and horticulture are the main summer crops. Cotton (518,319 feddan) only represented 4 percent of total area in 2000/01, but was back up around 730,000 feddan in 2001/02. Fruits and vegetables together constitute about 15 percent of the total area. All other crops including sugar, oilseeds, legumes and others represent another 16 percent of cropped area in Egypt.

Figure 4-1: Egyptian Crops in 2000/01



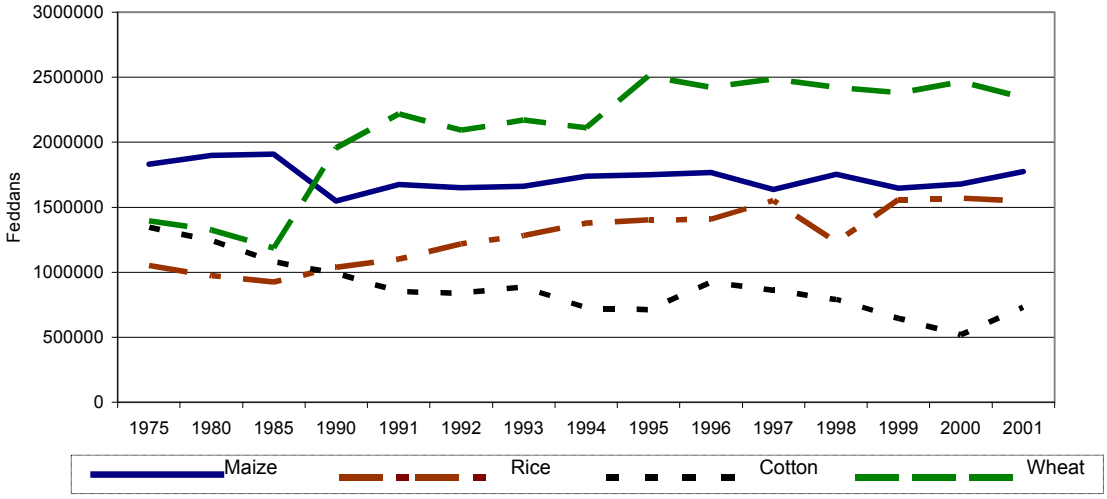
OVERVIEW OF CEREALS

Cereals, berseem, and cotton are the traditional heart of Egyptian agriculture. Berseem will be covered in greater detail in the livestock section, as it is exclusively an input into livestock production. Figures 4-2, 4-3, and 4-4 provide the history of area, yield, and production of wheat, maize, rice, and cotton from 1975 to the present. The big story in the area graph is the

changes in rice and cotton area. Over the past 20 years, cotton area has fallen about a half million feddan (about half the area today it was 20 years ago), while rice area has increased about the same amount, representing a 50 percent increase in rice area. Also, over that same period, wheat area has almost doubled. Maize area has remained essentially constant. Over the decade of the 1990s cotton fell about 5.9 percent, rice grew at 3.6 percent, and maize and wheat grew at 1.2 and 1.6 percent respectively.

The yield story is that cotton yields have remained stagnant over the past twenty years while cereal yields have increased substantially. In fact, cotton yields fell substantially in the second half of the 1980s and actually grew 2.9 percent from the low point in 1990. Much of the substantial growth in cereal yields occurred in the 1980s, and 1990s growth rates were 1.0, 1.8, and 2.5 percent for rice, wheat, and maize respectively.

Figure 4-2: Changes in Area for Cereals and Cotton



The production story, of course, is a product of the area and yield histories. Cotton production has fallen substantially, while production of all three cereals has increased substantially. Over the decade of the 1990s cotton production was essentially unchanged, while wheat, maize, and rice grew at 3.5, 3.7, and 4.7 percent annually.

Figure 4-3: Changes in Yield for Cereals and Cotton

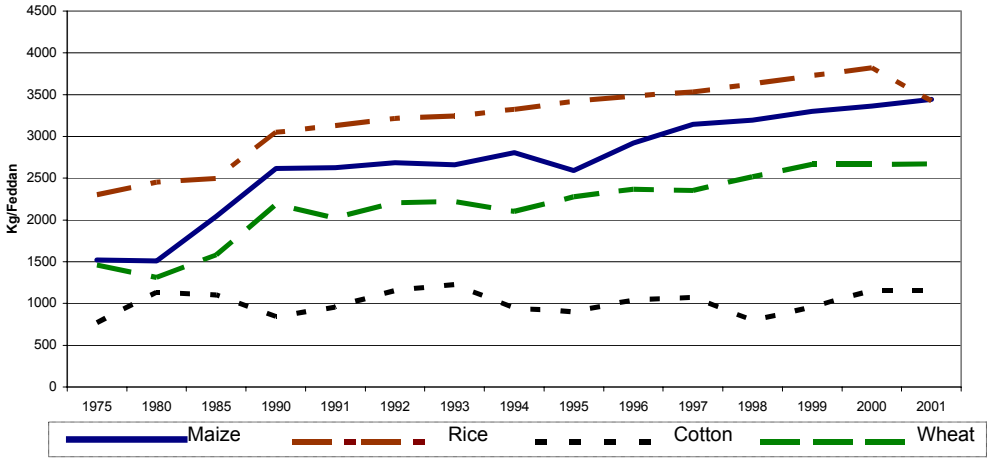
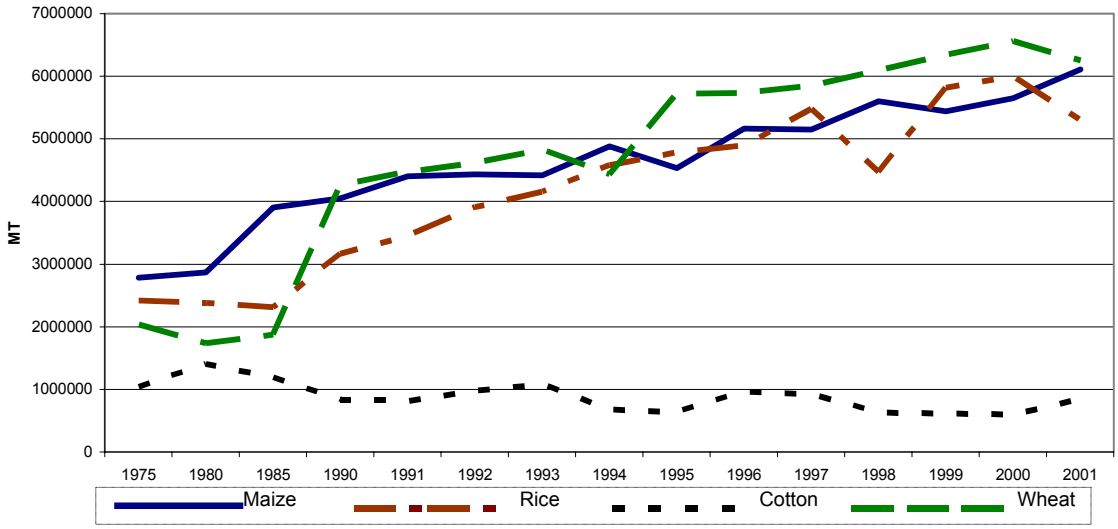


Figure 4-4: Changes in Production for Cereals and Cotton



Wheat

Egypt has the highest per capita consumption of wheat and bread in the world. It also has a complicated system of subsidizing bread and flour. In 2000, about 6.4 million metric tons of wheat was produced domestically, and about 5.8 million imported. Egypt is the world's second largest importer of wheat. The wheat/flour supply chain can be divided into three parts:[5]

The baladi bread and flour is the subsidized component. It consists of flour milled to an 82 percent extraction rate. About 5 million tons of wheat goes into this chain. The chain is completely controlled by the government, and the resulting flour and bread are highly subsidized.

The 72 percent flour (fino) chain uses entirely imported wheat to produce a more refined flour. About 3 million tons of wheat enter this chain at present. There are few government regulations on price or transport of the 72 percent flour, and government subsidies are limited to some implicit subsidies for government mills that produce this flour in competition with the private sector.

The remainder of the wheat, about 4.2 million tons in 2000, is processed through thousands of small village mills in rural areas and consumed locally.

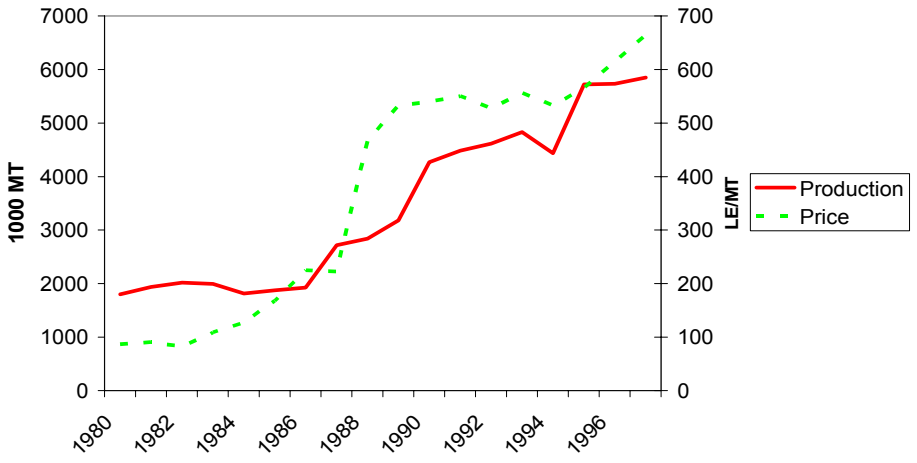
[5] This section draws heavily upon previous work done by Tyner and colleagues plus an update of that work in progress by Roger Poulin and Abla Abdel-Latif. The original work is Wallace Tyner, Adair Morse, Ragaa El Amir, Adel Mustafa, and Sherin Sherif, Wheat Sector Baseline Study, Impact Assessment Report No. 6, MVE Unit APRP, Abt Associates, May 1999. That volume contains detailed information on production, processing, distribution, and policy issues related to the wheat/flour sub-sector.

Production

As shown in Annex Table __, estimated 2001 national wheat production was 6.3 million tons. Of that 3.3 was produced in Lower Egypt, 1.4 in Middle Egypt, 1.1 in Upper Egypt, and 0.5 in frontier/new lands. The government (GASC) procured 2.0 million tons of national wheat for the baladi flour/bread system at a procurement price of LE 700 per ton, equivalent to about $156 per ton at an exchange rate of LE 4.50 per dollar. This government procurement effectively sets the value of national wheat. Private millers are prohibited from procuring domestic wheat. Over time, wheat production has been quite responsive to changes in wheat price as illustrated in Figure 5.

Cost of production varies by region and year. Table 4-1 provides representative costs and revenues for wheat production in Egypt. The values are based upon 1998 budgets adjusted for changes in tradable input costs due to the devaluation of the LE. Total estimated production cost per ton is LE 442 after adjusting for the by-product credits. With a yield of 2.67 tons per feddan, the profit per feddan is LE 687 after land rent, which is assumed to be LE 703 in these calculations. Thus from a private perspective, wheat production in Egypt is profitable under current economic and government policy conditions. The return to water is LE 0.39 per cubic meter.

Figure 4-5: Domestic Production and Farm Gate Prices



Processing and Handling

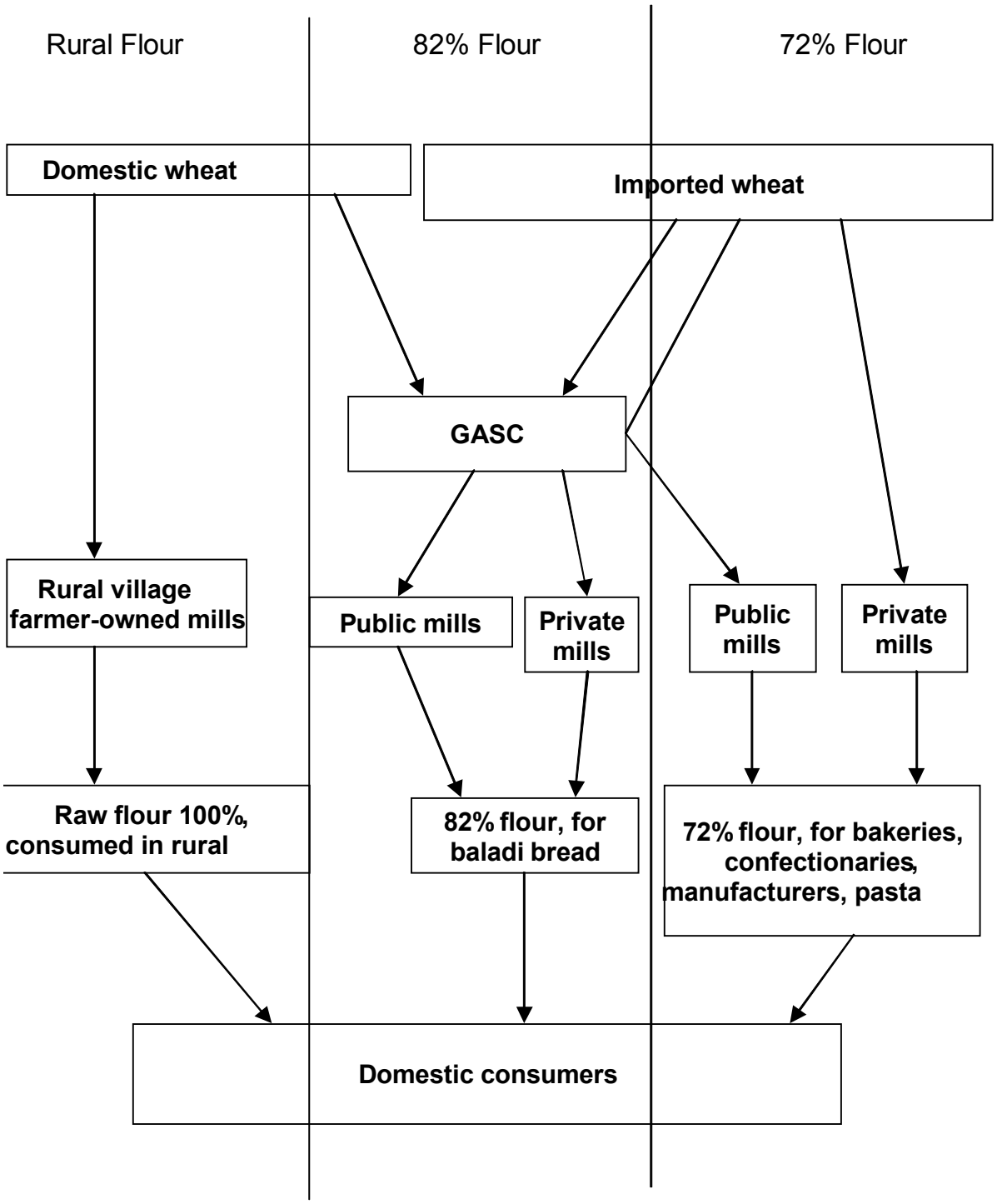
As indicated above, there are three distinct chains for processing wheat in Egypt. The flow of domestic and imported wheat through these chains is depicted in Figure 6. Domestic wheat either is milled in the rural/farmer owned mills and consumed locally or is sold to the government procurement agency, GASC for use in making baladi flour. The raw flour from the rural mills is sometimes termed 100 percent flour, but that is not accurate. Some of the flour is consumed as whole wheat flour (about 97 percent extraction), but much of it is sifted either a the rural mill or the farmer's home to yield bran and a more refined flour. The bran then s fed to animals on the farm.

Table 4-1: Wheat Production Costs and Returns

Accounts	Unit	Quantity	PRIVATE					
			Prices (LE)	Values (LE)	TR (%)	NTR (%)	TRV (LE)	NTRV (LE)
Revenue Account								
Output	Ton	2.67	700.00	1865.85				
By-Product	Ton	1.00	445.90	445.90				
Total Revenue				2311.8				
Cost Account								
Purchased Inputs								
1.Seed/Seedling	Kg / No.	6.00	13.15	78.90	1.00	0.00	78.90	0.00
2.Fertilizers:								
- Nitrogen	Kg	232.30	0.68	157.24	0.95	0.05	149.63	7.61
- Phosphate	Kg	100.00	0.36	35.81	0.91	0.09	32.54	3.28
- Potash	Kg	4.20	1.17	4.92	0.97	0.03	4.79	0.14
3.Manure	Load	64.40	0.50	32.20	0.00	1.00	0.00	32.20
4.Pesticides	LE	1.00	17.16	17.16	1.00	0.00	17.16	0.00
5.Machinery:								
- Tractor	Hour	4.11	16.71	68.63	0.33	0.67	22.65	45.98
- Water Pump	Hour	16.50	4.75	78.39	0.20	0.80	15.51	62.87
- Pesticide Spr.	Hour	0.50	10.00	5.00	0.50	0.50	2.50	2.50
- Trailer	Hour	2.62	17.37	45.53	0.35	0.65	15.79	29.74
- Thresher/Separ.	Hour	3.69	18.00	66.40	0.75	0.25	49.80	16.60
- Compiler	Hour	0.00	0.00	0.00	0.75	0.25	0.00	0.00
6.Other Expenses	LE	1.00	84.20	84.20	0.50	0.50	42.10	42.10
Domestic Resources			99.85					
1.Labor:								
- Man	Man/Day	25.73	7.50	193.00	0.00	1.00	0.00	193.00
- Boy	Boy/Day	12.80	4.00	51.20	0.00	1.00	0.00	51.20
2.Animal Work:								
- Cow	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00
- Cart	Day	0.44	7.00	3.10	0.00	1.00	0.00	3.10
- Camel	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00
3.Water Supply	M3	1749.00	0.00	0.00	0.30	0.70	0.00	0.00
4.Land	Feddan	1.00	703.40	703.40	0.00	1.00	0.00	703.40
Total Costs				1625.08			431.36	1193.72
Profit Account								
Net Profit	LE/fd			686.67				
Return to Land	LE/fd			1390.07				
Return to Water	LE/1000M3			392.61				

Source: The original data was provided by Dr. Mahmood Ahmad, FAO Near East Regional Office, Cairo. Adjustments were made for tradable input costs and farmer price by Tyner.

Figure 4-6: Wheat Subsector



The domestic wheat that is procured by GASC goes to either public or private mills to produce subsidized 82 percent extraction baladi flour. The public sector mills are a mixture of more modern cylinder mills and older stone mills. However, the government has decreed that the stone mills must be replaced by cylinder mills by the end of 2002. Less than 10 percent of the baladi flour is produced in private mills under contract from the government. These mills are likely to go out of business as they will be unable or unwilling to make the investment in cylinder milling technology.

Wheat is imported both by the government (GASC) and the private sector. GASC uses imported wheat to supply mills for production of baladi flour and to provision public mills that produce fino flour. There are 19 public sector mills with a total capacity for fino flour of 2.0 million tons. There are 30 private mills with a total capacity of 3.1 million tons bringing the total fino capacity to 5.1 million tons in 2001. Given that about 3 million tons of wheat is processed into fino flour, there is considerable excess capacity.

The fino flour sector is largely deregulated, but there are important government interventions in the sector. Only mills and importers under contract from mills are allowed to import wheat (plus the government). Private importers cannot import wheat on their own account for sale in the open market. Private mills cannot procure domestic wheat. Only 72 percent extraction flour can be produced. Thus mills cannot differentiate their fino product based on extraction rate. The public sector mills benefit from hidden subsidies in that they do not need to cover capital costs (depreciation). They also receive transfer prices on public sector port and transportation charges that are lower than private sector rates.

Many of these and other regulations that exist in the wheat/flour system are aimed at limiting leakage between the 82 and 72 percent flour chains. It is relatively easy to sift 82 percent flour down to 72 percent, and there is strong incentive to do so since the 82 percent flour is highly subsidized, and the fino flour price is market determined. Estimates of the leakage run as high as 30 percent or more. Public mills can only produce one of the two flour types, not both. Recently, the government has adopted a program of mixing maize flour (80/20 wheat/maize) with wheat to help limit the leakage. Once blended, the maize and wheat flour blend cannot be easily separated, so fraud could be reduced considerably. The implications of this program on the maize sub-sector are covered in that section.

Generally, the public sector mills are older and less efficient than the private mills. Because of subsidized competition from the government mills and because of the excess capacity, milling margins tend to be low. Of course, the margins in the baladi chain are negative, with the difference being paid as government subsidies.

Marketing

At the consumer level, there are two distinct product lines: baladi bread and flour and fino flour and products. For the fino chain, the marketing system is market driven with no controls on prices or distribution. Baladi flour and bread is marketed in a government controlled system. About 75 percent of the product is distributed as bread by baladi bakeries,

with the remainder being distributed as flour. The price of flour and bread is fixed by the government, as is the amount of flour allotted to each bakery. Bakeries maneuver through cost minimization and probably through converting some of the baladi flour to fino. With the devaluation, the premium for fino flour has increased even more.

In 1996/97 baladi flour and bread subsidies amounted to LE 2.9 billion, or 4.2 percent of total government expenditure. Recently the number of outlets for baladi bread and flour has dropped. Longer lines and waits are common for baladi bread. Baladi bread sells for LE 0.05. A fino flour loaf costs about LE 0.25, but the market has been growing for this product because of the supply constraints imposed by the government on baladi.

Comparative and Competitive Advantages

A recent World Bank study indicated that wheat is a highly protected crop in Egypt and that the incentive structure provided strong encouragement for farmers to allocate resources to crops like wheat, maize, and rice, instead of the more economically profitable cotton and horticultural crops.[6] Their calculated nominal and effective protection rates for wheat were 56 and 83 percent respectively. However, their calculations used an exchange rate of LE 3.4 per dollar and used world wheat prices that were quite low by historic standards. If one changes these assumptions, the results can be quite different. One of the problems with calculations of nominal and effective protection (NPC and EPC) and domestic resource cost (DRC) is that they use values for a given set of domestic and international conditions. As soon as these conditions change, the values will be different. In principle, these calculations should be based on long-term considerations rather that conditions existing at a given moment in time.

An alternative approach is to use a distribution of world prices and ocean shipping rates and to perform the calculations using Monte Carlo simulation based on these price distributions. We have performed these calculations for wheat using the same base data used in the World Bank calculations but with the exchange rate changed to LE 4.5 per dollar. We used monthly world price data from 1990 to January 2002 and fit a truncated normal distribution to that data.[7] The world price data are illustrated in Figure 4-7.

The results of these simulations are very enlightening. The expected NPC and EPC are 0.96 and 0.99, meaning that under simulated world market conditions and current Egyptian policy and exchange rate, wheat is neither protected nor taxed. The expected domestic resource cost is 0.67, and the probability of the DRC exceeding one is zero.[8] Thus, Egypt clearly has a

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[6] World Bank, Arab Republic of Egypt: Toward Agricultural Competitiveness in the 21st Century—An Agricultural Export Oriented Strategy, World Bank Report No. 23405-EGT, December 2001.

[7] The price distribution excludes the 1 year spike in 1995-96 because it does not represent normal conditions in world markets. The calculated mean and standard deviation are $138 and $21. The distribution was truncated at $100 on the low side and $250 on the high side. Over the past 21 years, wheat price has never fallen below $100. The slight downward trend in world price was not incorporated in the analysis. For ocean freight rates, a triangular distribution was assumed with a minimum of $9, a maximum of $20, and a mode of $13, which yields an average of $14. The world price and freight distributions are not correlated.

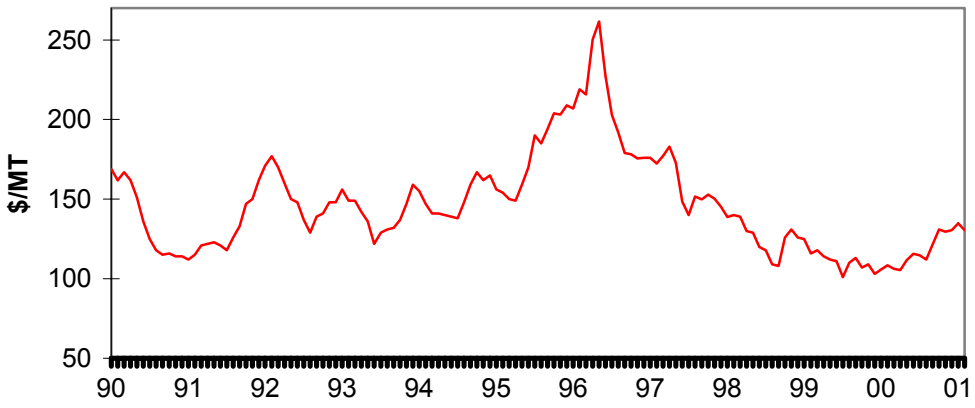
[8] The expected DRC of 0.67 differs slightly from the discrete value presented earlier (0.65) due to the stochastic nature of the calculations. That will be true for some of the other cereals as well.

comparative advantage in producing wheat. It is also interesting to examine the distributions of expected NPC and EPC, which are contained in Figures 8 and 9. The probabilities of the NPC and EPC being less than 10 percent (the recommended World Bank maximums) are 89 and 78 percent respectively. The conclusion is that Egypt does have a comparative advantage in producing wheat and that under world market conditions that have prevailed over the past decade, current policies would result in a high probability of no excessive protection of wheat.

Opportunities for Growth

So long as Egypt continues its policy of subsidizing baladi bread and flour, it is likely to remain the world's largest per capita consumer of wheat. At present, Egyptian yields are high by world standards and even high compared with other producers of irrigated wheat (Saudi Arabia for example). However, there will continue to be opportunities to increase efficiency and productivity. It is not unreasonable to assume that Egyptian wheat production growth could keep up with population growth, at the least.

Figure 4-7: U.S. Gulf Wheat Prices



There are also opportunities to improve the efficiency of the marketing system. Prior analysis indicates that there is not the degree of price integration across governorates one would expect of an efficient marketing system. There clearly are transportation bottlenecks and perhaps occasionally government intervention in the free movement of wheat around the country.

Sector-Specific Constraints

Many of the constraints have been discussed above and are elaborated in detail in the Tyner, et al. paper. In addition, improved extension services and water management would be important in increasing productivity in wheat.

Figure 4-8: Distribution for Wheat NPC/D8

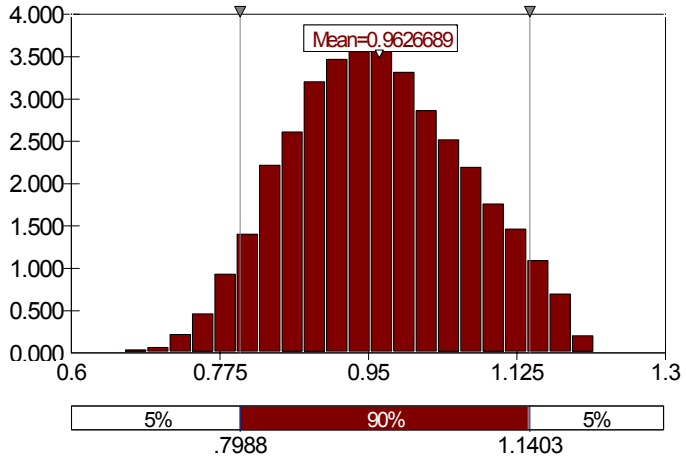
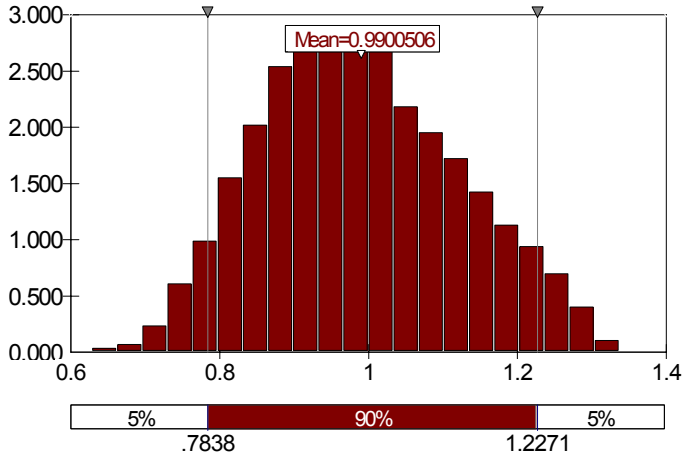


Figure 4-9: Distribution for Wheat EPC/D9



Maize

Maize is a very important cereal crop in Egypt covering almost 15 percent of the cropped area of the country. It is a summer crop, so it competes with rice, cotton, horticultural crops, and other summer crops. Most of the maize produced in Egypt (about 97 percent) is white maize. Maize is used both for human and animal consumption. The animal component is used both as grain and as fodder during the summer months when berseem is not available. A substantial amount of yellow maize is imported, and it is used entirely for animal feed.

Production

During the decade of the 1990s, maize area, yield, and production grew at 1.2, 2.5, and 3.7 percent respectively per year. The yield increase for maize was fastest of the three major cereals. Production in 2001 was 6.1 million tons of which about 56 percent was lower Egypt,

30 percent middle Egypt, and the remainder upper Egypt. The MALR National Maize Research Program has had considerable success developing new varieties, implementing a variety testing program (with both public and private varieties), and establishing a demonstration plot program where farmers can see the results on different varieties in their region. The breeding program also has been working on pest resistance, desired grain product traits, and other qualities in addition to yield. It appears that the rate of progress of the 1990s could be sustained for at least another decade with continued investment in maize research and extension.

The cost of production for maize is provided in Table 4-2. As was the case for wheat, it is 1998/99 data adjusted for the change in exchange rate for tradable inputs. Production cost is LE 432 per ton, and the value of water is LE 0.18 per cubic meter. Profitability per feddan and the return to water are both lower for maize than for wheat (although maize and wheat do not compete directly for land since maize is a summer crop).

Processing and Handling

Maize is either consumed directly by humans or used as animal feed. In either case, the only processing is milling the maize into maize flour. For human consumption, a substantial part of the maize is milled in the thousands of small village mills. Part of the local maize used for animal feed is used as is for farm animals such as cattle and poultry. Most of the maize used as animal feed is ground in feed mills and blended with other feed ingredients.

Recently there has emerged another important outlet for local maize—as an ingredient in baladi bread, the subsidized Egyptian bread. Government policy is now to blend 20 percent maize flour into baladi bread. The program has two main objectives: 1)to lower the cost of baladi bread and thereby reduce the subsidy cost, and 2)to reduce the leakage (fraud) in the baladi bread system. The combined wheat/maize flour, if blended at the mill, cannot easily be separated into fino flour and bran. In 2001 the government (GASC) procured 500,000 tons of maize on the local market for the baladi program (8 percent of national production). In the future, as the mixture program is expanded, the need for maize for baladi will grow.

Table 4-2: Maize Returns and Costs of Production

Accounts	Unit	Quantity	PRIVATE					
			Prices (LE)	Values (LE)	TR (%)	NTR (%)	TRV (LE)	NTRV (LE)
Revenue Account								
Output	Ton	3.40	579.14	1969.09				
By-Product	Ton	1.00	117.80	117.80				
Total Revenue				**2086.89**				
Cost Account								
Purchased Inputs	_							
1. Seed/Seedling	Kg / No.	3.00	27.07	81.21	1.00	0.00	81.21	0.00
2. Fertilizers:								
- Nitrogen	Kg	324.80	0.68	219.85	0.95	0.05	209.21	10.64
- Phosphate	Kg	100.00	0.36	35.81	0.91	0.09	32.54	3.28
- Potash	Kg	0.00	1.17	0.00	0.97	0.03	0.00	0.00
3. Manure	Load	135.00	0.52	70.20	0.00	1.00	0.00	70.20
4. Pesticides	LE	1.00	48.49	48.49	1.00	0.00	48.49	0.00
5. Machinery:								
- Tractor	Hour	4.33	16.71	72.34	0.33	0.67	23.87	48.47
- Water Pump	Hour	18.78	4.75	89.21	0.20	0.80	17.65	71.56
- Pesticide Spr.	Hour	0.50	10.00	5.00	0.50	0.50	2.50	2.50
- Trailer	Hour	1.38	17.37	23.96	0.35	0.65	8.31	15.65
- Thresher/Separ.	Hour	0.54	18.00	9.79	0.75	0.25	7.34	2.45
- Compiler	Hour	0.00	0.00	0.00	0.75	0.25	0.00	0.00
6. Other Expenses	LE	1.00	78.00	78.00	0.50	0.50	39.00	39.00
Domestic Resources	_		223.12					
1. Labor:								
- Man	Man/Day	33.55	7.50	251.60	0.00	1.00	0.00	251.60
- Boy	Boy/Day	12.03	4.00	48.10	0.00	1.00	0.00	48.10
2. Animal Work:								
- Cow	Day	0.07	0.00	0.00	0.00	1.00	0.00	0.00
- Cart	Day	0.17	7.00	1.20	0.00	1.00	0.00	1.20
- Camel	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00
3. Water Supply	M3	2860.00	0.00	0.00	0.30	0.70	0.00	0.00
4. Land	Feddan	1.00	551.60	551.60	0.00	1.00	0.00	551.60
Total Costs				1586.36			470.12	1116.23
Profit Account								
Net Profit	LE/fd			500.53				
Return to Land	LE/fd			1052.13		0.88		
Return to Water	LE/1000M3			175.01				

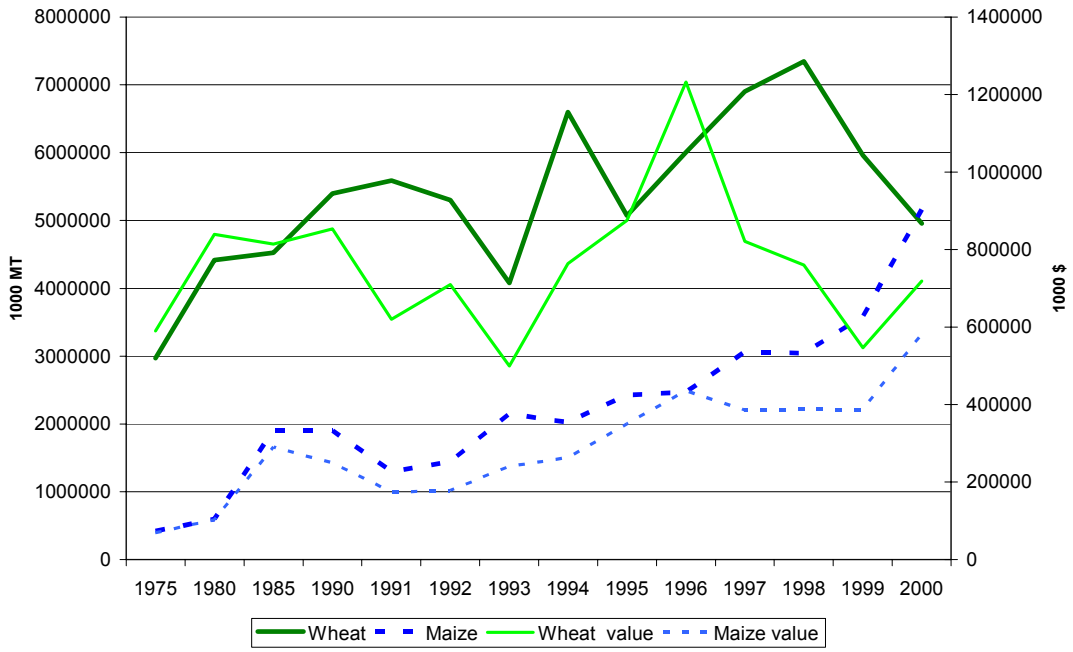
Source: The original data was provided by Dr. Mahmood Ahmad, FAO Near East Regional Office, Cairo. Adjustments were made for tradable input costs and farmer price by Tyner.

Marketing

Other than sales of maize to GASC for the baladi bread program, the rest of the maize market is private. Much of the local production is used on farm or in the farm household and does not enter formal markets.

In addition to national production, Egypt imports a substantial amount of yellow maize for use in animal feed. Figure 10 illustrates the time trend for maize (and wheat) imports both in quantity and value terms. Imports of yellow maize have more than doubled in the 1990s going from 2 million to 5 million tons. Much of this increase has come since 1997. Value of imports has not increased quite as much due to low prices on world markets in recent years. Most of the imported maize goes into the commercial animal feeding industry, but some is sold in rural markets directly for use by farmers as animal feed. There is no significant import duty on imported maize.

Figure 4-10: Quantity and Value of Wheat and Maize Imports



Comparative and Competitive Advantages

The same stochastic analysis of nominal and effective protection and domestic resource cost that was done for wheat also was completed for maize. The results are summarized in Table 3. On average maize is slightly protected and has a DRC of 0.83. The probability that the DRC is less than one is 92 percent, meaning that Egypt has a comparative advantage in maize production most of the time, but less so than wheat. The probabilities that NPC and EPC will be less than 1.1 are 82 and 62 percent respectively. These results indicate that maize, under current policy and projected world market conditions, is likely to be slightly

protected.[9] However, under most conditions, Egypt still has a small comparative advantage in maize production.

Table 4-3: Maize Simulation Results

Item	Average	P < 1	P < 1.1
NPC	1.00	49	82
EPC	1.08	33	62
DRC	0.83	92	

Opportunities for Growth

With continued research and extension, maize yields and production could be expected to continue to grow at about 2.5 percent per year at least for the near term. Yellow maize varieties are being developed for Egyptian conditions, but so far, white and yellow maize yields are quite similar. Given that total national consumption has risen so much in recent years, it is clear that the economy could absorb all increases in production that could be achieved.

Sector-Specific Constraints

As incomes rise in Egypt, more poultry will be consumed, and maize is the major ingredient in poultry feed. Improving the efficiency of the poultry sector and thereby lowering the cost of production and consumer prices would accelerate this trend and increase even further the use of maize in Egypt. Also, as other livestock production grows, more maize will be needed, as there is little potential for expanding berseem at present. So alleviating constraints to growth in livestock production will help expand the demand for maize.

Rice

The story of rice in Egypt is a complicated story that began with many quite important successes in market liberalization, but recently has mired in failure to follow-through on privatization and market orientation. In the space allotted here, we cannot begin to tell the whole story, but fortunately there is ample literature of previous studies on which we relied in preparing this section.[10]

Rice was one of the first commodity sub-sectors to launch liberalization in 1991-92. Government regulations on rice procurement, fixed prices, export monopoly, and public

[9] The protection calculation may be a bit misleading because local production is white maize and imports are yellow maize. The GASC procurement price was taken as the local price, but it is for white maize to be used in flour. Since white maize is not widely traded on world markets, we found no reasonable way to adjust the values. The bottom line is that the protection results may be slightly overstated.

[10] The most important and useful of these studies are the APRP/MVE *Rice Baseline Study* by John Holtzman, et al. (March 1999), and two updates done in January 2000 and March 2002 (draft).

sector milling were relaxed. Farmers responded with increased cultivation of rice, as both area and yields increased significantly. Private sector mills entered in large numbers and by 1997/98, private milling capacity exceeded public sector capacity. A program to privatize the public mills through employee ownership was launched, but is now in difficulty because of significant over capacity in rice milling. In recent years, rice prices on world markets have fallen such that, given prevailing domestic policies, Egyptian rice exports from public mills received an export subsidy to move the product.

Production

Over the decade of the 1990s rice area, yield, and production grew at 3.6, 1.0, and 4.7 percent respectively per year. The area expansion was partially stimulated by the approximate doubling of nominal farm level prices and the increasing net returns between 1990 and 1997. Prices of other crops, such as cotton, were not keeping pace with rice. The expansion came at the expense of other crops and with the addition of new land for cultivation.[11] Most of the rice produced in Egypt is *japonica* medium grain rice. Representative returns and costs of production for rice are provided in Table 4-4. Under the assumptions in this table, rice has the highest profitability per feddan and the lowest return per cubic meter of water (LE 0.09) of any of the cereals. Rice is a very water intensive crop. In recent years the government has encouraged (in some cases required) farmers to go to shorter season (120 day) rice varieties in order to conserve water. In principle, the government targets rice production at one million feddan, but the actual area has been running as much as 50 percent above that level.

Table 4-4: Returns and Costs of Production for Rice

Accounts	Unit	Quantity	PRIVATE					
			Prices (LE)	Values (LE)	TR (%)	NTR (%)	TRV (LE)	NTRV (LE)
Revenue Account								
Output	Ton	3.40	723.82	2460.99				
By-Product	Ton	1.00	104.00	104.00				
Total Revenue				2565.0				
Cost Account								
Purchased Inputs	_							
1. Seed/Seedling	Kg / No.	120.10	1.00	120.10	1.00	0.00	120.10	0.00
2. Fertilizers:								
- Nitrogen	Kg	147.00	0.68	99.50	0.95	0.05	94.69	4.81
- Phosphate	Kg	100.00	0.36	35.81	0.91	0.09	32.54	3.28
- Potash	Kg	1.50	1.17	1.76	0.97	0.03	1.71	0.05
3. Manure	Load	42.53	0.50	21.27	0.00	1.00	0.00	21.27
4. Pesticides	LE	1.00	76.44	76.44	1.00	0.00	76.44	0.00
5. Machinery:								
- Tractor	Hour	3.61	16.71	60.33	0.33	0.67	19.91	40.42
- Water Pump	Hour	30.06	4.75	142.81	0.20	0.80	28.26	114.55

[11] Of course, even the rice that went on new lands came at the expense of other crops that would have been cultivated on those lands had not the incentives been so strong for rice cultivation.

Accounts	Unit	Quantity	PRIVATE					
			Prices (LE)	Values (LE)	TR (%)	NTR (%)	TRV (LE)	NTRV (LE)
- Pesticide Spr.	Hour	1.26	10.00	12.60	0.50	0.50	6.30	6.30
- Trailer	Hour	1.55	17.37	26.93	0.35	0.65	9.34	17.59
- Thresher/Separ.	Hour	0.00	0.00	0.00	0.75	0.25	0.00	0.00
- Compiler	Hour	2.18	63.00	137.34	0.75	0.25	103.01	34.34
6. Other Expenses	LE	1.00	98.20	98.20	0.50	0.50	49.10	49.10
Domestic Resources	-		290.18					
1. Labor:								
- Man	Man/Day	27.51	7.50	206.33	0.00	1.00	0.00	206.33
- Boy	Boy/Day	20.08	4.00	80.32	0.00	1.00	0.00	80.32
2. Animal Work:								
- Cow	Day	3.17	10.00	31.70	0.00	1.00	0.00	31.70
- Cart	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00
- Camel	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00
3. Water Supply	M3	9000.00	0.00	0.00	0.30	0.70	0.00	0.00
4. Land	Feddan	1.00	623.10	623.10	0.00	1.00	0.00	623.10
Total Costs				1774.52			541.38	1233.14
Profit Account								
Net Profit	LE/fd			790.47				
Return to Land	LE/fd			1413.57				
Return to Water	LE/1000M3			87.83				

Source: The original data was provided by Dr. Mahmood Ahmad, FAO Near East Regional Office, Cairo. Adjustments were made for tradable input costs and farmer price by Tyner.

Processing and Handling

Over the past decade there have been huge changes in the rice milling sector. With the liberalization in the early 1990s, many private mills came into operation, and the role of the public sector mills became less prominent. With the flood of entrants in rice milling, a serious overcapacity situation developed, and fierce competition emerged. In some years, the public sector mills were able to use less than 10 percent of their nominal capacity. But in other years (recently) the public mills were advanced credit to enable them to purchase paddy from farmers or traders. Then in 2001, having paid a good price for the rice, the mills found it difficult to export rice onto the world market with the falling world prices. The government then announced export subsidies of as much as $50/ton to facilitate rice exports.

Marketing

Over the three year period 1988/99 through 2000/01, average rice produced in terms of milled rice equivalent was 3148 thousand metric tons. Of that 402,000 tons or 13 percent was exported with the remainder available for domestic consumption. Thus the vast majority of Egyptian rice is consumed domestically. It is milled either in village mills usually for home or nearby rural consumption or through public or private mills. Private mills now have the

bulk of milling capacity, but public mills still play an important role when government intervenes with credit guarantees or export subsidies. There are no controls on the marketing channel from the mills to the consumer.

There is a 25 percent import duty (20 percent duty plus 5 percent sales tax) on imported rice. This duty keeps out low cost Thai brokers that could enter the Egyptian market to meet the demand of low income consumers. Thus the import duty is the major impediment in the marketing system.

Comparative and Competitive Advantage

The same stochastic analysis of nominal and effective protection and domestic resource cost was done for rice as for the other cereals. The results are summarized in Table 5. The average nominal and effective protection rates are 0.91 and 1.01. The average domestic resource cost is 0.83, and the probability that the DRC is less than one is 81 percent. Thus Egypt has a comparative advantage in producing rice under most market conditions, assuming that the water charge is zero. Given that rice had the lowest return to water of any of the cereals, the viability of rice changes significantly when water opportunity costs are considered, especially in comparison with other crops.

Table 4-5: Simulation Results for Rice

Item	Average	P < 1	P < 1.1
NPC	0.91	73	85
EPC	1.01	58	70
DRC	0.83	81	

Opportunities for Growth

In today's international market environment the opportunities for growth in rice are pretty limited. The U.S. and other counties are heavily subsidizing rice production such that there is a considerable glut on world markets with near record low prices. Also, with water being a very scarce and valuable commodity in Egypt, it is unlikely the government would want to increase rice production because of the other opportunities for that water. With any reasonable opportunity cost for water included in the cost calculations Egypt would not be competitive on world rice markets.

Given that rice production has grown so much in this decade, there has been considerable discussion of the jobs created in production and milling of the additional rice produced.[12] It is true that more rice has been produced and milled and that people were employed in these activities. However, the study, which estimated the job creation impacts is fundamentally flawed from an economic perspective. The study takes a before and after perspective instead

[12] The study which estimated the job creation is *The Effects of Liberalization and Privatization on Employment: The Case of Rice*, by Ronald Krenz, et al., APRP, January 1999.

of the with—without perspective appropriate for economic analysis. For example, the study argues that two thirds of the rice was produced on new land brought under cultivation and did not displace any other crop. Thus, it argues that all the jobs gained are net additions. From a before and after perspective, that is correct. However, in the with-without perspective, one must ask what would have transpired on those lands if rice had not been grown. It is highly unlikely that the land would have been idle. Production of some other crop would have increased had rice not been so attractive. Thus, the proper economic framework would be to calculate the difference between the jobs created in rice and the jobs that would have been created in the next best alternatives had rice not been liberalized and become more attractive. Similarly, the study counted all the new milling jobs with no consideration for what economic activities would have transpired had another crop been produced. For example, had more cotton been produced, would there not have been more jobs in cotton ginning or export or other related activities? If more maize had been produced, would there not have been more jobs in livestock and other activities?

It is very important in doing economic analysis to make sure the proper with-without construct is used. Otherwise, one can grossly over or under estimate the outcomes. In this case, the authors overestimated the number of jobs due to the increase in rice production. It is likely that additional jobs indeed were created because the value added from rice was greater than from other alternatives. But the accurate assessment is the net of the with minus without scenarios. That number has not been calculated, but is likely to be relatively small. This is all very important in this case because there may be a tendency for policy makers to overlook the high water use in rice (and its high opportunity cost) under the mistaken belief that rice creates a huge number of jobs.

Sector-specific constraints. The major constraints for expanding rice production are world market conditions near term and water scarcity long term. Rice is the most profitable of the cereal crops with no water charge. A water charge (or opportunity cost) of only 9 piasters per cubic meters drives rice profitability to zero. For maize, it takes a charge of 17 piasters, and for wheat it is 39, to drive profitability for those crops to zero. Both the water and world market constraints will be difficult to overcome. It would be unwise for Egypt to attempt to expand rice production.

Cereals Sector Issues and Recommendations

Many of the issues in the cereals sector relate to government interventions in procurement, marketing, or milling. For wheat, much of the inefficiency is related to administering the subsidized baladi bread system. The decision to have a subsidized bread system is political, but doing it in such a way as to 1)provide maximum benefit to the targeted populations, 2)achieving the subsidy objectives at least cost, and 3)minimizing distortions elsewhere in the supply chain are economic issues that need to be addressed. There are some changes in the system that could be made to enhance achieving each of these three objectives, while maintaining the subsidy program. Our focus in future policy analysis in this area should be on examining the alternatives and their consequences. For example, wheat public sector mills compete with private sector mills in the fino flour market. The competition is not on a level

playing field because of (sometimes hidden) subsidies received by the public companies. If the public sector mills were restricted to the baladi system, the private fino system could function efficiently for that supply chain. Also, the costs of the baladi system would be easier to track and control.

In the rice sector, public mills competing with private mills also pose a serious problem. In 1996/97, public sector mills operated at only 6 percent of capacity. Then in 1997/98 they obtained credit to procure price. As world market prices fell, public sector mills received favored treatment (subsidies) in getting their rice into export markets. In the 2000/01 crop year, production was plentiful, and producer prices fell. In response, in January 2001, a minimum producer price of LE 500 per metric ton was established. However, by that time, 60-80 percent of producers had sold their crop, and it was the traders who received most of the benefit of the higher price. Then, having procured paddy at the higher price, exports at a profit became difficult. In response, the government provided export subsidies of LE 100 to 200/mt. The problem with these interventions is that they are *ad hoc*, don't provide advance market signals for producers, millers, or exporters, are not transparent, and tend to favor the public sector companies over the private sector. In general, the mixed public private sector markets have not worked well because the public companies are not subject to the same rules and market disciplines as private companies. It will be very important in the future to either entirely privatize the public sector companies or to segregate the markets in which they operate (baladi and fino flour, for example).

COTTON

As one of the most traditional crops in Egypt, cotton has long been important in terms of area planted, gross value of production, value-added in agriculture and upstream industry, and contribution to exports.

Moreover,[13] the cotton sub-sector employs more people than any other single commodity sub-sector. An estimated two to three million farmers grow cotton within seasonal and annual rotation schemes. In any given year there may be a million farmers actually producing cotton. Two million people are said to derive income from the production, marketing and manufacturing of this commodity.

Cotton must be taken into account in any discussion of agricultural growth scenarios not just because of its historical importance but because of future potential. It is generally regarded as one of the few agricultural activities in which Egypt has substantial comparative advantage. As noted previously, a 1993 World Bank study calculated that cotton has a Domestic Resource Cost ratio of 0.4, indicating a substantial favorable surplus at international prices of export value over domestic resources consumed in production. A more recent World Bank study[14] suggests a DRC of 0.???. Calculations by the present assessment team using current

[13] Krenz, Ron, F. Khattab and K. Swanberg, Cotton Sub-sector Map, Reform Design and Implementation Unit, Agricultural Policy Reform Program, 1997.

[14] World Bank, Arab Republic of Egypt: Toward Agricultural Competitiveness in the 21st Century—An Agricultural Export Oriented Strategy, World Bank Report No. 23405-EGT, December 2001

exchange rates and more accurate methods indicate a DRC for cotton of 0.??? Minor differences aside, all three analyses still confirm that Egypt does have substantial comparative advantage in cotton.

Nevertheless, the reality is that Egypt has never fully realized the potential benefits of this comparative advantage in world markets. The extent of the problem, the underlying causes and possible solutions are explored below.

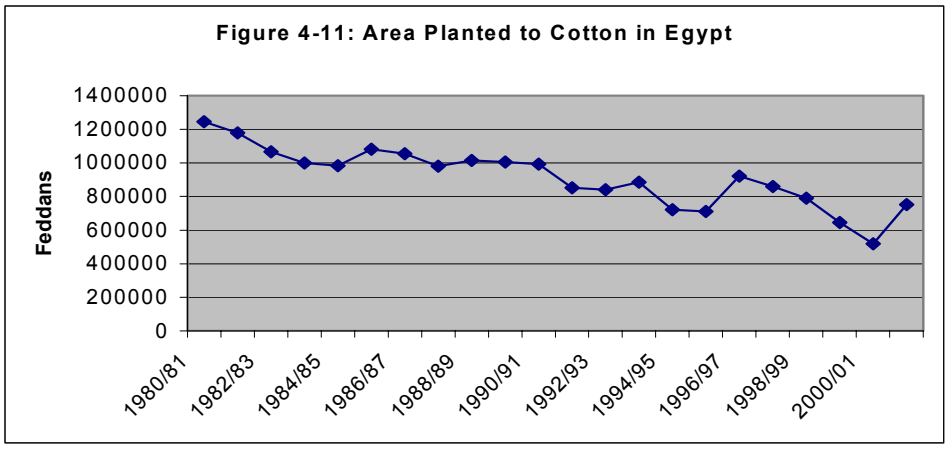
Ever since nationalization in the 1960's, the GOE has played a major role in the cotton supply chain—initially predominant, later controlling and most recently highly influential. GOE involvement still includes: influence over planting exerted via varietal controls and fixed prices for seed cotton; state-run grading and certification at both the seed cotton and lint cotton stages; state-owned gins, trading and textile companies; state-run export processing; the definition of target prices for export of cotton lint; and the maintenance of high tariffs and non-tariff trade barriers against imports of seed, lint and cloth. While the GOE role has been changing gradually over the past decade as agricultural sector liberalization has proceeded, de facto control over the industry is just now passing to the private sector, and remnants of the past still remain throughout the industry.

Production

Cotton production is unevenly distributed within Egypt. According to 1995 census figures, almost 75 percent was concentrated in the Delta, about 20 percent was located in Middle Egypt and the remaining 5 percent was planted in Upper Egypt. The current geographic distribution of plantings is believed to be roughly similar.

According to APRP,[15] cotton production is a small farmer crop. Surveys indicate that the average area planted is slightly less than two feddans (1 feddan = 1.037 acres = 0.42 hectares). Since the average farm size in Egypt is 2-3 feddans, it would seem that many small farmers use almost all of their available area to grow cotton at least one of the two or three growing seasons. Yet cotton is not grown every year by any given farmer. Many farmers reportedly plant cotton every other year or every third year.

[15] Krenz, Ron, F. Khattab and K. Swanberg, Cotton Sub-sector Map, Reform Design and Implementation Unit, Agricultural Policy Reform Program, 1997.



Source: The Egyptian Cotton Gazette, No. 117, October 2001

As with most other crops in Egypt, cotton is grown in rotation with other crops. In all three regions, it is cultivated in the summer, while short berseem or broad beans are grown on the same land in the winter.

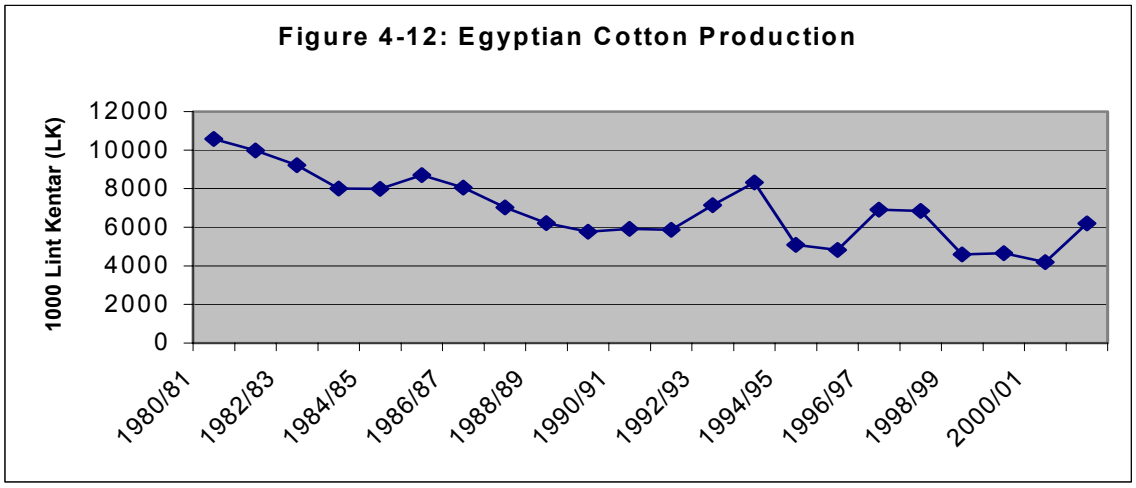
As Figure 4-11 indicates, the total area planted to cotton has declined steadily, from a level of 1.244 million feddans in the 1980/81 season to 993 thousand feddans in 1990/91, then down to a twenty-year low of 518 thousand feddans in the 2000/01 season. The acreage taken out of cotton production appears to have shifted mainly toward rice and other rotation schemes. Nevertheless, it should be noted that a rebound to more than 750,000 feddans (9.6 percent of Egypt's cultivable area) occurred in the 2001/02 season—apparently due mainly to price and grade liberalization in relation to exports—and there is an expectation of further recovery in terms of area planted to cotton.

The long-term decline in area planted is attributable to many different factors, most notably changes in the world yarn and textile markets that favor synthetics, increased supply and stagnant demand for cotton lint in general and extra fine lint in particular, structural and policy distortions within Egypt's cotton sub-sector, and profitability to the farmer as compared with alternative crops such as rice. Each of these factors will be explained further below.

Although Egyptian farmers have been free to choose which crops to grow since ERSAPs (Economic Reform & Structural Adjustment Programs) for agriculture were adopted and implemented in the early Nineties, planting decisions for cotton remain heavily influenced by legacy structures and policies that are being relaxed only gradually. If farmers choose to grow cotton, they must still adhere to GOE varietal recommendations under a system that was supposedly designed to preserve the purity of Egypt's valuable ELS and LS cotton varieties and to ensure uniform output from a given gin. Each year MALR asks the Cotton Allocation Committee to propose a "variety map", taking into account not only the agronomic situation at the district level but also conditions in the national and international marketplace. Even in a fully liberalized trading environment where market forces guide price discovery, the latter would require a difficult judgment call. Direct involvement (some describe it as interference) by the GOE in the cotton industry has made it even harder.

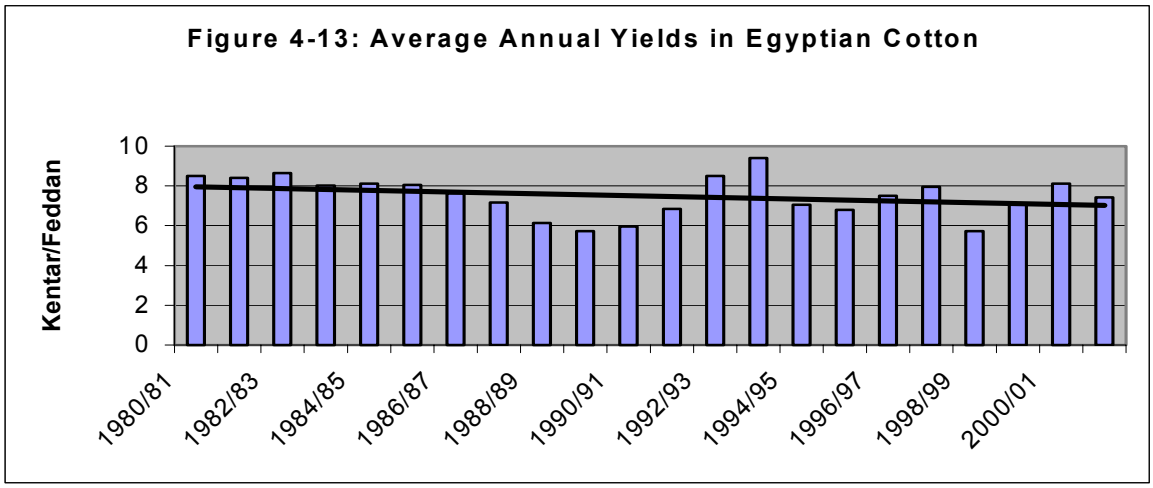
Until the 1995/96 season, the GOE controlled farmgate prices for seed cotton. Then a system of floor prices was instituted to enable greater private sector involvement and flexibility. Yet floor prices are still set somewhat arbitrarily at the start of the season, with variations by type that are not justified by any significant differences in yield or production cost. In practice, seed cotton prices to be paid by public sector companies have remained fixed during the season irrespective of world prices for cotton lint, and the floor has not been relaxed for private traders, neither of which makes sense since Egypt lost its role as market share and price leader in the Extra Fine cotton market in the early Nineties. Knowledgeable observers sustain that historically first the levels of carry-over stocks and second perceived current needs of the domestic spinning industry have played more of a role in determining prices than international supply-and-demand. Inappropriate price signals have led to distortions in farmer decision-making that partly explain the downward trend in area planted.

Figure 4-12 reveals a correspondingly negative trend in overall production, from a level of 10.574 million lint kentars (50 kg each) in the 1980/81 season, down to 5.919 million LK in the 1990/91 season, finally reaching a twenty-year low of 4.2 million LK in the 2000/01 season. Troughs near the 6 million lint kentar level occurred for four successive years between 1988/89 and 1991/92, near the 5 million LK level for the 1994/95 and 1995/96 seasons, and below 4.5 million LK between the 1998/99 and 2000/01 seasons. Noticeable upturns occurred in the 1992/93 and 1993/94 seasons, culminating in a level of 8.3 million lint kentars, between 1996/97 and 1997/98 when production levels of almost 7 million LK were attained, and again in 2001/2002, when production of again passed the 6 million LK level.



Source: The Egyptian Cotton Gazette, No. 117, October 2001

Overall production is a function not only of area planted and harvested but of yields. As the trend line in Figure 4-13 below indicates, average annual yields actually fell over the past two decades, from a starting point of 8.50 lint kentars/feddan down to an estimated 7.42 LK/feddan in the 2001/2002 season. A low point of 5.73 LK/feddan was reached in the 1989/90 season, while a high point of 9.40 LK/feddan was achieved in the 1993/94 season.



Source: The Egyptian Cotton Gazette, No. 117, October 2001

As one indicator of competitiveness, it is useful to compare yields across countries. During the twenty-year period shown above, world yields rose from 428 to 633 kg/ha, while Egyptian yields declined slightly, which implies loss of competitiveness over time. Table 4-6 below focuses on the past two seasons, listing competitors from top to bottom based on 2001/2002 yields. In the second to last season Egypt ranked tenth in the world in terms of national yields. In the latest season it ranked ninth. This recent change in ranking may or may not signal some recovery of competitiveness, since year-to-year variations can occur in a given country for climatic, pest and other reasons.

Table 4-6: National Cotton Yields For Selected Countries

	2000/2001	2001/2002
Australia	1,595	1,555 kg/ha
Israel	1,633	1,361
Syria	1,351	1,340
Turkey	1,198	1,234
Mexico	1,000	1,127
Greece	1,081	1,115
China	1,089	1,102
Spain	1,023	1,089
Egypt	898	985
Brazil	1,047	984
United States	708	782
Pakistan	610	556
Argentina	421	327
India	292	294

Source: USDA, Cotton: World Markets and Trade, March 2002.

At first glance it would seem that Egypt has higher yields than several more developed countries. Although possibly true in the aggregate, this comparison is somewhat misleading, since each producing country has a mix of cotton types, and many also have a mixture of irrigated and rain fed production. Those that show higher yields than Egypt depend much more on irrigated production, and are therefore more suitable for comparison. The fact that so

many Mediterranean and South Asian competitors are apparently more productive should be cause for general concern.

Since Egypt now produces LS and ELS cotton lint almost exclusively, it might be more appropriate to compare countries that also produce that type of cotton. In the 1997/98 season, for example, worldwide production of LS and ELS cotton was estimated (Egyptian-German CSPP 2002) to be 12.9 million lint kentars, of which Egypt produced 6.8 million LK, the USA 2.4 million LK, India 1.4 million LK, China 0.3 million LK and others a total of 2.0 million LK.[16] Figure C4 would seem to indicate that Egypt had a lower national yield than China, but a higher yield than all of the others, yet again the issues of types of cotton grown and irrigated versus rain fed production systems make this comparison somewhat precarious.

More precise still would be a comparison of Egyptian yields versus those of direct competitors. Egyptian LS and ELS cotton varieties are all of part of the Gossypium Barbadense great family, and all fall within the Extra Fine category (staple length greater than 32 mm, miconaire below 4.0) as defined by the International Cotton Advisory Committee (ICAC). The best-known competing variety is Pima, which can be traced back to Egyptian germplasm. Pima is produced in the United States, Israel, Australia, and Brazil. Other direct competitors include the variety Barakat produced in Sudan, Del Cerro grown in Peru, Xinjiang 149 from China, DCH and Suvin from India, and Barbadense from Central Asia.[17]

Of these, the strongest competitor by far is American Pima, which is produced in the United States. According to the Supima Association of America,[18] U.S. yields of American Pima for the 2001/2002 season were as follows: California—1200 lbs/acre (1344 kg/ha); Arizona—960 lbs/acre (1075 kg/ha); Texas—932 lbs/acre (1044 kg/ha); and New Mexico—686 lbs/acre (768 kg/ha). Since Egypt reported 985 kg/ha for 2001/02, average Egyptian yields for that particular season exceeded those of New Mexico but were surpassed by the competition in Texas, Arizona and California. This pattern seems to hold over time.

Whether precision agriculture as practiced in California could ever be applied widely under Egyptian conditions is debatable, but further improvement in yields is certainly an attainable goal. As a World Bank report[19] explains,

> *"According to field trials of the Egyptian Cotton Research Institute, the yield potential of some Egyptian varieties is above 12 kentar per feddan, while the average harvested is about 7 kentar per feddan. Egypt's most competitive variety, Giza-70, is over 20 years old, but its yield remains strong and higher than that of most long*

[16] Dahmoush, El Sayed, E. Ariza-Nino, and I. Siddik, *Toward a Globally Competitive Strategy for the Egyptian Cotton and Textile Sectors* (draft), Egyptian-German Cotton Sector Promotion Program (CSPP), January 2002

[17] Dahmoush, El Sayed, E. Ariza-Nino, and I. Siddik, *Toward a Globally Competitive Strategy for the Egyptian Cotton and Textile Sectors* (draft), Egyptian-German Cotton Sector Promotion Program (CSPP), January 2002

[18] http://www.supimacotton.org

[19] World Bank, Arab Republic of Egypt: Toward Agricultural Competitiveness in the 21st Century—An Agricultural Export Oriented Strategy, World Bank Report No. 23405-EGT, December 2001.

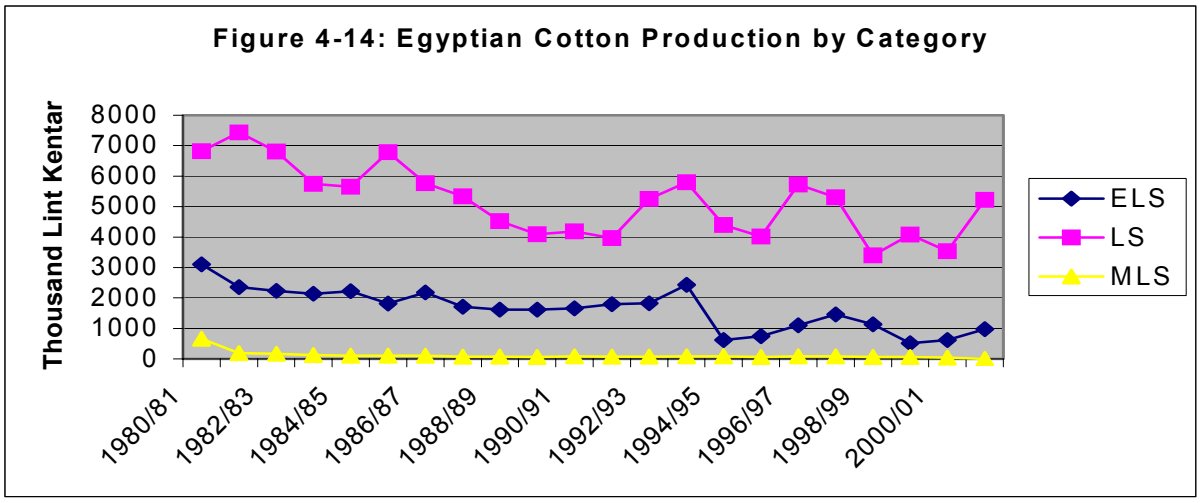
staple varieties. Other extra long staple and long staple varieties introduced in recent years were phased out for agronomic or commercial reasons. The transition of new varieties from experimental station to commercial production has been difficult. Breeders need to test new varieties under farmers' growing conditions before deciding the merits of new varieties…Low exports of the legendary Giza 75 (an extra long staple variety with exceptional characteristics, highly valued by foreign spinners), which led to its discontinuation, resulted more from noncompetitive pricing decisions than from quality deterioration of this variety. Lack of market prices for Egyptian varieties makes it difficult for agricultural scientists and decision-makers to compare the profitability of different cotton varieties…Introduction of genetically engineered cotton varieties with built-in resistance to disease and insects has enhanced the competitiveness of growers in the United States and other countries. Egyptian cotton varieties are far from such advances in genetic engineering. Breeding and research in Egypt is burdened by the conflicting goals of producing the finest cotton in the world for the export market or producing ordinary and cheap cotton for the domestic Egyptian market. Dual-purpose varieties have not been successful. Egypt would be better served by pursuing separate breeding and research programs for these two markets…According to Cotton Research Institute studies (CFDT 1999), the highest yield potential for the producer comes from Giza 70 (7.5 kentars per feddan), Giza 89 (10.3 kentars per feddan) and Giza 83 (11 kentars per feddan)."

Aside from productivity gains that might be achieved through conventional plant breeding or genetic engineering—hopefully guided by a more delicate balance between profitability to the producer, suitability for ginning and yarn-making within Egypt, and attractiveness to domestic and international end-users—the same World Bank study suggests some further innovations built around seed utilization. It claims, for example, that expanded use of acid-delinted seed in combination with seed dressing using systemic fungicides and insecticides would raise yields 20 percent on average. Higher germination rates of better-selected seed could reduce the seed rate per land unit significantly, more than compensating for the additional treatment and selection costs. Seed dressing would also reduce the risks from early season pests, because stronger development of the root system during the early growing phase reduces the impacts of water stress during the summer season. The report also asserts that these seed-based innovations would make it possible to produce high-quality seed on specialized farms instead of relying on commercial production of breeding material for the next season. Such a seed quality improvement program would also undercut the rationale for mandatory assignment of only one variety to each district to prevent potential mixing of seed from different varieties.

Finally, the same World Bank report argues that a longer term strategy to increase productivity at the farm-level should include a combination of adaptive research programs and problem-oriented extension services aimed not only at providing farmers with productive varieties but with improving crop management practices that have deteriorated in this traditional crop after decades of state control. On-farm water management and IPM remain key concerns.

It may also be possible to develop an organic cotton segment of the industry, using only manure as fertilizer and avoiding the use of synthetic agrochemicals. This however is not yet a significant part of the Egyptian industry, and it is a relatively small volume niche in world markets as well.

As far as types of cotton are concerned, as Figure 4-14 shows below, long staple (LS) cotton predominates in Egypt. In the Eighties it represented between 64 percent and 71 percent of total production; in the Nineties it was between 68 percent and 88 percent of total production. The trend over time is slightly upward in terms of percentage share, although downward in terms of overall volume. Egypt produced 6.814 million lint kentars of LS cotton in the 1980/81 season, some 4.186 million LK in 1990/91, and about 3.5 million LK in 2000/01.



Source: The Egyptian Cotton Gazette, No. 117, October 2001

Even though extra long staple (ELS) cotton is widely perceived to be Egypt's signature agricultural product, production of ELS actually declined gradually between 1980/81 and 1992/93, down to a level of 1.776 million lint kentars. A brief resurgence in the 1993/94 season back to almost 2.4 million LK was followed by a precipitous 1994/95 decline down to 586,000 LK. Production oscillated around a new based level of about 1 million LK for the rest of the Nineties, yet the 1999/00 season resulted in a twenty-year low of just 497,000 kentars. Since Egypt prides itself on ELS cotton, the downward trend in its production has been especially alarming to all stakeholders.

The decline in medium long staple (MLS) cotton is also remarkable. Throughout the Sixties and until the mid-Seventies, MLS production represented between 25 and 30 percent of national production, yet it fell rapidly in the late Seventies, so much so that by the 1980/81 season it had become negligible. Since high protective tariffs were applied to lower grade imported cotton lint, from that point onwards Egyptian spinners were forced to use the more expensive LS and ELS varieties, which made them uncompetitive in the medium and coarse count yarn segments, and also raised costs in the ready-made garment industry. On the other hand, an APRP report done in 1998 concluded that the elimination of the tariff on imported cotton yarn would have an extremely adverse impact on Egyptian spinners, so the preferred

solution was to re-align cotton agriculture toward the production of more MLS varieties such as Giza 80 and 83.

Since Egypt has had a "one cotton" policy for decades, a topic of some controversy within the Egyptian cotton industry in the Nineties was whether and how to allow the entry and planting of shorter duration upland varieties belonging to the great family Gossypium Hirsutum, which produces staple lengths of 25 to 30 mms (1 to 1 3/8 inches) and a micronaire of 3.8 to 5.0. Those who argued in favor of upland cotton production apparently felt that it would: (a) expand the marketing horizons of the entire cotton industry; (b) better exploit Egypt's natural comparative advantages; (c) better supply the needs of domestic spinners, low-end textile and ready-made garment makers; (d) free up more valuable long staple lint for higher-valued yarn, cloth and garments for the domestic and international markets. Those who opposed it apparently believed that: (a) it could dilute Egypt's world image; (b) it would add complexity to the commodity system; and (c) it might cause a deterioration in Egypt's unique stock of germplasm through cross-pollination or mechanical contamination. In 1998 the MALR finally accepted in principle the idea of growing Hirsutum cotton in Egypt, especially in the newly claimed lands. Experiments were launched in Farfara and East Owaiynat during the 1998/99 season, with oversight by the Cotton Research Institute. Since the Kingdom Agricultural Development Company is reportedly considering growing cotton in the Toshka megaproject slated to come on-stream over the next two years in remote new lands, it is conceivable that KADCO might decide to grow Hirsutum cotton as well. If successful, the commercial introduction of Hirsutum cotton could change the Egyptian cotton and textile industries substantially in the future.

Notwithstanding the various structural and policy distortions that still affect the industry, cotton has long been regarded as one of the most profitable crops to grow in Egypt, both on a single commodity basis and on a per feddan basis when the profitability of complementary winter crops such as short berseem are factored in. An MALR analysis done for the fourth five-year plan found it to be the single most profitable crop of all in 1996. A projection of returns to various crops through the year 2000 done by John Mellor Associates in 1995 concluded that it would be the most profitable of all crops. The 2001 World Bank study cited earlier ranks cotton as the seventh most profitable crop before adjustment for policy distortions, and fourth after adjustment. Figure 4-15 summarizes typical costs and returns using the same methodology applied elsewhere in this report for cereal crops and sugarcane. Yields and costs of production for the various cotton varieties grown in Egypt are similar enough to warrant grouping them altogether.

Figure 4-15: Cotton Revenue and Cost Structure

Accounts	Unit	Quantity	Prices (LE)	Values (LE)	TR (%)	NTR (%)	TRV (LE)	NTRV (LE)
Revenue Account								
Output	Ton	5.05	589.66	2977.78				
By-Product	Ton	1.00	80.90	80.90				
Total Revenue				**3058.68**				
Cost Account								
Purchased Inputs	_							
1. Seed/Seedling	Kg / No.	4.00	14.50	58.00	1.00	0.00	58.00	0.00
2. Fertilizers:								
- Nitrogen	Kg	220.20	0.68	149.74	0.95	0.05	142.49	7.24
- Phosphate	Kg	100.00	0.36	36.00	0.91	0.09	32.71	3.29
- Potash	Kg	25.00	1.16	29.00	0.97	0.03	28.19	0.81
3. Manure	Load	177.60	0.50	88.80	0.00	1.00	0.00	88.80
4. Pesticides	LE	1.00	226.59	226.59	1.00	0.00	226.59	0.00
5. Machinery:								
- Tractor	Hour	4.34	16.59	71.93	0.33	0.67	23.74	48.20
- Water Pump	Hour	21.98	4.74	104.18	0.20	0.80	20.61	83.56
- Pesticide Spr.	Hour	0.00	0.00	0.00	0.50	0.50	0.00	0.00
- Trailer	Hour	0.92	17.24	15.93	0.35	0.65	5.53	10.40
- Thresher/Srpar.	Hour	0.00	0.00	0.00	0.75	0.25	0.00	0.00
- Compiler	Hour	0.00	0.00	0.00	0.75	0.25	0.00	0.00
6. Other Expenses	LE	1.00	84.20	84.20	0.50	0.50	42.10	42.10
Domestic Resources	_		282.36					
1. Labor:								
- Man	Man/Day	39.69	7.50	297.70	0.00	1.00	0.00	297.70
- Boy	Boy/Day	32.73	4.00	130.90	0.00	1.00	0.00	130.90
2. Animal Work:								
- Cow	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00
- Cart	Day	0.01	7.00	0.10	0.00	1.00	0.00	0.10
- Camel	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00
3. Water Supply	M3	3535.00	0.00	0.00	0.30	0.70	0.00	0.00
4. Land	Feddan	1.00	568.60	568.60	0.00	1.00	0.00	568.60
Total Costs				1861.66			**579.96**	**1281.71**
Profit Account:								
Net Profit	LE/fd			1197.02				
Return to Land	LE/fd			1765.62				
Return to Water	LE/1000M3			338.62				

Ginning and Marketing[20]

Prior to nationalization of the industry, seed cotton moved from the farm to the gin via marketing circles, which were rural spot markets where cotton was assembled, graded and sold competitively to private buyers.

[20] This section is based largely on the Cotton Sub-sector Map done in April of 1997.

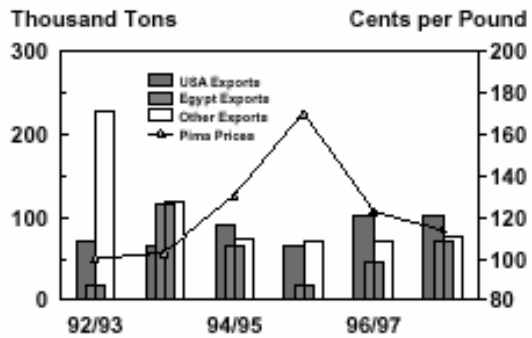
After nationalization, a fairly vibrant and complex procurement network developed to move seed cotton from the fields to the gins, then move lint cotton out of the gins to the spinners or into export channels. The set of actors of greatest importance initially was the cooperatives: an estimated 3,000 village cooperatives, about 60 Agricultural Reclamation and Land Reform Cooperatives, plus some of the multi-purpose cooperatives. Another important set of actors was the informal and unlicensed private brokers—reportedly 2-3,000 strong—who either bought on their own account or acted as commission agents for the private trading companies, public trading companies or gins. Domestic cotton traders, of whom there were 162 in 1997, comprised the third set of actors.

Marketing circles coexisted with and were used by this complex network, but anecdotal reports suggest that they were often bypassed when export prices were high, and conversely, relied on more when GOE fixed or floor prices were high relative to export prices.

Until the 1995/96 season, the GOE fixed prices not only for seed cotton but for cotton lint destined for export. Seed cotton prices were fixed based on source area, variety, grade and out-turn at the gin. Cotton lint prices were based mainly on cotton type and variety. During the 1996/97 season the GOE applied a full support price system for seed cotton and cotton lint, but starting with the 1997/98 season the Government changed to a deficiency price system in an attempt to provide more incentives to growers to plant LS and ELS cotton, as well as to private traders so that they would become more involved in marketing and exporting.

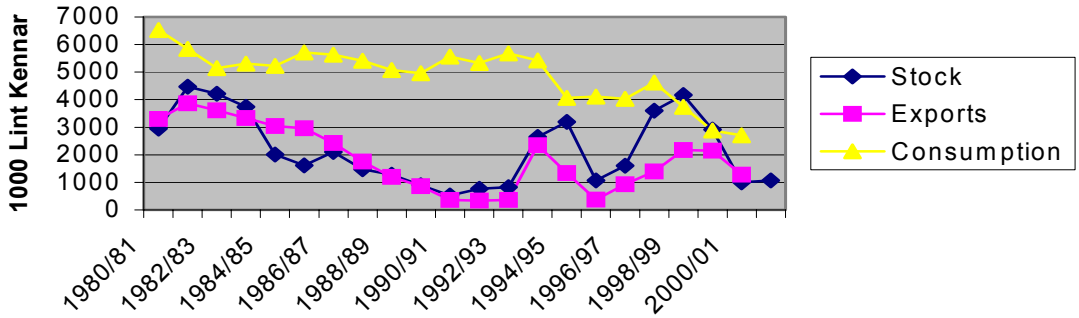
Until the mid-Nineties, the Government trading companies virtually dominated the ginning and trading of cotton. Yet the private sector responded right away to the relaxation of controls after the 1995/96 season, increasing its share of volume from 3 percent to 25 percent, and reportedly performed reasonably well. Yet when the floor price for seed cotton purchases was later raised above the corresponding international price for Egyptian cotton, private traders could no longer purchase and export profitably, so they withdrew. Since the GOE had in effect promised to buy all the farmers' cotton, the public trading companies were then obligated to purchase on the GOE's behalf. The Government had to spend an estimated 3 billion pounds to buy over 5 million kentars of seed cotton. Since exports at world prices would have caused huge losses to the public trading companies, the exporter association ALCOTEXA (described below) set a minimum export price as high as it thought feasible. As Figure 4-16 reveals, this seems to have caused the world price for ELS cotton to spike. Unfortunately international buyers balked at paying it, so effective demand fell and public traders from Egypt could not clear the market at ALCOTEXA prices. Nor could local spinners absorb the product since their price was based on the export price less "farfarra" (blending) fees. Thus this sequence led not only to a precipitous decline in Egyptian exports but a large increase in carry-over stock.

Figure 4-16: Extra-fine Cotton



Because of its policies of guaranteeing a market, setting first fixed then floor prices, and assuming responsibility for unsold inventories at the end of each marketing year, for the past twenty years or more the GOE has had to maintain a large, deteriorating and costly inventory of low grade product from multiple prior seasons. Figure 4-17 charts the inventory levels over time, comparing them with exports and local consumption. Readers will note that stocks have generally been higher than annual exports, and have sometimes exceeded local consumption.

Figure 4-17: Trends in Stock, Exports, and Consumption of Egyptian Cotton



Source: The Egyptian Cotton Gazette, No. 117, October 2001

Each year the GOE faces a choice of whether to: (a) dispose of such stocks right away at a loss; (b) carry over inventory until the next season in hopes of better prices, or (c) manipulate planting decisions the following season to reduce the stocks. The order of preference has usually been the reverse, which has tended to distort planting decisions and has contributed to the decline in area planted and production.

Partially in response to this problem, the GOE decided to formally re-establish the marketing circles via decree number 908 (August 1996) as "collection sales rings", to be used for the 1996/97 season and beyond. These rings are simply yards in selected growing areas to which farmers bring their crops for weighing and grading. This decree drastically reduced the sourcing role of both the village cooperatives and informal private brokers. Apparently the ARLR cooperatives handled only 2 percent of the 1996/97 crop, and the number of private brokers fell to several hundred.

Acting on decree number 931 (August 1997), a network of 680 such rings was established by the Principal Bank for Development and Agricultural Credit (PBDAC). By the end of the first season the number was raised to 855, in order to provide better service. There are reportedly about 1,000 at this point in time.

According to the 2001 World Bank report cited earlier, 70 percent of these rings are assigned to public trading companies and the remaining 30 percent to private traders. Private trading companies first compete for the right to be assigned these collection rings, then unselected rings are assigned to the public trading companies. The buyer designated to operate a ring is

obliged to buy all cotton brought into the ring. Farmers who bring cotton to a marketing ring can sell only to the trader designated to operate that ring. Farmers are allowed to sell outside the ring to other traders, but of they do so they lose access to the weighing and classification services provided as part of the ring. For that reason the collection rings have apparently handled a very high percentage of the seed cotton produced in Egypt over the past five years.

Even before the collection rings were established, and continuing thereafter, marketing channels for seed cotton in Egypt have been split between public and private trading companies, some of them vertically integrated.

According to the cotton sub-sector map prepared in 1997 under APRP, as of the 1995/96 season, five public ginning companies together owned about 70 gins, leasing out some of them each season to private companies. By the 1997/98 season, after one new private investment and an IPO, there were three publicly held ginning companies and four private ginning companies.

The public sector firms at that point in time consisted of three different holding companies, each of which had at least one trading company and one ginning company. The Cotton International and Trade (CIT) Company managed four trading companies, three of the ginning companies mentioned above, and five textile firms. The Spinning, Weaving and Ready-made Garment Company held one trading company, one of the public ginning companies and nine textile companies. The Textile Trading and Manufacturing Company had one trading company, the last public ginning company and eleven textile companies.

In April of 1997, when the sub-sector roadmap was completed, there were 172 licensed domestic cotton traders. Of these, 29 were public companies, 67 were private companies, 52 were individuals and 14 were cooperatives. All of the public companies were active in trading in the 1996/97 season, but only 5 of the private firms did so that season, and few of the cooperatives traded then. In other words, the public sector continued to dominate trading back then. The transition toward greater private sector involvement has been gradual, and is farther advanced the more moves up the supply chain.

Exporting

Until after the 1996/97 season, all export cotton had to pass through an obligatory quality assurance and blending process called "farfara", then be re-pressed into high density 720-lb bales (as opposed to the 420-lb bales commonly used in the industry worldwide). Both blending and pressing are done by the Alexandria Cotton Pressing Company, which remains a state-run monopoly. Starting with the 1997/98 season, both farfara and pressing were made optional for private exporters, some of whom preferred different size bales, yet it continued to be required of the public trading companies.

The export of lint cotton from Egypt has been controlled for several decades by the Alexandria Cotton Exporters Association (ALCOTEXA), which represents the Egyptian lint cotton traders and exporters in both domestic and international commerce. ALCOTEXA is

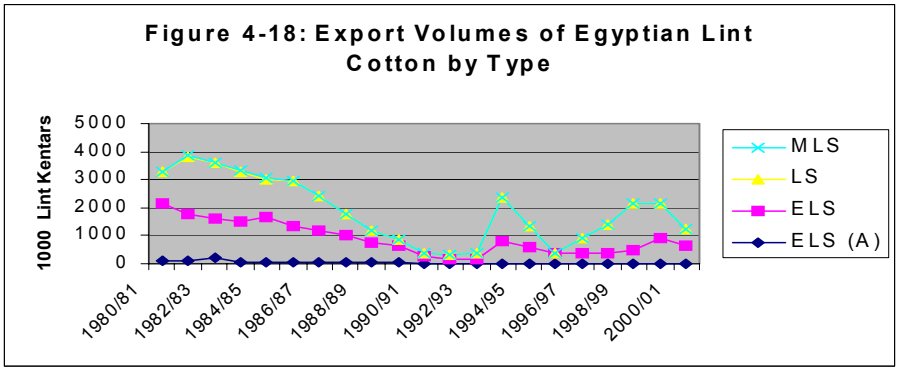
supported by annual membership fees, a marketing fee per bale exported, and user fees for arbitration services.

When the cotton sub-sector map was completed in early 1997, there were 22 member firms in ALCOTEXA. Half were public companies and half private. The eleven public companies included six trading and five ginning companies, while the eleven private firms were all trading companies (the most active in the industry).

Since its inception, the ALCOTEXA Board of Directors was dominated by representatives of the nationalized, public-sector cotton trading companies. Yet elections held at the end of 1997 resulted in a majority of the Directors being from the private sector, and the 2000 elections produced a new Board in which 10 of 12 members are from private firms. These were both important milestones in the on-going process of liberalization and transition to private sector leadership of the industry.

This progress notwithstanding, Egypt still faces some major challenges as a cotton exporting country. As Figure 4-17 indicated above, overall exports of cotton lint from Egypt have shown a downward trend for the past two decades, interrupted by peaks at the 3.871 million lint kentar level in 1981/82, at the 2.349 million lint kentar level in the 1993/94 season, and at the 2.170 million lint kentar level in 1998/99.

Figure 4-18 below shows separate trend lines for the main types of cotton lint exported. Readers will note that MLS cotton exports are practically invisible because they were extremely small in the early Eighties and ceased entirely after the 1984/85 season. ELS(A) exports, which correspond to Egypt's finest product, the G45 variety, dwindled down to almost nothing as well. LS cotton, which comprises 13 different varieties, showed the highest volume throughout this period, and exports of it peaked in the 1982/83, 1994/95 and 1998/99 seasons. ELS cotton, which comprises 8 varieties, evidenced a gradual decline as well.

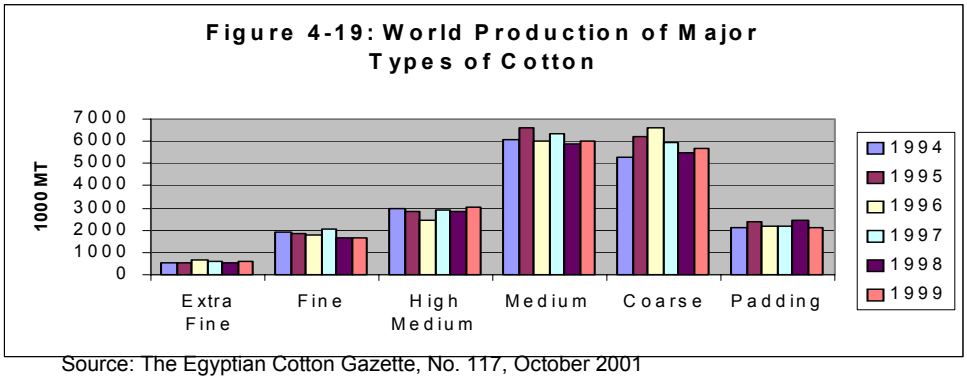


Source: The Egyptian Cotton Gazette, No. 117, October 2001

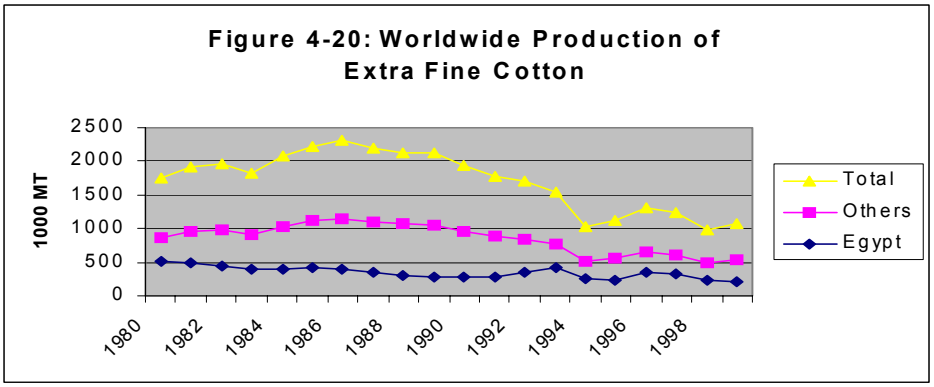
A constellation of supply and demand factors lies behind these trends.[21] Starting with the supply side, as Figure 4-19 indicates below, cotton of the medium staple type is the largest volume produced worldwide, accounting for more than 31 percent of the annual total. It is

[21] Adapted from Dahmoush, El Sayed, E. Ariza-Nino, and I. Siddik, *Toward a Globally Competitive Strategy for the Egyptian Cotton and Textile Sectors* (draft), Egyptian-German Cotton Sector Promotion Program (CSPP), January 2002.

closely followed by coarse count cotton, which amounts to just under 30 percent of total production. High medium staple cotton represents the third largest segment of production, usually 15-16 percent of the total. Padding ("scarto") is fourth at 11-13 percent of annual volume. Fine cotton places second to last, with between 8 and 10 percent of total annual production. Extra fine cotton ranges from 2.7 to 3.3 percent of the total between 1994 and 1999. Even though the ICAC classification scheme might allow Egypt to present some of its cotton as Fine Cotton, thus far Egypt has elected to define all of its export offerings as Extra Fine, so only the smallest segment of production is immediately relevant.

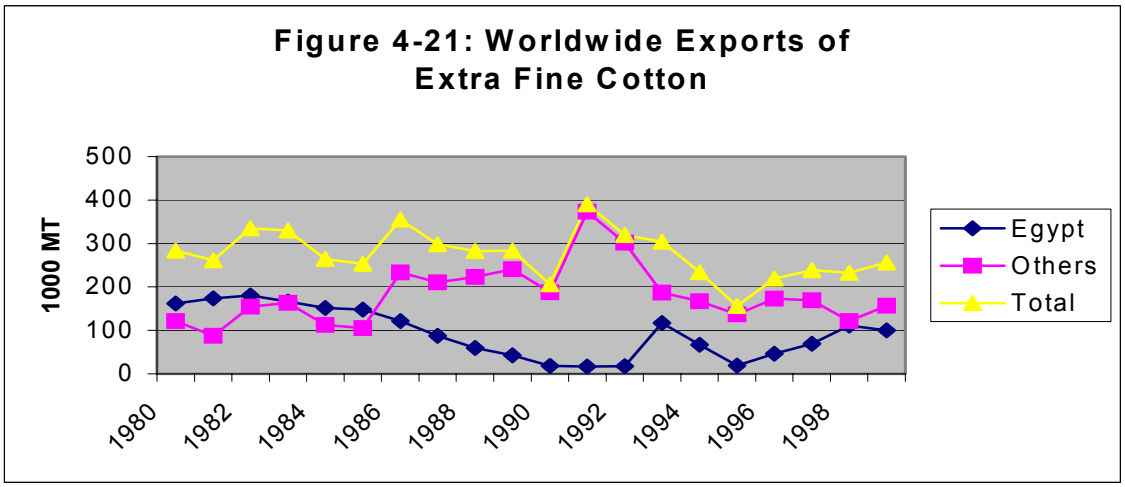


Source: The Egyptian Cotton Gazette, No. 117, October 2001



Source: ICAC

Figure 4-20 compares Egyptian production of Extra Fine lint cotton to that of the rest of the world. As the top line indicates, worldwide production peaked between 1984 and 1989 at more than 1 million MT, fell progressively between 1990 and 1994 down to 519,300 MT, then averaged 571,000 MT during the latter part of the Nineties. Egyptian production declined gradually throughout this period, averaging 272,000 MT during the last five years of the Nineties. In effect Egypt had about a 47 percent share of worldwide production of Extra Fine cotton during the latter half of the Nineties.

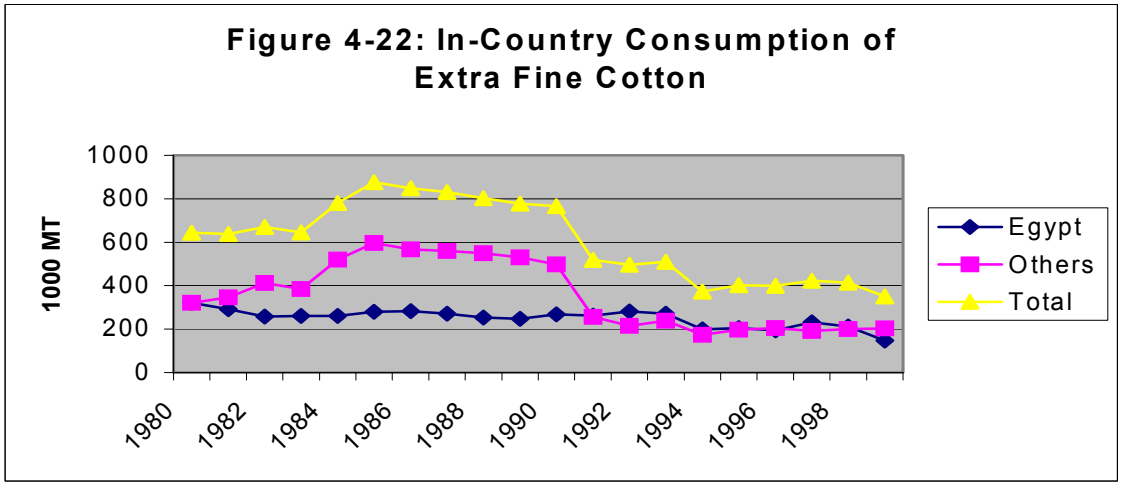


Source: ICAC

Figure 4-21 summarizes world exports of extra fine cotton. Total exports show a slight negative trend over the past two decades, with greater volatility in the Nineties than the Eighties. There seems to be a weaker correlation between Egyptian exports and total exports, than between exports from others and total exports. This suggests that Egypt is not the driving force in Extra Fine cotton exports except in a negative sense, i.e., when Egypt withdraws, others jump in.

In 1999, the most recent year for which details are available, of the 261,000 MT of Extra Fine cotton exported, Egypt supplied 100,000 (38.3 percent), the USA supplied 98,000 (37.5 percent), Turkmenistan supplied 13,000 (5 percent), China supplied 12,000 (4.6 percent), and the rest of the world supplied the balance. It is evident that the USA is Egypt's main competitor in this niche.

Figure 4-22 depicts in-country consumption of Extra Fine lint cotton by Egypt and the rest of the world.



Source: ICAC

Clearly overall consumption peaked in the mid- to late-Eighties, and then fell in two stages to new lower levels between 1992 and 1994, and between 1995 and 1999. Egyptian domestic consumption was relatively stable between 1981 and 1993, at a level averaging 268,000 MT, then fell to a new low averaging 198,000 MT between 1994 and 1999.

With respect to the question of whether overall consumption of cotton might grow and thereby lift demand for Extra Fine cotton as well, ICAC statistics present a sobering picture. World per capita consumption of cotton declined by 8.5 percent between 1960 and 2001, while the total consumption of all other non-cotton fibers rose 201 percent. Although world consumption of major textile fibers rose about 66 percent between 1980 and 2000, cotton consumption rose just 38 percent. Between 1990 and 2000, consumption of all major textile fibers rose about 30 percent, while cotton consumption rose just 6 percent. Cotton had a 48.3 percent market share in 1980, a 49.1 percent share in 1990 but just a 40.1 percent share in the year 2000. In other words, cotton consumption has been growing much more slowly than that of other fibers, so there is no reason to expect that overall consumption would lift Extra Fine consumption.

Comparative and Competitive Advantage

Various analysts have confirmed that Egypt does have a comparative advantage in cotton production in terms of domestic resource costs. Some of this comparative advantage has been realized in the past, but more so in the Eighties than in the Nineties.

Inappropriate policies have been the main reason why more of this comparative advantage has not been realized. Government involvement in the industry—both directly through public investment in the supply chain and indirectly through production, price, processing, marketing and export controls—has prevented producers, traders, spinners, garment makers and exporters from building a truly competitive industry.

Egypt has long had two important competitive advantage, which are its unique store of germplasm and country image. However, since synthetics are gaining market share at the expense of natural fibers, and other countries have developed Extra Fine varieties of cotton that can compete with Egyptian varieties, neither of these competitive advantages is unassailable. Aggressive action is needed to protect and better exploit them.

At the same time, an industry development strategy that focuses on just 5 percent of the known market for a given product can only aspire to generate high per unit margins, rather than a substantial contribution to overall growth in value-added. Niche marketing is not the solution to Egypt's employment problem.

Opportunities for Growth

In order to realize its full potential, the cotton industry in Egypt needs to take more decisive action on many fronts. These include, among others:

Production

- Further increases in yields via plant breeding, genetic engineering, and technical innovations;
- Further increases in farm-level productivity via improved on-farm research and solution-oriented technology transfer;
- Introduction of seed treatments and dressings;
- Reintroduction of MLS varieties to supply domestic industry;
- Reintroduction of Giza 45 to compete with the very best American Pima;
- Further liberalization of input markets for seeds and agrochemicals;
- Further development of organic cotton for niche markets;
- Expansion into New Lands; and
- Movement toward commercial-scale production of Hirsutum cotton.

Processing

- Closing or rehabilitation of obsolete gins;
- Closing or rehabilitation of obsolete spinning facilities;
- Continued privatization of ginning, spinning, weaving, dying and other upstream industries;
- Upgrading of spinning, weaving and other upstream processing facilities; and
- Continued withdrawal for GOE from the productive chain.

Marketing

- Gradual elimination of the guaranteed purchases of all seed cotton;
- Gradual elimination of the guarantee to buy any left over inventories of lint cotton; and
- Phasing out of floor prices on seed cotton, with greater flexibility to adjust both during the season.

Exporting

- Continued work on the country seal and surrounding promotion;
- Repositioning of extant varieties to fill not just Extra Fine but also Fine and other categories;
- Permission to export any and all varieties and grades; and
- Elimination of the ALCOTEXA monopoly on exporting.

General

- A concerted effort by public and private stakeholders to move up the value chain within the Egyptian cotton, spinning, textile and garment industries.

HORTICULTURE

The horticulture sector is characterized by four striking characteristics not found in the other crop sectors included in this report's analysis. They are:

- A large number of individual crops;
- The relatively small amount of land required for their production;
- An absence of direct government subsidies; and
- The presence of traditional and non-traditional crops having very different dynamics.

The number of crops produced is in the dozens, with fruit and vegetables alone accounting for over forty. In addition, Egyptian farmers produce numerous flowers, ornamental and medicinal plants, herbs and spices. Products selected for this analysis were chosen for their relative importance to their respective sub-sectors and can be considered illustrative of each sub-sector.

A relatively small amount of land is required to meet domestic demand for horticulture products and sell significant amounts of selected products into export markets. Of the estimated total of 13.03 million feddan harvested in 1998, slightly less than 20 percent was for horticulture crops - 1.67 million feddan in vegetables and 1.06 million feddan in fruits. The amount of land devoted to the other horticulture crops negligible. The importance of this point is that large amounts of land are not needed for a significant increase in horticulture crop products. Nor will policy changes that significantly increase land area (reclamation, reductions in other crops) be readily absorbed by increased horticulture production unless there is significant unsatisfied demand.

It is important to note that horticulture crops receive no direct incentives from the GOE. All do receive indirect subsidies such as low cost irrigation water applicable to other crops. All also are penalized by GOE policies that increase costs and/or reduce yields, for example policies and regulations that delay the introduction of improved seed and planting stock, import tariffs that increase the cost of cold chain equipment that will reduce post-harvest losses and preserve quality, and an over-valued exchange rate that maintains artificial prices of tradable goods.

Most of the crops produced to Egyptian agriculture. The most important of these in terms of are traditional production volume are potato, tomato, and orange. There are also a number of recently introduced non-traditional export crops grown primarily for their export value. The most important of these are table grape, strawberry, fine green bean, and cut flowers. These crop categories are very different from each other, and in current and potential USAID

interventions, and are treated separately in the following analysis. A projection of their combined export performance is included at the end of this section.

Non-Traditional Export Crops

Promotion of fresh non-traditional export horticulture crops has been USAID's principal agricultural production intervention since 1996. The vehicle for this intervention is the on-going Agricultural Technology Utilization & Transfer project (ATUT). ATUT 's primary goal is to help the Egyptian private sector develop an efficient and competitive export capability for a selected group of fresh, high value, non-traditional export oriented horticulture products. This has, of necessity, required ATUT to work with large growers and/or exporters having the financial capacity and entrepreneurial spirit to invest in such a capital intensive and high-risk venture. There is every indication that ATUT has achieved its principal objective. New products are being successfully grown and marketed. Technical and management training have been provided through technical assistance and field visits to producing counties abroad. Market and marketing knowledge has been disseminated through market analyses, and field trips to foreign markets. Expertise has been provided to initiate and/or support efforts to establish efficient international transportation.

USAID, ATUT and APRP have worked with the horticulture industry to establish the Horticultural Export Improvement Association (HEIA) to provide support services to the industry. This has resulted in institutionalization of selected technology transfer training, quality inspection services and training, and a voice to lobby for removing GOE policy and regulatory constraints.

The Agricultural Policy Reform Program (APRP) has addressed a number of policy issues that adversely impact the horticulture sector including work with HEIA to secure GOE approval for a new cool holding facility at Cairo International Airport, improvements in refrigerated sea container availability, and beneficial changes in seed and pesticide policies and regulations. Additionally, it has recently become involved in pilot projects with the HEIA , Governorate level MALR offices, and selected cooperatives and private companies to test the feasibility of extending the non-traditional export crop production to medium and smallholders.

The Agriculture-Led Export Business Project (ALEB) has worked to increase exports and value-added of horticultural crops through provision of technical and marketing assistance to food processors.

Production

Crops chosen as having potential for ATUT's Phase One effort included artichoke, cherry tomato, fine green bean, green onion, mango, strawberry, table grape, and cut flowers. As the project progressed, initial efforts were focused on two crops—table grape and strawberry. Subsequently, three additional crops were added - fine green beans, galia melon, and cut

flowers. With its focus on the considerable work required to achieve success in these crops, the other Phase One crops were put on hold or dropped from consideration as more was learned about them.

Table grape and strawberry are the products with which ATUT and its clients have the most experience. Total Egypt and ATUT client production volume of these products is shown in Table 4-7.

Table 4-7: Strawberry and Table Grape Production, 1997-2001

	Strawberry					Table Grape				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	e2001
	'000 metric tons									
Total	45.9	52.3	53.7	70.6	69.1	867.9	957.7	1,009.6	1,075.1	1,118.0
ATUT Clients	3.7	5.2	6.3	9.2	16.2	2.6	4.0	5.0	6.3	8.5
ATUT Share percent	8.1	9.9	11.7	13.0	23.4	0.3	0.4	0.5	0.6	0.7

Note: ATUT client production is after post-harvest loss.
Source: Faostat - total; ATUT

ATUT has projected that, with continued technical improvements to raise product quality to European Union (EU) standards, production of EU and Gulf export quality table grape and strawberry will increase significantly over the next 10 years—to 67,500 tons of strawberry and 45,600 tons of table grape. ATUT advisors are aggressively implementing their programs for fine green bean (started with trials in 1999) and cut flowers (started in 2001). ATUT projections for these crops are in Annex Horticulture-1. These projections assume continued technical, transportation, and marketing assistance from a follow-on project similar to ATUT. ATUT marketing and technical staff has identified cherry tomato and green onion as the crops to focus on after success has been achieved in establishing fine green bean and cut flowers.

Producer net income from non-traditional horticultural crops is higher than from other crop alternatives. For example, ATUT estimates medium and smallholder operating profit for green bean at LE 1,737/feddan, LE 20,772/feddan for strawberry, and LE 21,790/feddan for a triplex cut flowers—all excluding depreciation on capital improvements, interest expense, and rent. Other sections of this report estimated returns per feddan at LE 790 for rice, LE 686 for wheat, LE 499 for maize, and LE 1,197 for cotton. APRP has estimated gross operating margins/kilogram for fine green beans a LE 1.46 (higher than ATUT's later projection due to a higher farm-gate price) compared to LE 1.12 for cotton, LE 0.94 for fava bean, LE 0.66 for New Land potato, LE 0.40—LE 0.490 for Valley potato, bobby bean, rice, and wheat, and LE 0.24 for maize. These estimates do not include depreciation on capital improvements, interest, and rent. See Annex Horticulture-2 for detailed information.

Marketing

ATUT's estimates of EU export quality production results from increases in total production and in the proportion of production that meets export quality standards. However, there is a question as to whether or not the target markets for these products will be of sufficient size to purchase these quantities. Table 4-8 provides information on EU import volumes of table grape and strawberry during the Egypt's windows of opportunity.

Table 4-8: EU Import Data—Table Grape and Strawberry, Crop Years 1999-2000 (metric tons)

	Table Grape		Strawberry	
	1999	2000	1999	2000
EU Imports				
Total	307,561	344,913	31,534	37,141
During Egyptian Window				
Total	78,100	77,567	14,350	23,921
From Egypt	2,549	3,567	504	983
Egypt Share	3.3 percent	4.6 percent	3.5 percent	4.1 percent
Gulf State Imports				
Total	61,013	61,139	1,628	1,631
During Egyptian Window (est)	20,228	20,380	543	544
From Egypt	3,600	5,800	2,100	2,900
Egypt Share (est)	17.8 percent	28.5 percent	NA	NA

Notes: (1) Egypt's production and marketing windows are May-August for table grape, October-April for strawberry. These windows have been lengthened by one month from previous analyses using shipping technology that preserves quality and market. (2) Gulf State monthly data unavailable. Estimate assumes constant level of monthly imports throughout the year. (3) There are discrepancies between official GOE, Faostat, and/or ATUT data that cannot be resolved. See Horticulture Annex 3.
Sources: Eurostat—EU total imports; Faostat—Gulf total imports; ATUT—imports from Egypt.

Egypt's 1999 table grape exports to the EU of 2,549 metric tons accounted for a 3.3 percent share of total imports during Egypt's market window (production period). ATUT estimates its clients alone will be able to produce 19,400 tons of European quality table grapes by 2007, and 41,000 tons by 2012. (See Horticulture Annex 1) If the market remains relatively flat, Egypt may not reach the 50 percent market share w e consider reasonable until 2012. ATUT estimates its clients will produce 4,900 tons and 4,600 tons of Gulf quality production by 2007 and 2012, respectively. (Note: reduction due to increase in proportion of EU quality product.) FAOSTAT reports current Gulf country imports total at about 61, 000 tons annually, and down from a high of approximately 78, 000 tons in 1996. If current Gulf imports are spread more or less evenly across the year, then imports during Egypt' window approximate 20,000 tons, significantly less than ATUT projects its clients will be able to provide.

Egypt's 1999 and 2000 strawberry exports to the EU totaled 3.5 percent and 4.1 percent of the available market. Egyptian production is projected to increase rapidly. ATUT estimates its clients will be able to produce 12,600 tons of EU quality strawberry by 2006-07, and

33,800 tons by 2011-12. (See Horticulture Annex 1.) Total EU imports during the 1999-2000 Egyptian window were 23,921 tons. Imports during the 1992-97 period ranged between 24,700-28,50 metric tons but have increased 12.0 percent and 19.4 percent in 1999 and 2000. Whether or not this growth will continue, or current import levels even maintained is open to question—imports in 1991were 39,200 metric tons. After the post 1991 decline, imports increased sharply until 1997, but have leveled off in subsequent years. If current EU import levels do not increase significantly, ATUT clients could supply the EU's entire needs by 2008. Morocco currently dominates the EU off-season market, however its strawberries are primarily freezing quality. If Morocco is able to match Egypt's fresh quality, its proximity to the EU market will likely dominate the fresh market, too. In addition, ATUT estimates its clients will produce 18,900 tons and 33,700 tons of Gulf quality strawberry by 2006-07 and 2011-12, respectively. This appears to be far more than the Gulf markets will be able to absorb. Faostat data puts current annual strawberry imports by Gulf States at about 1,600 tons.

Table 4-9 shows Egypt's apparent domestic consumption of strawberry and table grape. ATUT client table grape producers will have no problem selling excess volumes produced for export into the large local market. However, strawberry producers may face a problem selling the indicated excess production into the local market, as those volumes require a 27 percent and 49 percent increase in domestic consumption by 2007 and 2012, respectively. If the potential market limitations prove correct, current strawberry producers probably will not increase their production unless new, profitable export markets are found or a domestic freezing industry is established.

Table 4-9: Egyptian Production, Export, Domestic Consumption Data, Strawberry & Table Grape, 1997-2001 (000 metric tons)

	Strawberry					Table Grape				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Production	45.9	52.3	53.8	70.6	69.1	868	958	1,010	1,075	1,118
Exports	1.8	2.6	3.6	5.8	6.6	8	3	4	6	7
Consumption	44.2	52.0	51.7	67.7	64.9	866	955	1,006	1,069	1,111
ATUT Client Egypt Sales	2.0	3.2	4.2	6.3	12.0	0.8	1.4	1.4	0.5	1.9

Notes: (1) Grape volumes are rounded. (2) ATUT Egypt sales equals total production less exports. (3) There are often discrepancies between official GOE, Faostat, and/or ATUT data that cannot be resolved. (See Annex Horticulture 2.) Given the small proportion of exports, apparent domestic consumption amounts and trends are considered reflective of the actual situation. (See Annex 2)
Source: Faostat—production; ATUT—exports, client sales.

We do not know to what extent EU and Gulf imports have been constrained by available supply, if at all. However, we do know that 1994 and subsequent estimates of the potential for Egyptian exports are significantly higher than subsequent market growth has proven to be. The magnitude of the implications for Egyptian producers is such that the export market projections for Egypt—table grape, strawberry, and other products—developed using the "unmet demand model" should be thoroughly reviewed as soon as possible. If the market opportunities look as promising as originally estimated, Egyptian producers and exporters can continue to expand their production capacity. If the markets are significantly smaller than originally projected, or than projected above, and other markets are not found, further

investment in expanding table grape and strawberry production can be put into other crops in which Egypt has a competitive advantage.

Egyptian table grape and strawberry exporters have focused their sales efforts on a limited number of countries. Now that they have established a reliable and increasing production capability, they need to launch a major marketing effort in all significant European, Gulf, and other markets to reduce the risk of concentrating on a relatively small number of markets. This should include a continued effort to extend the marketing window through production in Upper Egypt, and adoption of available technology to store table grapes for up to three months without a loss in quality. Opportunities to reduce costs and to move grapes up the value chain in product form should also be made, for example, juice, concentrates, raisins, frozen strawberries, jams/jellies.

The lack of experience and market data for fine green bean do not allow an analysis of the market share implications of ATUT's future production estimates. Eurostat green bean data amalgamates bobby, fine, and extra fine. Its potential also should be carefully re-examined as well. The market for glass pack and canned fine green beans needs to be explored as well.

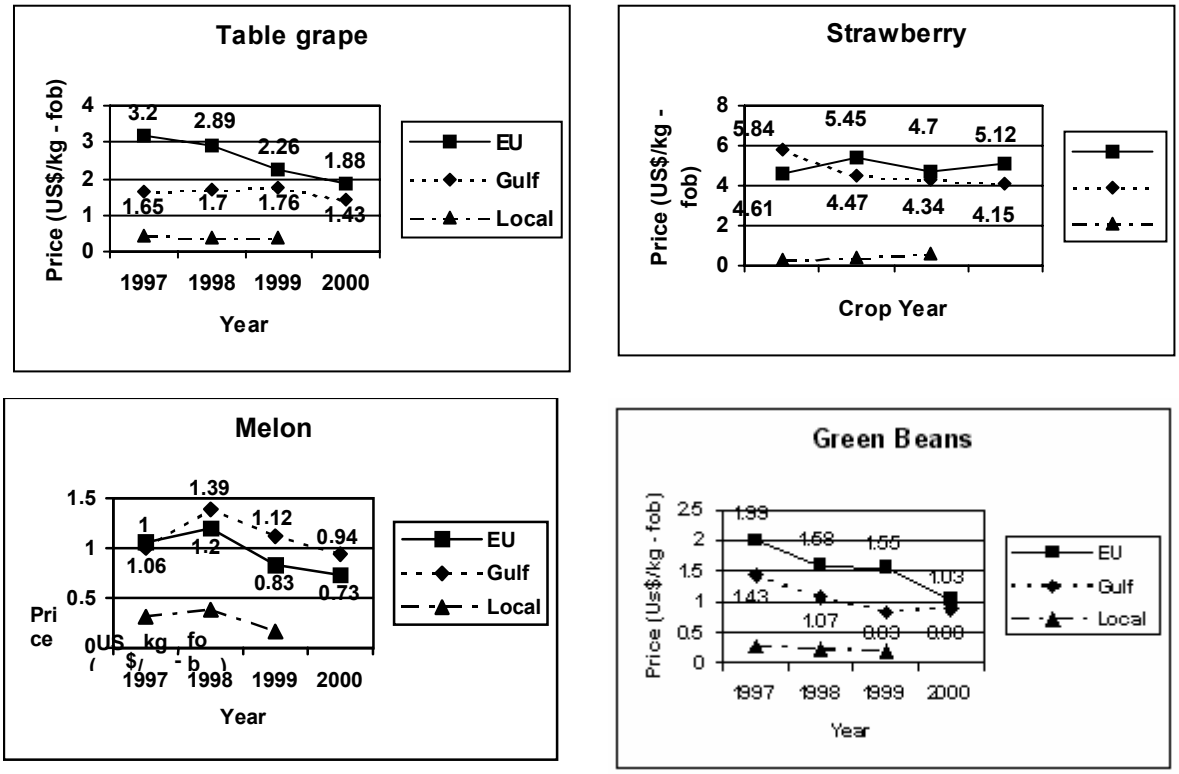
Data available from the Centre for Promotion of Imports from Developing Countries (CBI) indicates that the five cut flower varieties in ATUT's plan may reach their maximum market share by 2006. This should be closely examined. If correct, new varieties will have to be introduced in order to continue Egypt's exports of cut flowers.

Other than fruits, vegetables, and plants (flowers, ornamentals), there is also a small but growing market for "medicinals"—plants used in "natural medications", herbal teas, and as spices. Eurostat reports the EU imported Euro 17.7 million (about US$12 million) in 2000. Egyptian export data is not readily available but does show "tea" exports of almost US$ 5 million. SEKEM, perhaps the major Egyptian company in this trade, has about 6,000 feddan under cultivation, of which three-quarters are produced on company operated farms, with the balance produced by about 150 small and medium holders. SEKEM estimates market growth potential at 10-15 percent annually. While this is significant growth, the total market opportunity in terms of feddan, and therefore the potential number of small farmers involved, is small.

Competitive Advantage

Figure 4-23 shows price relationship for four ATUT supported crops for the period 1997-2000. They are derived from historical monthly CIF prices adjusted to FOB port of embarkation prices using average transport costs to a market basket of importing countries. Egyptian prices are derived prices at the four principal wholesale markets (Obbour, Alexandria, Mansoura, and Asyout), taking into account estimated annual quantities moving through each. The results demonstrate Egypt's ability to produce product at costs well below target market prices.

Figure 4-23: Price Relationships for Selected Export Crops between the EU, Gulf Countries, and Local Markets



Source: ATUT, November 2001 Evaluation Report

Market successes indicate Egypt's strong competitive advantage in export markets for the strawberry, table grape, fine green bean, and cut flower products that major growers and exporters are emphasizing. There are no explicit subsidies pertaining to these products. They do face some high costs: for example, trucking, in part due to continuing high tariffs on trucks, spares, and refrigerated equipment; and high export unit production cost due to low (but improving) exportable yields as growers learn how to grow acceptable quality products. Yet, even without subsidies and with high costs, these products are being sold into European and Gulf country markets in increasing amounts and gaining market share.

Egypt's price and competitive advantages will not remain without explicit efforts to maintain them. As can be noted from the graphs, market prices are declining both absolutely and in relation to Egyptian prices. This reflects the competition in the market. Egypt's competitors - Kenya, Zimbabwe, Morocco, Ecuador, Chile and other countries - constantly seek new ways to reduce costs, increase yield of acceptable quality product, and add value. These concurrent market dynamics are putting pressure on Egyptian growers and exporters to maintain or increase its existing competitive advantage. Bobby beans represent a specific example. Morocco has entered this market and, according to a Cairo-based European buyer, moves 18 ton container loads on trucks across the Mediterranean by ferry at LE 5,000 compared to the LE 18,000 Egyptian exporters pay out of Alexandria

The decline in Egypt's competitive advantage for individual crops does not necessarily mean that Egyptian growers and exporters are going to lose their markets. It does mean they must continually take actions to maintain, improve, and/or take advantage of their competitive position.

Egyptian growers, exporters, shippers, and the GOE must work together to initiate or respond to competitive developments, taking actions that bring down costs. Growers will have to seek new technologies that improve yield and/or reduce productions costs. Exporters and shippers will have to find ways to reduce shipping costs. The GOE will have to reduce tariffs on crucial supplies and equipment (for example, refrigerated trucks), increase access to cross-border trucking, and may have to reduce the tax burden on export development ventures.

Egyptian growers and exporters also need to ensure their products remain competitive in quality given the coming implementation of Euro-Retailer Produce Working Group Good Agricultural Practices (EUREPGAP) and major buyer requirements on technical issues ranging from chemical application (allowable chemicals, residues), to water (contamination, pollution), to records keeping—in addition to maintaining competitive cost, reliability of supply, and product appearance and taste. This will require continuous upgrading of Egypt's horticulture export industry through the transfer of up-to-date technologies and farm management systems. EUREPGAP will lead European buyers to source their imports from a limited number of large, highly qualified exporters. Egyptian exporters and producer associations will be faced with a particular challenge in guaranteeing that their medium and smallholder suppliers meet these requirements. It should be noted that cost considerations have led at least one Kenyan fine green bean exporter is reduce its involvement with smallholders.

Finally, Egyptian growers and exporters will have to add value to their products. Examples of such actions include negotiating direct contracts with retail chains to reduce their buying costs (while also increasing the Egyptian seller's price), providing products for niche markets (for example, organic produce), and shipping product in packages that can be put directly on the retailer's shelf.

Opportunities for Growth

ATUT's work with the export oriented horticulture sector has established a product development system, facilities infrastructure, and supporting services to foster further expansion. It has identified crops in which Egypt has a competitive production advantage, successfully introduced agronomic and post-harvest handling improvements to assure competitive quality, and developed efficient international transportation modes. Much more needs to be accomplished to establish the critical mass necessary to sustain these accomplishments. This will be achieved only through further development of the industry including continuing technology transfer, upgrading field and marketing management skills, increasing the variety of its product line, and increasing the number of industry participants. Without continued progress, the accomplishments that have been achieved are put at serious

risk, the industry will concentrate into a few major players, and the next important step in export development cannot be taken.

That next step is to extend the income generation opportunities offered by export markets to medium and smallholder farmers. This activity, building on the ATUT developed export development system, is where the major rural impact of USAID's horticultural export development strategy will be felt. Medium and smallholders, especially those who own their own land, spend a much greater portion of their increased income from horticultural export products in their villages than do corporate farms and absentee landlords, who purchase inputs in major cities and/or directly from foreign suppliers, and do not leave the profit from their operations in rural villages. The attraction for export companies to use medium and smallholders is the opportunity to increase their volume of exports without further investments in land and capital improvements such as irrigation systems. ATUT is testing production of fine green bean and strawberry with medium and smallholders. APRP has a promising pilot program for table grape involving APRP, HEIA, Governorate MALR staff, rural cooperatives and producer associations, and existing ATUT exporter clients. The risk to exporters in using medium and small shareholders is that quality assurance requirements, such as EUREPGAP, will prove too costly and/or risky to justify working with smallholders (reference the aforementioned Kenyan example).

Sector Specific Constraints

The principal constraints to continued development of Egypt's emerging non-traditional export sector relate to delivered product cost and quality. With total supply from Egypt and other countries increasing and Egypt increasing its market shares, delivered (CIF) costs are becoming a significant issue. Increased supply and importer quality requirements also increase the need to produce and deliver product that meets buyer specifications. Many of the quality and cost issues are impacted by GOE policies, regulations, and actions.

Quality constraints include the lack of adequate post harvest facilities, including cooling/packing sheds, refrigerated transport, and cold storage. Large growers/exporters are establishing their own facilities and acquiring refrigerated trucks. The availability of refrigerated containers has increased significantly in recent years and regulations have been changed to facilitate their use and movement at Alexandria port. A new cold store facility is being constructed at Cairo International Airport. However, increasing production and export volumes will require more investment in support facilities. Particular challenges will be faced in extending these facilities to medium and smallholder growing areas.

The transportation issue goes beyond the relatively simple, if unnecessarily costly, acquisition of additional refrigerated trucks. Egyptian law does not permit efficient use of non-Egyptian trucks, thereby increasing the cost and availability of refrigerated transportation. Roads are often rough, slowing down the speed and/or reducing the quality of shipments. Airports in Upper Egypt do not have cold storage facilities in which to hold perishable cargo awaiting shipment. The aforementioned improvements were made well after

their necessity was recognized, primarily because various GOE offices were slow to take action pre-requisite for the private sector to proceed.

Other quality factors include product variety and pesticide issues. Most horticulture crop seeds and planting materials are imported. GOE time requirements for the registration of new varieties, while recently improved, still prevent rapid adoption of improved varieties by growers. This is especially crucial with regard to export products where Egyptian producers have to compete with other suppliers with less time-consuming registration requirements, for example, Morocco. GOE requirements can be further changed to benefit growers and exporters without harm to Egyptian agriculture.

The pesticide issue is of very immediate concern given the EU's expected decisions in 2002 specifying by name the chemicals that are acceptable for use on fresh fruits and vegetables consumed in the EU. The GOE's recent adoption of a "fast-track" system, allowing approval of chemicals without proper documentation has moved it away from earlier protocols that brought its regulation of pesticides more in line with international standards. It is especially worrisome that the "fast track" approval system, may result in use of products that do not meet EU standards. Should imports from Egypt be found in violation of EU regulations, further imports will be endangered until producers come into compliance.

The principal GOE imposed cost factors, other than income tax, relate to tariffs and/or sales taxes on imported equipment. For example, the tariff levied on imported refrigerated trucks and components remains at 45 percent despite Parliament's 1998 action reducing it to 5 percent. There are also tariffs on other equipment and materials needed to improve the cold chain. Some of these tariffs are designed primarily to raise GOE revenues, others to protect local interests. Regardless of their intent, they are a constraint to continued development of horticultural exports. At present, these taxes reduce the incentive to invest in additional facilities. In the future, as Egyptian exports increase total supply, suppliers will engage in price and/or value-added competition that will reduce margins and, at some point, further investment.

Commercial financing costs are quite high—commercial interest rates are presently in the area of 15 percent minimum. As will be seen under Traditional Products below, medium and smallholders are also constrained by limitations on PBDAC financing and high rates of interest charged by other suppliers of credit.

Export product growers and exporters need to improve their technical and management skills. They need to learn more about production, handling, shipping, and marketing quality products. All levels of management need to learn and implement effective general management techniques.

Technical and marketing expertise provided by ATUT, and policy analysis expertise provided by APRP, have not been fully institutionalized. HEIA is providing technical expertise and training in packing and shipping and will probably do so for table grape production when ATUT ends. Other technical capabilities, marketing knowledge, and the

very important transportation expertise provided by ATUT have not been institutionalized. Nor has the policy analysis expertise provided by APRP.

Egypt will have to reduce the CIF (delivered) cost of its products to remain competitive. This will have to be accomplished through a combination of investment in technology transfer in all areas (production, post-harvest handling, transportation), increasing the proportion of exportable yields, developing economies of scale, and reduced taxes, the latter in part to create the incentive for the former.

Traditional Crops

Generally, traditional fresh horticultural crops were not considered for USAID's export development intervention. Mango was included, but others considered - date, dried onion, garlic, potato, and sweet potato - were ruled out for several reasons. They are grown primarily for the domestic market, difficult to differentiate as value-added products, normally sold in bulk, and have a low export pricing structure. Thus, they did not have or could not develop the high margin required to attract the capital investment envisioned by the ATUT project objectives.

However, as shown in Chapter Three, a strategy to maximize rural income, and hence rural employment generation and poverty alleviation, must focus on products grown by large numbers of farmers, preferably beyond the subsistence farmer level. Desirable products should have high domestic demand, and preferably some export demand to secure higher prices, promote increased quality, and provide outlets for increased production. The characteristics that made them undesirable for a high-value export strategy actually make these crops attractive for a strategy designed to maximize impact on rural income, employment generation, and poverty alleviation. They are grown primarily by medium and smallholders who know how to grow them; they are sold through existing marketing chains; quality is not a major current issue; the crops respond to low-tech agronomic improvements; and the technology interventions to be learned and transferred by extension agents are relatively simple.

Crops chosen for inclusion in this analysis are: tomato, which has the largest harvested area and greatest tonnage production; and potato and orange (including navel, Mandarin, Clementine, nectarine), which have large cultivated area and production, and established export markets.

Production

Table 4-10 shows area, production and yield data by region for these products. Note especially the variations in yield on Old Lands. While due in part to weather, soil, and the growing season, some of the variation is also due to cultural practices.

Table 4-10: Major Production Areas, Selected Crops, 2000

	Tomato			Potato			Orange*		
	Feddan 000	Yield Mt/f	Prod. 000 mt	Feddan 000	Yield Mt/f	Prod. 000 mt	Feddan 000 *	Yield Mt/f	Prod 000 mt
Lower Egypt	178. 9	13.1	2,404	112.7	10.1	1,140	141.9	8.6	1,223
Old Lands	154.2	13.1	2,071	112.7	10.1	1,140	141.9	8.6	1,223
New Lands	24.7	12.0	332	-	-	-	-	-	-
Middle Egypt	107.97	14.8	1,165	38.7	8.6	334	10.0	6.1	61
Old Lands	93.5	14.1	1,448	38.7	8.6	334	10.3	6.1	61
New Lands	14.4	16.6	237	-	-	-	-	-	-
Upper Egypt	61.6	17.0	1,382	3.0	13.2	40	10.4	14.5	78
Old Lands	60.2	24.1	1,368	3.0	13.2	40	10.3	7.5	77
New Lands	1.4	9.9	14	-	-	-	0.1	7.0	0.9
Other New Lands	116.8	13.6	1,347	24.3	10.3	250	38.7	6.4	248
Total	465.2	16.3	6,786	178.7	9.9	1,765	201.0	8.0	1,611

* Fruiting area. There are an additional 12,004 feddan planted not yet bearing fruit. Excludes 121,934 fruiting feddan in other citrus crops.

Source: Economic Affairs Sector, Ministry of Agriculture

Tomato

Tomato is the most geographically dispersed horticulture crop in Egypt. Tomatoes are produced in all Governorates. In 2000 Noubaria, Qena, Alexandria, Giza, Ismalia, and Mena accounted for almost two-thirds of total production. Most tomato production comes from small and medium sized farms growing under open field conditions using flood irrigation. Large corporate farms in the New Lands grow tomatoes using plastic row tunnels, intensive cultivation, and drip irrigation to grow tomatoes in the winter season and for a small, irregular export market (5-19,000 mt in 1998-2000. It is generally believed that there is over-production of tomatoes, especially in seasons following high prices. There are many anecdotal stories about over-production (for example, plowing tomatoes under due to low prices). It is not certain this is due to general over-production—it may result from local market distortions. Regardless of any real or imagined over-supply, farmers continue to produce increasing tonnage, and exports have declined significantly. All tomatoes are grown from expensive imported hybrid seed. Yellow Leaf Curl Virus (YLCV) became a problem in the late 1980s. This, and the need to produce tomatoes that withstand poor post-harvest handling conditions, has restricted farmers to a relatively limited number of mostly processing varieties. These sell in the domestic market but are not acceptable in some

potential export markets, most notably Europe. They also ripen in a short time frame, thus contributing to over-supply problems. Tomato producers benefit from its relatively high tolerance for salinity. Yield varies greatly by season and area, ranging in 2000 from a national average of 16.3 mt/feddan in winter to 13.4 tons/feddan in the summer; and from 22.7 mt/feddan in Upper Egypt to 15.3 mt/feddan in Middle Egypt (total year). Tunnel producers experience significantly higher yields. USAID's project through the University of California—Davis in the 1970-80s introduced new varieties that increased yields at unprecedented rates of growth.

Smallholder tomato producers engage in a number of poor cultural practices. Some growers use improper chemical applications in an effort to control the YLCV. As with other horticultural crops, smallholders generally over-water and do not have the finances for optimal use of chemicals or tunnel systems. Untrained or inattentive harvest labor pick and handle tomatoes roughly, thereby causing cuts and bruises. In addition, tomatoes are harvested in an over-ripe condition, however that may be due to consumer preferences. Poor field practices are exacerbated by transport practices that cause even more deterioration of quality, for example high stacking, rough roads, and multiple handling.

Potato

The principal potato producing regions are Behaiah, Noubaria, Menoufia, Gharbia, Ismailia, and Dakahlia. In 2000 they accounted for almost 70 percent of total production. The majority of production for domestic consumption comes for over 100,000 traditional smallholders in the Delta and Valley. Most of these farms are ¾-1 feddan, with ½ - ¾ feddan devoted to potato production. Corporate farms in desert lands of up to 5,000 feddan each and are increasingly the principal suppliers to export and processing markets. This is largely a quality issue: corporate desert farms are better able to forestall and control brown rot and provide potatoes meeting processor specifications. Potatoes are a multi-seasonal crop with three crops grown for food, two crops for seed. Almost all production in the Delta and Nile Valley goes to meet local demand or to the wholesale markets in Alexandria and Cairo. In most years, about 15 percent of total production is exported. Approximately 20 percent of the crop is saved for seed, however Egypt is entirely dependent on Europe for disease resistant seed potatoes. Small farmers average 8-9 mt/feddan, while large corporate farms employing highly productive farming techniques average about 12 mt/feddan.

Smallholder potato production suffers from a number of poor cultural practices. These include use of uncertified seed that may be diseased and/or of advanced generation, failing to rotate with another crop (believing that only potatoes provide the cash return they need), inadequate and perhaps poorly timed chemical applications, use of untreated manure risking spread of brown rot, and over-watering. These poor cultural practices reduce both yield and quality. The smallholder cannot presently afford to implement some of these practices—for example, certified seed and adequate chemical application—but others are correctable through effective extension.

Orange

Orange is Egypt's leading fruit crop. Planted area increased significantly through the early 1990s, due primarily to plantings in newly reclaimed lands. The principal orange produced is the navel—approximately 80 percent of all production. Mandarin, Valencia, and Clementine varieties make up the other 20 percent. Behairah, Kalyoubia, Noubaria, Sharkia, and Menoufia are the principal productions areas. In 2000 they accounted for just over three-fourths of total production. With the exception of the Valencia, oranges are harvested during December—April, and are primarily for eating, being relatively low in juice content and in compounds preferred for frozen concentrate. Usually less than 5 percent total production is exported, with Saudi Arabia being the principal market. Nile Valley and Delta production is generally on very fertile but small lots—2-3 feddan although there are some lots of up to 50 feddan. These lots are flood irrigated with Nile water. New Lands orchards are larger, on less fertile soil, of younger trees, and irrigated with drip systems. Both production systems make extensive use of low cost labor. National yields approximate 8.0 mt/feddan, ranging from 8.6 tons in Lower Egypt to 6.1 tons in Middle Egypt. The Mediterranean fruit fly is present in Egypt but has been well controlled through appropriate action at both the field and packing house levels.

Smallholders could improve their yields through improved cultivation practices such as pruning older trees to maximize the fruit bearing surface, more efficient use of water, and improved use of chemicals. Harvest and post-harvest handling at the farm level can be improved through proper harvest and packing practices.

Marketing

Farmers market these crops using two different systems. Tomato and potato are sold after harvest, primarily to local traders and wholesalers. Most small and even medium size farmers secure production loans from these traders/wholesalers, and are obligated to sell at least a part of their crop to them. Some oranges are also sold after production but the kelala system is more common. Under the kelala system the buyer purchases the fruit while it is on the tree and not completely ripe, and is responsible for subsequent production and harvest activities. This reduces the farmer's costs and risk but also his profit potential. After leaving the farm the products are sold into local markets, and into the four major wholesale markets serving the major cities. From the major wholesale markets they make their way to retail markets and vendors in the major cities and throughout the country through various levels of wholesalers. Exporters and major processors (for example, tomatoes, potatoes) purchase their requirements directly from farmers through contract growing arrangements or at harvest, or through independent buyers who source product for them.

Competitive Advantage

As with the non-traditional export products, the export of potato and orange into nearby and European markets without the advantage of specific subsidies and with the imposition of

high non-production costs (for example, the various tariffs and regulations associated with truck transport) is evidence that Egypt has a competitive advantage in the production and marketing these products. This conclusion is reinforced by the lack of imports for local consumption, even though there are no barriers to import. This does not obviate the need to reduce production and marketing costs. In the short run these cost reductions will benefit Egyptian farmers, marketers and consumers. In the long run they will maintain or increase Egypt's competitive position in the increasingly internationalized trade of fresh and processed foods.

Opportunities for Growth

The key point to be drawn from the above is that the farming practices employed for Egypt's principal horticultural crops, grown by hundreds of thousands of medium and smallholders principally for domestic demand, can be improved and thereby increase rural income. Costs can be reduced, yields increased, and/or quality improved through the introduction of even low technology, low cost techniques. This has not been accomplished for three principal reasons: (1) MALR does not have a sufficient number of well trained horticulture extensionists; (2) MALR does not have horticulture technology packages for extensionists to deliver to the farmer; and (3) NGO efforts to provide horticulture extension are relatively small. This is also true of crops that are of smaller volume but offer profitable opportunities, as evidenced by farmer decisions to increase production of numerous other crops. None of the individual smaller volume crops represent an opportunity the size of tomato, potato, or orange to reach such large numbers of medium and smallholders. But, taken together, and in light of where they can best be grown throughout Egypt, they do represent approximately 600,000 feddan, an opportunity to impact large numbers of farmers. In addition to production information, farmers will also benefit from access to market information. Both can be accomplished through effective use of the aforementioned cooperatives, producer associations, and even Governorate offices. APRP is meeting success with this approach in pilot projects in Beheira, Beni Sweyf, Giza, Ismalia, and Luxor/Qena.

An opportunity that goes beyond (but affects) the individual farmer is the establishment of a refrigerated product handling system that includes assembler packing sheds in rural areas, trucks hauling product to various markets, and at wholesale markets themselves. This is a long-term project, best left to the initiative of the private sector as the horticultural sector continues to develop, but can be facilitated by removing import and sales taxes that are a disincentive to establishing these facilities and by providing tax incentives for location of packing/storing facilities in areas where they are needed.

There also are opportunities related to growth in consumption. The first and most obvious is growth in the domestic fresh markets. If per capita consumption remains the same, population growth will increase volume at about 2 percent annually. However, APRP's Monitoring, Valuation and Evaluation Unit has found that real prices of horticultural products are increasing. This indicates a shortage in supply that farmers can be expected to fill as returns increase. We suspect part of apparent unfilled demand is coming from a change

in diet patterns apparent being experienced throughout the rest of the world. As incomes rise, consumption of horticultural products rises, too.

Exports are another area of opportunity. The GOE and individual companies, often assisted by USAID programs, are working on the development of new markets in both fresh and processed foods. An example of this in traditional products is orange. Exporters, in conjunction with the Egyptian Export Promotion Centre (EEPC) are seeking entry into the Hong Kong export and China markets. EEC officials see a near-term opportunity for up to 15,000 tons annually. Selected markets in Africa have been identified for promotion of orange exports. An example of individual corporate activity is Egypt's relatively recent entry and success in exporting frozen potato. Volume and value have increased from under 200 tons/US$200,000 in the mid-1990s to 11,880 tons/US$5.2 million in 2000.

There will be increasing opportunities for new processing as production costs are reduced, production volumes are increased, and/or processing varieties are introduced. The ability to produce significant amounts of competitively priced strawberry should result in processing of frozen products, primarily for the export market. Reduced production cost and varietal improvements in tomatoes should lead to tomato paste production, at least initially for import substitution. The variety of fruits and vegetables grown in Egypt holds other processing opportunities for both export and domestic markets.

Another opportunity for "growth" in rural income is related to more efficient production and marketing. Reduced production costs will result in higher net income to farmers. Increased efficiencies in domestic marketing will reduce post-harvest loss and make land available for other crops, both of which should lead to increased farmer income. Exporter marketing contracts with retail chains will increase income to exporters, some of which will flow to farmers and farm workers who grow the generally higher quality products required by such contracts.

Sector Specific Constraints

Most smallholders have not adopted advances in agricultural practices that will lower cost of production and/or increase yields. Part of the reason for this is lack of financing for capital investments, such as drip irrigation and tunnels, and adequate or improved inputs, such as proper chemicals and certified potato seed. These are addressed below. However, even low cost improvements have not been adopted because the farmer does not know about them. While MALR has an extensive number of extensionists for cotton, sugar cane and other field crops, it has neither a large number of adequately trained horticultural extensionists nor packages of good horticultural practices to provide to farmers.

Credit availability and cost are a major constraint faced by smallholders. Farmers who do not have registered title to their farmland cannot obtain the relatively low-cost (7 percent) loans available from PBDAC. Those who do have registered title may be restricted to loan amounts that are insufficient to finance inputs needed for optimal production. For example, the maximum PBDAC loan available for potato production is LE 2,992/feddan but the cost of

inputs to attain 12 mt/feddan yield (including imported seed) is closer to LE 4,500. An additional LE 1,000 for full fertigation will increase yield to near 20MT. The potato farmer then has a choice—use less than optimal level of inputs or find another source of credit. Whatever credit cannot be raised from PBDAC and /or family resources comes from brokers, wholesaler agents, and input suppliers. These sources charge 1.5 percent or more per month. For some crops, PBDAC provides seeds as part of the loan. If these are lower yield seeds than the farmer could purchase elsewhere, they effectively reduce income. Brokers and agents will also provide inputs, usually marking them up from their cost. They require part or all of the crop as payment, making no differentiation in price for the quality of the crop. The advantage of this system is that it requires virtually no liquidity on the part of the farmer. The disadvantage is that it increases the cost of production, resulting in lower revenue than would otherwise be received

In addition to the low limits on PBDAC crop loans, there is also a limit on the total amount of borrowings a farmer can obtain from PBDAC for farm improvements such as irrigation. Again, for those who have registered title to their land, the maximum allowable is 50 percent of the total expenditure and the interest rate is higher—13-14 percent. These limitations may make it difficult for qualifying smallholders to purchase new technology that will greatly increase their yields, for example, drip irrigation, trellising, and row tunnels. Those without registered title to their farmland usually have no source of credit to make such improvements.

Smallholders are also constrained by their lack of market information. Reliable price information about historical and current prices and market conditions is not widely available. Lack of information about last year's crop prevents good planting decisions and choice of trader/wholesaler agent for the following year. Lack of information on current prices weakens their bargaining position for farm gate sales.

Water pollution is a problem in the Delta, especially in areas near cities. Areas of particular concern are Kalubia, Beheira, and Alexandria but large areas of the Delta have problems arising from the dumping of raw sewage and garbage into the canal system. This raises domestic health issues and may also prevent Delta farmers from selling into European markets when EUREPGAP quality provisions are implemented.

Lack of varietal choice is a constraint for various reasons. Tomato farmers are limited by their need for YLCV resistance and poor post-harvest handling systems. Potato farmers often use contaminated or advanced generation seed because they do not have the operating capital to purchase imported and/or certified seed.

The domestic horticultural market is constrained by a transportation and storage system that is very damaging to product quality. It is estimated that up to 40 percent or more of total production of highly perishable products, are damaged or lost in transit and handling. Estimates of tomato losses run as high as 60 percent. This is due to poor packaging, lack of cold chain facilities, rough transport, and multiple handling. The impact on farmers is lower farm-gate prices because so much product and product value is lost. The impact on consumers is higher retail prices and lower quality than would be the case with proper post

harvest handling. It also reduces the overall production value of Egyptian agriculture, requiring land that might be planted to other products.

Domestic and Export Growth Potential

Domestic Market

Table 4-11 shows that growth in the real value of domestic horticultural production has averaged about 8.5 percent over the 1990-1991 period.

Table 4-11: Growth in Domestic Consumption of Horticultural Products, 1991-1999

Year	Consumption LE 000 1999 = 100	Annual Growth percent
1990	8,356	
1991	7,963	(4.7)
1992	8,538	7.2
1993	11,537	35.2
1994	13,451	16.6
1995	16,289	21.1
1996	18,959	16.4
1997	16,521	(12.9)
1998	16,572	0.3
1999	17,593	6.2

Note: See Annex Horticulture-5.

This is quite high and may be partially attributable to inaccuracies in data gathering. Nevertheless, even if reduced significantly the annual growth rate is probably at least equal to, if not above, the 5 percent growth rates posited in the model used for rapid agricultural led growth in Chapter III. Future increases in demand will result from several factors. Population growth will add about 2 percent annually. Additional demand will result from rising incomes that, on a worldwide basis, lead to increased consumption of horticultural products. Finally, there is a "catch-up " factor due to the apparent unmet demand for horticultural products in Egypt. This is consistent with the findings of the APRP Monitoring, Verification, & Evaluation Unit that real prices of horticultural products are increasing. Finally, there is increasing demand arising from the increasing export of processed horticultural products.

Export Markets

Table 4-12 shows that in general, the volume and total and per ton value of Egypt's horticultural exports have declined since the mid 1990s.

The decline began with the political and economic collapse of the former Soviet Union, which had been a major buyer of certain Egyptian products, such as oranges. Russia again

made major orange purchases in 1998. The major but temporary upsurges in 1995-96 potato exports were due to a potato brown-rot problem in the European Union. The decline in 1997 resulted from recovered EU production and, reportedly, a brown rot problem in Egypt. Increases in the "Other" category were primarily due to an upsurge in dried onion exports in 1993, and again in 1998. Average prices for the total market basket of horticultural exports declined rather steadily and sharply throughout the decade.

Table 4-12: Egyptian Horticultural Exports, 1990-1999

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Metric ton–000										
Potato	135.6	217.8	209.4	175.5	131.9	418.7	411.2	233.0	228.5	255.6
Orange	144.6	111.1	102.8	56.2	28.0	42.0	53.6	44.3	217.6	53.4
Other	154.0	158.9	207.6	277.8	257.2	250.7	231.2	230.1	275.2	230.3
Total *	434.2	487.8	519.8	509.4	417.0	711.4	696.0	507.3	721.3	539.3
Value–US$ 000										
Total	156.2	183.2	184.2	181.8	146.9	228.7	179.0	146.0	188.9	135.9
Per MT	360	376	354	357	352	321	257	288	262	252

* Numbers may not add due to rounding
Source: FAOSTAT

The structure of Egypt's horticultural exports will change in the near term. The major factor in this change will be the rapid growth of non-traditional export products by growers and exporters working with ATUT. This is based on ATUT's estimates of its clients' production capability, current and projected market demand during Egypt's windows of opportunity, and conservative assumptions on Egypt's increase in market share. It has also been assumed that exports of traditional products have bottomed out, and will increase somewhat as a result of exporter innovations and joint GOE/exporter market development programs. The aforementioned example regarding orange exports to Hong Kong is an example of this activity. Increased value of potato exports can be realized through value-added activities such as direct links with importers. At least one exporter is already doing this, obtaining prices well above prevailing export prices by selling directly to a retail chain (which also results in a lower price to the buyer). Finally, exports of "other products" can be increased through improvements in cultural practices that reduce prices and increased exporter knowledge of market opportunities. Increased private sector awareness of the export profitability, due in part to USAID, will help exporters locate these opportunities.

Horticulture export projections are shown in Table 4-13. Among traditional crops, tomato is not separated out because its export volume has declined to such a low level as to be unpredictable. Nor have we attempted to project prices given the highly unpredictable nature of supply, demand, and exchange rates.

Table 4-13: Export Growth Rate Projections, 2002-2007, 2012

	Export Volume MT 000			Volume Increase MT 000		Growth Rate	
	2002	2007	2012	2002-7	2007-12	2002-7	2007-12
Traditional Crops							
Potato	150.0	165.6	182.8	15.5	17.3	2.0 percent	2.0 percent
Orange	85.0	104.0	114.9	19.0	10.9	4.1 percent	2.0 percent
Other	230.0	253.9	280.4	23.9	26.5	2.0 percent	2.0 percent
Total	465.0	523.5	578.1	58.4	54.7	2.4 percent	2.0 percent
Non-Traditional Crops							
Table Grape	8.2	24.3	45.6	16.1	21.3	24.3 percent	13.8 percent
Strawberry	6.3	16.9	21.1	10.6	4.2	22.0 percent	4.7 percent
Fine Green Bean	1.4	6.8	13.2	5.4	6.4	37.3 percent	14.2 percent
Total	15.9	48.0	79.9	32.1	31.9	24.7 percent	10.5 percent
Cut Flowers - mil. Stem	32.3	139.7	153.8	107.4	14.1	34.1 percent	2.9 percent
Grand Total—ex Flowers							
Volume	480.9	571.5	658.0	90.5	86.6	3.5 percent	2.9 percent
NTAE share	3.3 percent	8.4 percent	12.1 percent	35.5 percent	36.8 percent	-	-

Note: See Annex Horticulture 6 for detail.

It should be noted that projected growth in export volumes on a year-to-year basis (see Annex 6) is lower than those in the agricultural led growth model presented in Chapter III. Were these projections based on value, the NTAE sector would show higher relative growth and share because of their higher value than traditional products. Inclusion of cut flowers will increase the growth rate somewhat, and introduction of new products will, too. It would not be difficult to reach an annual growth rate in volume of 5 percent or more.

The projected growth in "Other" traditional crops is due in part to expected accomplishments of the recommended USAID intervention in traditional, domestically oriented products. With this assistance, we expect crops that formerly captured significant export volume and/or value will do so again (for example, tomato, sweet potato, garlic), and exports of some smaller additional crops will continue to increase (for example, artichoke, tea, melon.)

The projections show the need to introduce additional NTAE products into the ATUT developed system. Strawberry and the planned cut flower varieties encounter market share limitations in the 2007-2012 period, and all of the products experience lower rates of growth because they are increasing from a constantly increasing base.

Rapid increases in NTAE products are not unprecedented where a concerted effort has been made to achieve them. The development of Chile's export table grape sector was initiated in the 1950s. By 1960 Chile's exports reached 6,600 MT; by 1970-15,680 Mt, and by 1980 over 50,000 MT. The Kenyan green bean sector began well before 1990 when FAO began tracking Kenyan trade. By that time, Kenya's exports of green bean had reached 25,500 MT annually, most of which were fine green bean. India's table grape export sector began in the late 1970s. By 1989 India exported 6,900 MT of table grape, and in 2000 over 20,600 MT. Morocco initiated development of its strawberry exports in the late 1980s. Its strawberry exports in 2000 were 21,700 MT.

Actual exports will prove different from the projections. Some assumptions will prove incorrect, agricultural exports are usually quite volatile from year-to-year, and projections often prove optimistic. But the trend is clear. The rapid growth of non-traditional horticultural exports, powered by USAID financed interventions, is about to change the structure of Egypt's horticultural export sector. This emphasizes the importance of USAID's recent interventions to increase horticultural exports. Imagine where horticultural exports would be headed without the growth engendered by ATUT, APRP, ALEB, and other projects. It also emphasizes the importance of continuing these programs for the time necessary to attain the critical mass and product diversification required for continuing growth without further USAID assistance.

PROCESSED FOOD AND AGRICULTURAL PRODUCTS

Egypt enjoys favorable growing conditions (fully irrigated land, abundant sunlight, cool night temperatures, and intensive management), low wage rates, a long farming tradition, a large and expanding population, and a geographic location relatively near to major Gulf and EU markets. These circumstances provide not only a solid foundation for agriculture in general and horticulture in particular, but also for greater processing of food and other agricultural products, targeted at both domestic and export markets.

The universe of products that can be derived from agriculture is large and diverse, comprising:

- Food (Crops, Livestock/Meat/Dairy/Hides, Fish);
- Feed (Animals for Consumption, Pets);
- Fiber (Rope, Textiles, Paper, Paperboard);
- Aesthetic (Cut Flowers, Foliage, Ornamental Plants);
- Health-Oriented (Phytomedicines, Nutraceuticals, Functional);
- Energy (Biofuels);
- Ecological (Soil Stabilization, Nitrogen Fixation); and
- Industrial (Colorants, Aromas, Flavors, Essential Oils, Coatings, Adhesives, Elastomers, Lubricants, Waxes, Solvents, Resins, Fatty Acids, Starches, Sizing, Gums, Fermentation Media, Building Materials).

While there are certainly growth opportunities in each of these categories and uses, and the Assessment Team hopes that Egyptian entrepreneurs will be able to pursue all of them more than has occurred so far, of necessity this brief supply chain analysis has to concentrate on just a few.

Production

Egyptian agriculture already generates substantial quantities of semi-processed products destined for human consumption, animal feed or industrial use.

Table 4-14: Trends in the Production of the Selected Crop-based Semi-Processed Products in Egypt (1991-2001)

Metric Tons	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Beer from Barley	44,000	42,000	35,000	36,000	36,000	38,000	39,000	40,000	41,750	75,000	75,000
Cottonseed Cake	166,601	179,256	213,471	197,825	128,731	139,680	191,655	148,809	128,896	109,575	102,015
Groundnut Cake			20,000	20,000	20,000	17,500	12,500	10,000	30,000	30,000	30,000
Linseed Cake	15,120	18,270	14,490	17,640	13,860	17,010	18,522	22,302	29,169	29,547	29,547
Soybean Cake	72,000	76,000	80,000	82,400	117,600	139,200	139,200	96,800	140,000	174,400	174,400
Sunflower Seed Cake	25,185	20,851	27,202	24,465	42,026	31,968	12,289	15,455	22,188	10,479	9,532
Other Oilseed Cake				458	201			166	9	49	49
Cotton Lint	299,000	370,000	415,708	254,750	241,525	345,707	342,030	229,685	233,105	210,072	210,072
Margarine & Shortening	81,250	90,000	81,250	75,000	56,250	62,500	62,500	62,500	55,500	50,400	50,400
Cottonseed Oil	67,600	71,600	83,600	79,800	51,900	55,500	78,000	56,452	51,100	45,500	50,000
Groundnut Oil			16,000	16,000	16,000	14,000	10,000	8,000	24,000	24,000	24,000
Linseed Oil	8,000	9,700	7,700	9,300	7,200	8,900	9,700	11,700	15,300	15,500	15,500
Soybean Oil	18,100	17,100	18,000	18,600	26,500	29,500	29,300	20,400	29,500	36,800	36,800
Sunflower Seed Oil	14,607	12,093	15,777	14,190	24,375	18,542	7,127	8,964	12,869	6,078	5,529
Oils (Boiled, etc)	13,336	19,927	15,980	16,157	17,655	20,155	22,279	20,324	22,164	19,111	19,111
Sugar (Centrifugal Raw)	1,064,000	1,077,000	1,093,000	1,195,000	1,230,000	1,222,000	1,170,000	1,242,000	1,350,000	1,459,000	1,476,000
Vegetable Oils & Fats	108,372	110,525	141,100	137,995	126,021	126,507	134,234	105,531	132,771	127,891	131,842
Wine	2,300	2,400	2,450	2,480	2,550	2,600	2,665	2,700	2,730	2,950	2,950
Total	1,999,471	2,116,722	2,280,728	2,198,060	2,158,394	2,289,269	2,281,001	2,101,788	2,321,051	2,426,352	2,442,747

Source: FAOSTAT

As Table 4-14 indicates, overall production volume of these semi-processed products has risen about 20 percent over a ten-year period, yet raw sugar alone explains the increase, which follows from the area and yield increases described elsewhere in this report. Notable increases also occurred in: beer, soybean cake, linseed cake, linseed oil, wine and vegetable oils and fats in general. The main factors at play included population growth and changing consumer preferences. On the other hand, notable decreases occurred in cottonseed cake, sunflower seed cake, sunflower seed oil, margarine/shortening. Explanatory factors included the reduction in area planted to cotton, increasing reliance on soybean imports, and once again consumer preferences (toward healthier oils).

Table 4-15: Trends in the Production of Selected Livestock-based Semi-Processed Products in Egypt (1991-2001)

Metric Tons	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Butter and Ghee	82,650	85,625	89,675	81,600	77,225	84,375	91,125	91,375	96,050	96,700	97,700
Cheese	272,750	275,500	281,500	323,000	343,750	371,250	400,000	427,000	464,250	467,250	465,000
Total	355,400	361,125	371,175	404,600	420,975	455,625	491,125	518,375	560,300	563,950	562,700

Source: FAOSTAT

Since meat, milk, poultry and eggs will be discussed separately under the livestock analysis, they are not treated here, but a few additional points should be made about some other livestock-based products. Over the period shown, butter production rose 18 percent, and

cheese rose a huge 106 percent. The former figure indicates growth slower than the population increases, while the latter is much faster. Since cheese exports have not grown much, it would seem that domestic consumption of cheese has risen dramatically.

In the case of horticultural products, a separate subsection of this report explains that both area planted and volumes produced for fruits and vegetables have been rising steadily over the past decade. In 1998 about 1.67 million feddans of vegetables were harvested, and 1.06 million feddans of fruits. Together they accounted for almost 20 percent of the overall cultivated area of 13 million feddans.

Area for the most important crops is shown below to set the stage for the discussion that follows.

Table 4-16: Area Harvested for Selected Horticultural Crops in Egypt (1991-2001)

feddans	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Beans, Green	32250	30057	29762	30952	40112	49443	46079	35943	46067	51729	51624
Broad Beans, Dry	326060	425074	297052	374067	294752	329462	355152	385064	318707	270643	333833
Broad Beans, Green	548	560	571	560	571	583	595	607	619	619	619
Cantaloupes&oth Melons	55905	50000	42857	40000	40883	54462	47619	45238	57143	84524	84524
Carrots	9090	8202	9621	10410	11314	10102	12229	11762	10690	10921	9407
Citrus Fruit,Total	297745	352305	347255	302762	308790	303374	309886	312805	336076	324733	333088
Cucumbers and Gherkins	37007	37776	35714	36905	38095	39286	42857	44048	45238	45238	45238
Dates	64286	65357	53021	61076	61076	64990	66667	78571	76133	69005	76190
Fruit excl Melons,Total	704802	881164	884536	819274	840398	863488	889848	908652	1015017	990433	1020479
Onions, Dry	29000	32005	35005	26000	40874	45933	36429	72200	82779	68095	60667
Oranges	205590	234752	231095	213040	204581	200421	204136	200081	222262	208819	215919
Peaches and Nectarines	29919	40000	50000	60714	69048	77381	84845	82519	86002	77917	80564
Pears	15912	17969	15595	14286	13336	12731	11624	9576	10902	9936	10274
Potatoes	210162	184336	178571	154236	292948	309452	196574	211545	184912	180810	180952
Strawberries	3795	3690	3762	3929	4060	4707	5774	5407	6402	6383	
Sweet Potatoes	11226	8862	13057	14669	15124	15193	20150	22371	25048	23919	238333
Tang.Mand.Clement.Sats	48836	76450	76405	54238	69133	68514	71536	78252	76190	78571	78571
Tomatoes	328117	362019	351064	353619	355576	412267	401490	422007	450979	465343	450243
Watermelons	102498	72557	76190	95238	122424	100100	149683	129724	160402	161643	144145

Production, of course, follows partly from the changes in area shown above, but also from changes in yield, which relate to both weather and technology employed. The table below summarizes fresh fruit and vegetable production in the Nineties.

Table 4-17: Production of Selected Horticultural Crops in Egypt (1991-2001)

Metric Tons	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Beans, Green	147628	128832	106000	127000	165067	201797	219527	179410	200021	201628	221893
Broad Beans, Dry	466000	382000	438000	357000	392300	442394	476252	523129	307083	353909	439480
Broad Beans, Green	2200	2250	2200	2200	2250	2300	2350	2400	2450	2450	2450
Cantaloupes&oth Melons	462831	401000	340000	345000	350842	525913	546814	467421	560000	850000	850000
Carrots	93127	89774	104733	118333	130987	108760	137627	129450	122113	128214	116045
Citrus Fruit,Total	2307271	2424921	1855446	2062694	2278458	2379173	2226292	2121218	2433085	2372284	2441218
Cucumbers and Gherkins	250299	270310	247000	248000	250000	253000	255000	258000	260000	260000	260000
Dates	603490	603652	631290	646039	677934	738147	740838	839805	905953	1006710	1102350
Fruit excl Melons,Total	4620556	5307156	5016869	5288274	5903789	6309340	6223861	6347400	6791425	6889124	7211869
Onions, Dry	556000	606000	742000	481000	386345	447734	396132	722672	889797	762993	652940
Oranges	1624238	1771457	1324170	1513050	1555024	1613256	1522098	1441652	1636600	1610520	1713720
Peaches and Nectarines	52381	105000	159000	213000	267000	321000	376969	429853	301191	240193	249232
Pears	44028	92925	80000	65000	54272	57917	56630	41391	38336	51641	51641
Potatoes	1786057	1618650	1600000	1324649	2599100	2626021	1802761	1984013	1808890	1783640	1800000
Strawberries	25200	25000	27000	32000	36994	45938	52321	53684	70612	69106	
Sweet Potatoes	127520	89815	142929	152262	165016	147629	190323	225560	253053	275936	276000
Tang.Mand.Clement.Sats	267734	340733	205337	250089	411134	448709	434554	421811	511755	481182	420000
Tomatoes	3795987	4693985	4762570	5010682	5034197	5995411	5873441	5753279	6273760	6785640	6579910
Watermelons	893899	711307	714000	923000	1199813	1126560	1735448	1409405	1670320	1785280	1730480

From the perspective of relative abundance of raw material, it is evident that potatoes, tomatoes, oranges, and watermelons would seem to be the most likely choices. However, not all varieties suitable for fresh market sale are equally suitable for processing, and vice versa. In fact, in those countries where processed horticultural products are important to the subsector, over time the processors select or breed varieties that satisfy their particular needs in terms of traits such as: planting and harvest dates, solid content, Brix level, color after processing, processing (as opposed to field) yield, target buyer or consumer, and so on. For that reason total production is a very crude indicator of processing potential.

Marketing

No reliable hard data on domestic sales of processed products could be found. One would assume that overall volume has at least kept up with population growth, and probably more, since the consumption of processed food tends to rise as per capita income rises. On the other hand, as protective tariffs are starting to fall in keeping with WTO and other agreements, imports of processed foods seem to be rising, especially for branded products produced elsewhere in the Middle East, North Africa or EU. This phenomenon is likely to accelerate as 2005 approaches.

Exports

As the next table suggests, there is a certain correlation between those crops that Egypt has been traditionally producing and those that it has been processing and exporting.

Table 4-18: Exports of Selected Processed Foods by Volume (1996-2001)

	1996	1997	1998	1999	2000	2001
Metric Tons						
Frozen Vegetables and Fruits	14362	17387	19840	20686	31270	41803
Dehydrated Vegetables	21619	21570	18871	21110	45842	49995
Fruit and Vegetable Juices and Concentrates	2389	2319	1911	3520	4744	10438
Jams and Preserves	461	5746	271	1140	2676	1442
Canned & Glass Packed Vegetables	3992	4209	3972	9256	10756	25734
Subtotal	42823	51231	44865	55712	95288	129412
Dairy Products	3011	3080	2163	7698	3328	3757
Processed Meat/Fish Products	3221	3171	2186	1583	1139	1833
Biscuits, Confectionery Products, Pastries	3959	3372	3949	12434	3018	5872
Dry Blends, Soup Mixes, Bouillion, Sauces	3667	2743	1215	1586	1536	3508
Total	56681	63597	54378	79013	104309	144382

Source: USAID CAD

As far as export volume is concerned, it is evident from the above data that substantial growth (202 percent in five years) occurred in those categories that are based on fruits and vegetables. The frozen vegetable and fruit subcategory rose 191 percent in five years, dehydrated vegetables rose 131 percent, juices and concentrates rose 337 percent, jams and preserves increased 213 percent, and canned/glass packed vegetables rose 544 percent.

Of the other four subcategories, only dairy products and biscuits etc showed volume growth, the former just 25 percent and the latter 48 percent. Processed meat and fish products experienced a 43 percent decline, while blends, soup mixes etc showed a 4 percent decline.

Table 4-19: Exports of Selected Processed Foods by Value (1996-2001)

	1996	1997	1998	1999	2000	2001
US$1,000						
Frozen Vegetables and Fruits	11103	18000	16970	14477	17093	19539
Dehydrated Vegetables	26148	22519	22226	22615	36878	37181
Fruit and Vegetable Juices and Concentrates	2486	2168	2067	2846	3612	5374
Jams and Preserves	532	5167	329	883	2235	1100
Canned & Glass Packed Vegetables	838	4277	1979	4495	6202	14957
Subtotal	41107	52131	43571	45316	66020	78151
Dairy Products	4490	4437	3567	16374	5669	5520
Processed Meat/Fish Products	149	6343	4200	2457	2089	2705
Biscuits, Confectionery Products, Pastries	4734	4178	4359	3377	3526	7372
Dry Blends, Soup Mixes, Bouillion, Sauces	1686	2743	1215	4953	5206	1869
Total	52166	69832	56912	72477	82510	95617

Source: USAID CAD

As far as export value is concerned, the same general patterns are evident. The various subcategories derived from fruits and vegetables together advanced 90 percent in five years. Growth in value for frozen vegetables and fruits was 76 percent; 42 percent for dehydrated vegetables; 116 percent for juices and concentrates; 107 percent for jams and preserves; and an extraordinary (perhaps doubtful) 1680 percent for canned and glass packed vegetables.

With respect to export values for non-hort subcategories, dairy products advanced 23 percent, processed meat and fish (seemingly) went up 1715 percent, biscuits et all rose 56 percent, and dry blends and soup mixes increased 11 percent.

When both volume and value growth trends are considered together, it does appear that processed foods based on horticultural raw materials have all done well in this period, advancing in volume about twice as fast as in value. That is understandable since presumably the exports were attained by expanding market share in previously existing end-markets, or else penetrating new ones, either of which usually means sacrificing margins, at least for a while.

Anecdotal and other evidence suggests that certain products are doing better than others. Frozen potato exports, for example, are reportedly rising at least 15 percent per year, which is not a surprise since this category is booming all over the world. The entire frozen vegetable category is perhaps Egypt's strongest, closely followed by dehydrated vegetables.

As far as the non-hort subcategories are concerned, they all appear to be in a period of little or no growth in volume, but with some increases in unit value. That could relate to changes in product mix, world prices, destination market, or many other factors.

Comparative and Competitive Advantage

Egypt does enjoy some important comparative advantages in processed food production, especially for products derived from horticulture. The single biggest advantage relates to growing season, since Egypt can produce many crops 2 or 3 times per year, including during the Northern Hemisphere's winter months from November through March. On the other hand, the Egyptian processing industry has not been able to readily take advantage of new varieties developed abroad, because of restrictions relating to how they must be introduced, how long they need to be tested, and an apparent bias in favor of fresh-oriented varieties. This situation not only retards new product development, but lowers processing yields, raises unit costs, and often affects perceived quality

Processors also report that systems for procuring raw materials for processing do not yet work well in Egypt. Even though some model contracts have been developed, the sense of shared fate and capacity to enforce that are the underpinnings of contract farming do not seem well developed, so farmers are prone to divert product to the fresh market whenever there is a price spike, and even if production advances in cash or kind have been given. (This relates back to the varietal problem, since varieties that are tailor-made to processing are not as easy to divert).

In addition, Egypt continues to be at a disadvantage in terms of transport costs, even to Saudi Arabia and the Gulf States. According to an ALEB report, one Saudi importer complained that it cost $2400/container for a shipment coming from Egypt versus just $1200 coming from Italy. Moreover, domestic transport within Egypt is considered quite high by most exporters, partly due to high rates charged by local truckers hampered by high tariffs on their equipment, partly due to the lack of back haul opportunities, and partly due to unpredictable but significant informal charges levied all along the way to market.

In some markets, especially in the Gulf States but to some extent within COMESA countries to the South, Egypt does have a tariff advantage, since the Gulf States do not apply the 12 percent to Egypt that EU countries, Canada and the United States generally have to pay. Nevertheless, the disadvantages of yield, production cost and transport cost reportedly often offset this one advantage.

Constraints

Quality continues to be the single most important constraint to growth in the processed food industry in Egypt. Having enjoyed a large, protected market for many years, many domestically-oriented processors often do not have the quality needed to penetrate and hold new export markets.

Quality starts in the field, where the absence of appropriate varieties may result in fruits or vegetables that do not conform closely even to official grades and standards (where they exist), much less commercial ones as specified by buyers.

For example, ALEB staff encountered complaints about a frozen pea product that contained peas of uneven size and inconsistent color, hard to the touch, with poor taste.

For processed products, quality must be preserved as much as possible not just through harvest and cooling, but also through processing. In many instances handling procedures are inadequate to proven significant deterioration in quality and condition before reaching the processing plant, and then the technology and equipment used, as well as the workflows and degree of training of plant labor further contribute to a lessening of quality. Perceived quality is directly affected by processes used, to absence or scarcity of Individually Quick Frozened (IQF) capacity in Egypt places freezers at a disadvantage as compared with suppliers in the EU, elsewhere in the Middle East and to some extent in places like India or even Thailand.

Increasingly, the use of Good Agricultural Practices in the field and Good Manufacturing Practices in the plant, often backed by EurepGAP, HACCP (Hazard Analysis at Critical Control Points) and ISO 9000 series certification, are minimum entry requirements for export markets. Many domestically-oriented processing enterprises have not yet complied, and some may never be able to do so because of the human, financial and physical investment that this implies. The need to limit pesticides used to permissible levels, to control for the quality of water used in irrigation, and to prevent micro bacteriological contamination often present a major challenge to outgrowers.

While there are many qualified professionals in the Egyptian food processing industry, not all have received sufficient training in matters such as the Better Process Control School, low-acid canned foods, aseptic processing, etc.

Presentation is another serious constraint. Seals can be a problem for the entire range of jars, boxes, bags and plastic containers needed. Market studies have also indicated that the image of Egyptian products often suffers not just on the basis of intrinsic quality, but for the relative lack of attractive, high graphic packaging. In some cases, the packaging may be fine, but the cartons in which packages are delivered are too weak to withstand the time, distance and conditions under which they are shipped. Even if the cartons are okay, whether and how they are palletized, stacked and handled can be crucial to airflow and maintenance of required temperatures.

For current as well as new exporters, the formulation and execution of marketing and sales strategies is often a constraint as well. Assessing growth trends, sizing up the competition, devising an entry strategy, identifying a competent agent, getting the product on supermarket shelves, ensuring consistent delivery, arranging promotions and advertising, handling rejects or recalls, and in general servicing the client are entirely new challenges to many companies looking outward.

Since market development is expensive, requiring upfront money in the form of market analysis and investigation, slotting fees, promotional allowances, travel and communications, and then credit of 30-120 days is required, finance can also be a serious constraint.

Opportunities for Growth

These difficulties notwithstanding, over the last several years the Egyptian food processing industry has expanded exports significantly, assisted by USAID's own ALEB project. Additional assistance is now arriving via the EU's Industrial Modernization Program, which will make available perhaps one-third of a 250,000 Euro budget for industrial rehabilitation and co-funded technical assistance.

The sense of the industry seems to be that the best opportunities for the future will lie in the Gulf, in the EU and to a lesser extent in the Former Soviet Union and COMESA countries.

In the more mature Gulf countries, especially Saudi Arabia because it has invested so much in the same industry, the provision of ingredients in bulk form may actually hold more promise than incremental increases in finished, consumer-oriented items, although ALEB staff see great potential in products such as diabetic pasta designed to respond to the problem that affects the entire region.

As far as processing technologies are concerned, freezing and dehydrating seem to hold more promise than traditional canning, which has become extremely sensitive to scale and unit costs.

Potatoes in frozen form are often mentioned as a winner. Once the strawberry production volume rises enough, and IQF capacity is installed, IQF strawberries are likely to be an important new product as well.

As far as dried and dehydrated products are concerned, onions are probably the most important commodity, but potato flakes are also likely to be important. Since the grape varieties used in Egypt are different than what is used in the States, it may be possible to export golden raisins to the U.S. as well.

Since tomato production is so large and important to Egypt, it would make sense to mount a major effort to make the processed tomato industry more competitive as well. This will require efforts on all fronts, starting with varieties, cultural and handling practices that will ensure high processing yields and food safety even where small farmers are involved as suppliers.

Finally, since Egypt has such a large population, of which a reasonable proportion is middle class or above, and since the tourist trade is so important, there are certainly growth opportunities in the substitution of imports in major hotels and in developing more value-added products and presentations. If the proper investments are made, Egypt could become a major supplier of freshcut produce to the Gulf States and possibly even the Southern Mediterranean.

On the other hand, as 2005 approaches, their suppliers will also be trying to open the Egyptian market, so time is getting short to upgrade and get the entire industry more competitive.

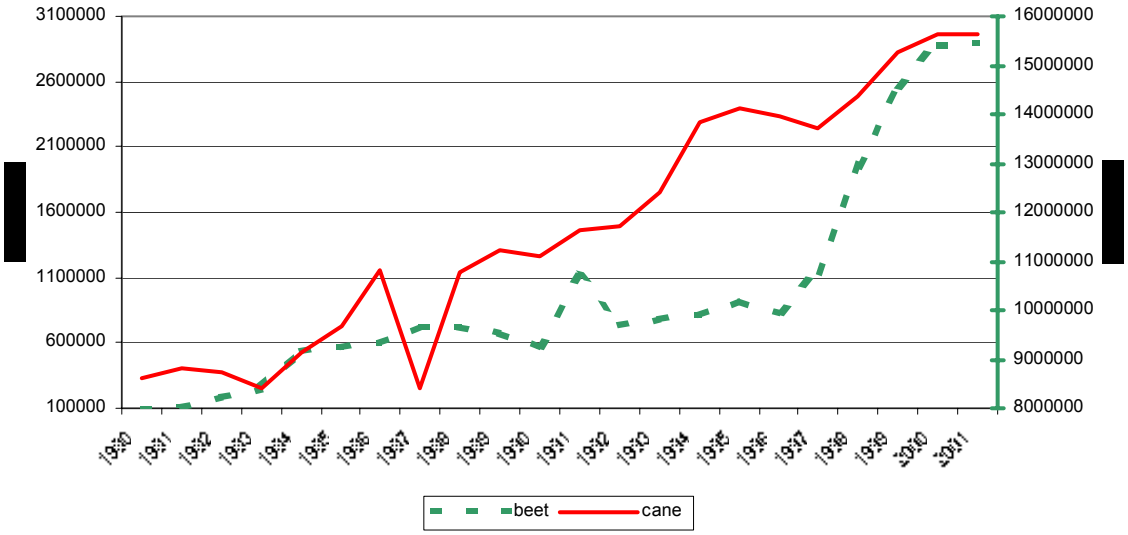
SUGAR

Sugar has become an important crop in Egypt representing 3-4 percent of the cropped area. About three-fourths of the sugar is produced from cane and one-quarter from beet. In addition, there is a small amount of high fructose corn syrup and glucose. Demand at the subsidized prices exceeds supply, so Egypt also imports sugar, with about 23 percent of consumption currently being supplied by imports.

Production

Figure 4-24 displays the twenty year trend in sugar cane and beet production in Egypt. Figures 4-25 and 4-26 depict the history of sugar cane and beet area and yield (data for all three figures comes from FAO-STAT). While sugar cane production is much larger, beet production has been growing faster in recent years. This faster growth is a result of a conscious policy of the GOE to encourage more beet production as it is more efficient in water use than cane production. But despite this policy, sugar cane area and yield have both been growing over the past decade. On the other hand, sugar beet yield has been variable, but more or less stagnant over the past decade.

Figure 4-24: Sugar Cane and Beet Production



Cost and revenues of producing sugar cane and beet sugar are presented in Tables x and x. These tables draw upon the same FAO data set as was used for cereals and cotton. According to this data set (1998 data with tradable input costs converted to 2002 values), profitability

per feddan for cane is 1237, and the value of water is 0.11 per cubic meter. For beet sugar, the profit per feddan is 190, and the water value is 0.06 per cubic meter. So even though beet area has been increasing, the crop is not profitable, and the water use value is very low. In fact, water value is lower for both sugar crops than for any other crops considered in this analysis.

Figure 4-25: Sugar Cane Area and Yield

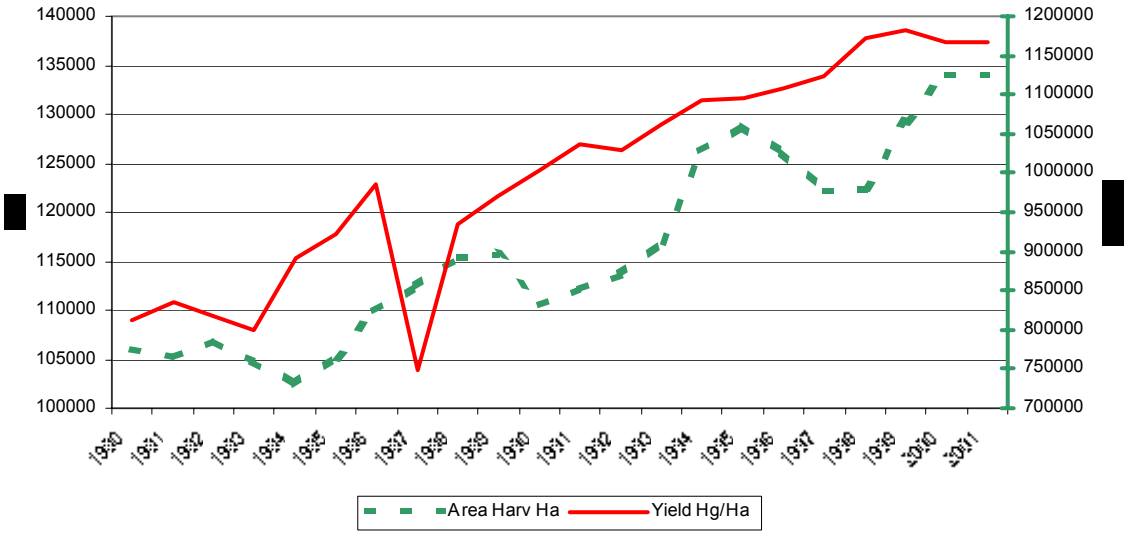
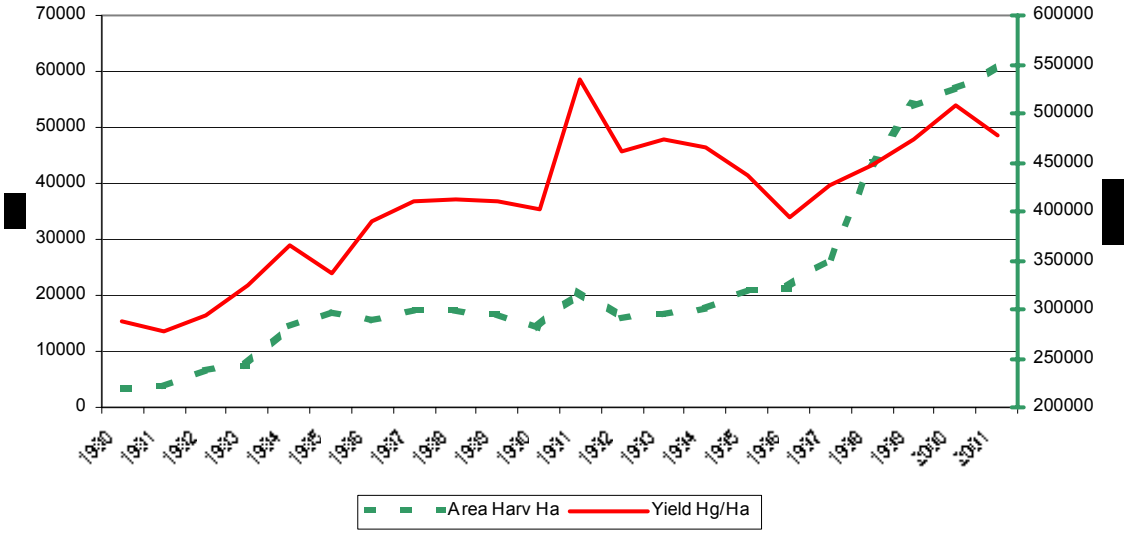


Figure 4-26: Beet Area and Yield



Processing and Handling

Sugar processing is handled either by government owned companies (cane) or government holding companies (beet). Given the procurement prices and processing costs in effect in Egypt, total sugar cost is estimated at 22 to 27 cents per kilo. This range compares to current world sugar market prices of about 13 cents per kilo. World sugar prices are notoriously variable, but over the past decade have generally been higher than current levels. Generally, Egyptian sugar would have been marginally competitive at prevailing world prices over much of the decade, assuming no value is assigned to the water used in sugar production.

Table 4-20: Sugar Cane Revenue and Cost Structure

Accounts	Unit	Quantity	Prices (LE)	Values (LE)	TR (percent)	NTR(percent)	TRV (LE)	NTRV (LE)
Revenue Account								
Output	Ton	49.50	100.00	4950.00				
By-Product	Ton	0.00	0.00	0.00				
Total Revenue				4950.00				
Cost Account								
Purchased Inputs								
1. Seed/Seedling	Kg / No.	1362.00	0.09	122.58	1.00	0.00	122.58	0.00
2. Fertilizers:								
- Nitrogen	Kg	807.00	0.68	546.23	0.95	0.05	519.81	26.43
- Phosphate	Kg	400.00	0.36	143.24	0.91	0.09	130.14	13.10
- Potash	Kg	0.00	1.17	0.00	0.97	0.03	0.00	0.00
3. Manure	Load	120.96	0.50	60.48	0.00	1.00	0.00	60.48
4. Pesticides	LE	1.00	5.33	5.33	1.00	0.00	5.33	0.00
5. Machinery:								
- Tractor	Hour	4.22	16.71	70.52	0.33	0.67	23.27	47.25
- Water Pump	Hour	69.71	4.75	331.17	0.20	0.80	65.53	265.64
- Pesticide Spr.	Hour	0.88	10.00	8.80	0.50	0.50	4.40	4.40
- Trailer	Hour	16.21	17.37	281.60	0.35	0.65	97.68	183.91
- Thresher/Separ.	Hour	0.00	0.00	0.00	0.75	0.25	0.00	0.00
- Compiler	Hour	0.00	0.00	0.00	0.75	0.25	0.00	0.00
6. Other Expenses	LE	1.00	291.50	291.50	0.50	0.50	145.75	145.75
Domestic Resources								
1. Labor:								
- Man	Man/Day	83.27	7.50	624.53	0.00	1.00	0.00	624.53
- Boy	Boy/Day	17.16	4.00	68.64	0.00	1.00	0.00	68.64
2. Animal Work:								
- Cow	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00
- Cart	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00
- Camel	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00

Accounts	Unit	Quantity	Prices (LE)	Values (LE)	TR (percent)	NTR(percent)	TRV (LE)	NTRV (LE)
3. Water Supply	M3	11600	0.00	0.00	0.30	0.70	0.00	0.00
4. Land	Feddan	1.00	1158.20	1158.20	0.00	1.00	0.00	1158.20
Total Costs				3712.82			1114.49	2598.33
Profit Account								
Net Profit	LE/fd			1237.18				
Return to Land	LE/fd			2395.38				
Return to Water	LE/1000M3			106.65				

Table 4-21: Beet Revenue and Cost Structure

Accounts	Unit	Quantity	Prices (LE)	Values (LE)	TR (%)	NTR (%)	TRV (LE)	NTRV (LE)
Revenue Account								
Output	Ton	19.59	91.00	1782.69				
By-Product	Ton	0.00	0.00	0.00				
Total Revenue				1782.69				
Cost Account:								
Purchased Inputs								
1. Seed/Seedling	Kg / No.	6.00	6.67	40.02	1.00	0.00	40.02	0.00
2. Fertilizers:								
- Nitrogen	Kg	240.00	0.68	162.45	0.95	0.05	154.59	7.86
- Phosphate	Kg	125.00	0.36	44.76	0.91	0.09	40.67	4.09
- Potash	Kg	0.00	1.17	0.00	0.97	0.03	0.00	0.00
3. Manure	Load	0.00	0.00	0.00	0.00	1.00	0.00	0.00
4. Pesticides	LE	1.00	96.72	96.72	1.00	0.00	96.72	0.00
5. Machinery:								
- Tractor	Hour	4.00	16.71	66.84	0.33	0.67	22.06	44.79
- Water Pump	Hour	17.00	4.75	80.76	0.20	0.80	15.98	64.78
- Pesticide Spr.	Hour	2.27	10.00	22.70	0.50	0.50	11.35	11.35
- Trailer	Hour	1.20	17.37	20.85	0.35	0.65	7.23	13.61
-Thresher/ Separ.	Hour	0.00	0.00	0.00	0.75	0.25	0.00	0.00
- Compiler	Hour	0.00	0.00	0.00	0.75	0.25	0.00	0.00
6. Other Expenses	LE	1.00	81.00	81.00	0.50	0.50	40.50	40.50
Domestic Resources								
1. Labor:								
- Man	Man/Day	33.93	7.50	254.48	0.00	1.00	0.00	254.48
- Boy	Boy/Day	24.98	4.00	99.92	0.00	1.00	0.00	99.92
2. Animal Work:								
- Cow	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00
- Cart	Day	0.00	0.00	0.00	0.00	1.00	0.00	0.00
- Camel	Day	0.37	12.00	4.45	0.00	1.00	0.00	4.45
3. Water Supply	M3	3025.00	0.00	0.00	0.30	0.70	0.00	0.00
4. Land	Feddan	1.00	617.50	617.50	0.00	1.00	0.00	617.50
Total Costs				1592.45			429.12	1163.33
Profit Account								
Net Profit	LE/fd			190.24				
Return to Land	LE/fd			807.74				
Return to Water	LE/1000M3			62.89				

Marketing

In recent years total sugar consumption has averaged about 1.8 million tons per year or 27 kilos per capita (Sugar Crops Council Year Book 2000). About three-quarters of that consumption comes from domestic sources and one-fourth is imported. Sugar is highly subsidized, so the consumption level is higher than it would be under market conditions.

Comparative and Competitive Advantages

The estimated domestic resource costs for cane and beet sugar are 0.81 and 0.77, meaning that on average Egypt has a small comparative advantage in producing sugar. Again, however, this result assumes the large volume of water used in producing sugar has no opportunity value, which, of course, is not the case. Egypt is not competitive with low cost producers. On average, the country does not lose money producing sugar instead of importing (NPC and EPC values are near 1). However, compared with other crops, the gains from sugar are much lower.

Opportunities for Growth

It would not be wise for Egypt to expand sugar production. In fact, contraction of sugar area and using the land for more profitable crops would yield greater opportunities for growth.

Sector-Specific Constraints

The biggest constraint to expanding sugar production is that sugar production is very intensive in water. It uses large amounts of water per hectare, and the value of the water per cubic meter is the lowest of any crops considered in this study. Given that water is so scarce in Egypt, crops that make more efficient use of water must be given priority over sugar.

FISHERIES AND AQUACULTURE

Overview

Fisheries is an activity that employs more than 1.1 million persons and supports the life of more than 6 million (Tawfik; et al. 2000). Employment in fisheries accounted for more than 3.8 percent of the total agricultural employment in the country (Barrania; et al. 1999). Fisheries also involves a wide range of allied activities that employ a large number of people with various professional backgrounds varying from the simple wooden box maker to design engineers.

The fourth Five-Year Development Plan of Egypt (1996-97 to 2001-02) indicates that the fisheries sector accounted for 7.1 percent of the total value of agriculture production in 1996/1997. Fisheries constituted also 32.2 percent of the total value of animal production for the same year. The estimated value of 2001/2 production is about 7.9 percent of the total value of agriculture production and 37.7 percent of the value of animal production (Barrania; et al. 1999). This figure indicates that fisheries production is growing in a higher rate than other animal production or agriculture activities. Currently, the value of domestic fish production is about 5.7 billion pounds (GAFRD, 2001).

Fish is a traditional and important component of the Egyptian diet. Fish contributed 19.7 percent of the national animal protein consumption in 1996 and has grown to 20.5 percent in 2001 (GAFRD, 2001). Fish is second only to beef as a source of animal protein (Barrania; et al. 1999).

Depending on the source, fish production in Egypt is classified as marine, inland fisheries, or aquaculture. Each of the three sectors differs greatly in the character of the activity. Yet, they are similar in that they all are labor-intensive and privately owned activities.

Fish Production

Production by source during the period 1992 to 2000 is shown in Table 1. During this period overall production of fish for human consumption has increased from 347,000 to 724,000 tonnes. Significant increases in production were obtained from the Mediterranean Sea and Lake Bardwil (due, in recent years to increase Nile flows). In 2000, marine capture fisheries accounted for 18 percent of production, lake fisheries 22 percent, and the River Nile 11 percent. Aquaculture (including carp production in rice fields) contributed 47 percent of production and 36 percent of consumption.

Marine Fisheries

The total catch of the Egyptian marine fisheries in 2000 summed up to 130.9 thousand tons constituting 18.06 percent of the total production. This figure is lower than the reported catch of 1999 by 24.1 percent. The Mediterranean catch declined from 90.0 thousand tons in 1999 to 54.9 in 2000. The higher production reported in 1999 was a result of a sharp increase in plankton feeder pelagic fish especially sardines. The higher production of sardine was associated with the discharge of surplus flood water.

The high catch of the Red Sea after 1997 is a result of adding the catch of the Egyptian vessels fishing in the territorial waters of other countries (Yemen, Sudan, Eritrea ...). It can also be observed that the catch of marine fisheries is either constant or slightly increasing. This clarifies the fact that the exploitation of the fish stocks in our territorial water have exceeded to maximum sustainable yield.

Table 4-22: Fish production and import during 1992-2000 ('000 tonnes)

Source	1992	1997	1998	1999	2000	1992-2000
Sea fisheries						
Mediterranean	44.0	52.7	68.0	90.0	54.9	+25 percent
Red Sea	43.0	57.4	57.1	82.0	76.0	+77 percent
Lakes						
Manzala	59.0	63.1	78.3	65.0	74.1	+26 percent
Burullus	52.0	58.7	59.0	55.3	51.7	-1 percent
Bardawil	1.8	2.2	1.9	3.9	3.3	+83 percent
Idku	8.3	10.8	10.3	9.5	8.9	+7 percent
Maryut	3.5	4.5	4.5	5.3	6.4	+83 percent
Qarun	1.4	0.9	1.0	1.5	1.8	+29 percent
Nasser	33.0	52.6	53.8	41.3	19.0	-42 percent
Fouad	0.2	0.2	0.2	0.2	0.1	-50 percent
Elrian	0.6	0.9	1.0	1.7	1.9	+217 percent
Rivers and canals						
Nile, canals and others	40.0	77.8	79.2	57.6	80.3	+101 percent
Fish farming	35.0	66.5	116.0	215.8	323.7	+825 percent
Rice fields	25.0	6.9	12.4	8.1	16.4	-34 percent
Morra and Timsah	0.7	1.7	1.7	2.0	5.8	+79 percent
Total Production	347.5	456.9	544.4	639.6	724.3	+108 percent
(of which fish farming)	17 percent	16 percent	24 percent	354 percent	47 percent	
Net imports	n.a.	153.8	175.2	192.5	212.7	+101 percent
Total Consumption	n.a.	610.7	719.6	832.1	937.0	+170 percent
(of which fish farming)		12 percent	18 percent	27 percent	36 percent	

Source: General Authority For Fish Resources Development(GAFRD), 2001, Fisheries Statistic Yearbook.

Inland Water Fisheries

In 2000, the total recorded landed catch of inland fisheries was 253.5 thousand ton (GAFRD, 2001). This represent about 35 percent of the total fish production of Egypt and 74.5 percent of the capture fish. Inland water fisheries include the fisheries of Delta Lakes, Fayum and the Nile system. The catch of the Delta Lakes summed to 141.2 thousand tons representing 55.7 percent of the inland water fish. The catch of the Nile system (the river, irrigation canals and lake Naser) was 99.3 thousand tons representing about 39.2 percent of the inland water catch.

The catch of inland water, on the contrary to the marine fisheries, was steadily increasing over the period from 1992 reaching its maximum in 1998, after which time it started to decline. It can be observed from Table 1 that the change in total inland catch is a result of the increase of the catch of the Nile System more than the Northern Delta lakes. The increase in the catch of the Nile was a result of the increase in the catch of the river and canal more than being affected by the decline in the recorded catch of Lake Naser. Although the catch data of Delta Lakes showed a lower rate of increase, this is due to the continuous reduction in its area by draining for land reclamation.

The reported increase in the recorded catch from the inland water fisheries is a result of two factors, a) the improvement of catch data collection and recording system, especially during the last five years, and b) the effect of restocking programs. Most of the delta lakes and the Nile are restocked by hatchery produced fry and fingerlings to improve its stocks.

Aquaculture

Aquaculture is presently the largest single source of fish in Egypt. The total production of the activity reached 323.7 thousand tons in 2000 (GAFRD, 2001). This amount represents 47 percent of the total fish production of Egypt. Aquaculture is practiced in Egypt in several systems with varying levels of technology, including pond culture, floating cages, culture in rice field and restocking water bodies. Except for a very limited and isolated cases, most of aquaculture activities are located in the Delta Region. The production of fish and crustaceans in salt water (marine or salty brackish water) is still in its very early stages, and its development suffers many technical and economical problems.

The production of aquaculture is the fastest growing part of fisheries in the country. As a result, aquaculture is considered as the only available option for covering or reducing the gap between production and consumption of fish in Egypt. aquaculture activities in Egypt have witnessed a sharp increase in production beginning a few years ago. This was a result of the introduction of intensive pond culture technology especially of tilapia. This system produces an average of 10-12 tons of fish per feddan per year instead of the traditional 1-2 tons per feddan.

The current development in production associated with application of higher levels of technology was the result of the change in the structure of fish faming community. The high rate of return on investment in aquaculture has attracted a large number of small to medium sized investors. Those were generally with higher scientific background than traditional farmers and more attracted to develop production systems with high return. The activity is becoming more sophisticated and diverse. This was associated with fast expansion in supportive activities such as feed mills and developed hatcheries. The number of fish hatcheries have increased from 14 in 1998 (Barrania; et al. 1999) to a present figure of 265 (GAFRD, 2001), and more than six large fish feed companies were established during the last three years.

One of the major features of the pattern of production is the rapid increase in contribution of aquaculture, with an 800 percent increase in the eight years since 1992. Output doubled between 1998 and 1999, to 223,000 tonnes, and in 2000 production increased by a further 50 percent to 340,000 tonnes (Table 4-22).

The most common types of fish production in Egypt are tilapia (40 percent of production from all sources) and grey mullet (about 14 percent). These two groups account for more than half of all fish produced in Egypt.

Supply Chain

Catch and Production

The local fish production is basically the sum of the landed catch and aquaculture harvest. In 2000 the total fish production of Egypt reached 724.4 thousand tones (GAFRD, 2001). The landed catch is from two major sources, the inland and marine fisheries. Marine fisheries is basically carried out in the territorial waters of Egypt in the Mediterranean and the Red Sea. Inland fisheries covers the different Northern Delta Lakes, coastal lagoons and depression, inland lakes and the river Nile. The total catch of both marine and inland fisheries is 384.3 thousand tons constituting 53 percent of the local total fish production of 2000. Aquaculture contributes about 47 percent of the local production with a total of 340.1 thousand tons (Saleh, 2002).

Production Present and Forecast

Marine fisheries are overexploited and any reported increase is temporary, and its continuity is uncertain. Accordingly, it can be unwise to consider marine fisheries as a factor in developing the local fish production to cover the increasing gap between production and consumption (Saleh, 2002).

Inland water fisheries, although showing a trend towards growth, is faced with a lot of uncertainly. The Delta lakes, which are producing now 55.7 percent of the total inland, catch and about 20 percent of the country production are in a threatened condition. The oldest and most important threat is the draining of those lakes for agriculture land reclamation projects. Since the 1930s, 56 percent of the area of Delta lakes has been drained and reclaimed for agriculture, urban and industrial development. The area has decreased from 641 thousand feddan to less than 280 thousand feddans in 1997 (Tawfik; et al. 2000).

The production of the Nile system and lake Naser is still growing. This is due to the new application of fisheries and marketing regulations in the lake and the Nile system and lake Naser is approaching its maximum possible levels. This means that the production can increase by a little fraction during the next decade and sustaining that level will be the goal (Saleh, 2001).

One cannot expect a noticeable increase in fish production from the fisheries. Any optimistic estimate will never consider more than 3-5 percent till the end of this decade. This estimate can only be right if no change occurred in area or water allocation to the Delta lakes. The GAFRD development strategy (1997-2017) is considering an increase in the fisheries production to reach 805 thousand tons in 2017 (GAFRD, 1996).

Aquaculture, with in 800 percent increase in the eight years since 1992, shows clearly the great possibility of increasing the local production and employment through aquaculture. Thus, the structure of the locally produced fish should be considered with increasing

contribution of aquaculture. This will bring us into two different future-forecasted production. The first is that estimated by the GAFRD development strategy to reach a production of 1.397 million tons with 57.6 percent of the target production from captured fisheries. The second is an estimated figure of total production of 1,053 million tons with only 38.3 percent from the capture fisheries (Saleh, 2002).

Consumption and Future Plans

The trends in fish consumption per capita are shown in Table 2. Annual increase in population in assumed to be in the region of 2 percent, while supplies of fish for human consumption have increased at an average rate of 13 percent during the 9 year period. Annual consumption of fish per capita has increased from 6.4 kg per capita/annum in 1992 to an estimated 14.7 kg per capita in 2000. Although CAPMAS and GAFRD estimates are slightly lower in some years, it is clear that per capita fish consumption during the decade has grown significantly, at an average rate around 9-10 percent per year.

Table 4-23: Fish Consumption During 1992-2000 ('000 tonnes)

Fish ('000 tonnes)/Year	1992	1993	1994	1995	1996	1997	1998	1999	2000
Production	347.5	358.2	368.4	407.1	421.5	456.5	544.4	639.6	724.3
Net imports			143.1	120.1	181.1	153.8	175.2	192.5	212.7
Total consumption	347.5	358.2	511.5	527.2	602.6	610.7	719.6	832.1	937.0
Population estimate (million)	54.7	55.8	56.9	58.1	59.3	60.5	61.7	62.9	64.2
Consumption (kg/capita)									
PMU estimate	6.4	6.4	9.0	9.1	10.2	10.1	11.7	13.2	14.6
CAPMAS	6.9	8.2	9.4	9.7	8.8	9.3			
GAFRD statistics	7.8	7.2	8.2	9.4	10.1			13.2	14.7

Source: CAPMAS Yearbooks, 19922000.GAFRD, Fisheries Statistic Yearbooks

Per Capita Consumption

The present per capita per annum of fish is about 14.7 kilogram which is slightly above the fish consumption (13 kg/year) recommended by the FAO. The local production of fish facilitate an average per capita of 11.31 kilograms. The difference between present consumption rate and production is covered by importing 212.6 thousand tons of fish (Table 1). Considering the previous figures, Egypt is presently enjoying a self-sufficiency rate of 87 percent if the FAO rates are considered and 77.2 percent of the present consumption.

According to the population projections, Egypt's population in 2010 will be about 87 million. At that time, to reach the recommended average by the FAO, more than 221 thousand tons of fish should be imported. To keep the consumption at the present level, at least 348 thousand tons should be imported. The GAFRD strategy, on the other hand, assumes reaching a total fish production of 1.397 million tons by 2017.

Findings

It can be concluded that the self sufficiency of fish is reducing and the present level of consumption is very difficult to maintain unless fundamental changes in the production policy are considered. Such policy should consider the following points as stated by Saleh (2002):

- Keeping or developing (as much as the resources allow) the production of marine fisheries considering realistic target annual increase of 0-2 percent.
- Keeping the current rate of development of inland water fisheries.
- Enhancing and developing aquaculture activities.

Fisheries is an activity that depends greatly on water resources. Fish can be grown or harvested from water with different characteristics. In Egypt, the majority of production is obtained from waters with total dissolved salts of 0.3 to 10 grams per liter. Fish produced in such levels of salt water is harvested from the Nile System, Delta Lakes and aquaculture.

The catch of the Nile system is not as much affected by the water policy as it is affected by the flood levels, where the surface area of lake Nasser is affected. Most of the catch of Lake Nasser is harvested from the shallower parts. These parts are the first and most affected by the reduction of the water level. The creation of a large water body in Tushki depression years ago, have added only a fractional increase in the catch (2200 tons).

The inland water fisheries in the Delta Lakes are affected by the water allocation policy. According to the 2002-2017 plan, the present outflow of freshwater (12.4 billion cubic meters) will be reduced to between 6-10 billion cubic meters (Tawfik; et al. 2000). A study conducted by USAID Water Policy Reform Program (WPRP, 1998) concluded that a minimum of 8.5 billion cubic meters of fresh and drainage water is required to sustain the present production of fish from the Delta Lakes. The future policy of water allocation is adopting a zero discharge approach, which will result in losing large areas of the lakes and disappearance of the majority of the presently captured fish. The large volumes of agriculture drainage water planned to be diverted to irrigate agriculture expansion projects will also adversely affect the fisheries. The catch of the Delta Lakes (1,089 billion pounds value) can be reduced to not more than 16 thousand tons per year if the agriculture drainage water flow declines to less than 4 billion cubic meters per year (Tawfik; et al., 2000). The reduction of the agriculture and fresh water flow to the lakes will result in a sharp increase in the pollution levels, and increasing the levels of harmful cumulative pollutants in the fish tissues. As a result, the catch of lake fisheries will be unhealthy or even not suitable for consumption.

Aquaculture is presently the most important single source of fish production. Presently, the majority of aquaculture production (90.5 percent) is produced in earthen pond systems. This activity is not allowed to use Nile water and utilizes agriculture drainage water as a single source. The present average production per feddan of this kind of fish farming is 1.5-2 tons per feddan in the traditional system and 10-12 tons per year in the semi-intensive form. The

water requirement for production of fish in different aquaculture systems was reviewed by Saleh, 1996. The developments in pond system during the last few year have resulted in reducing the required volumes of water and land to produce fish to even lower levels.

Inland Water Fisheries

In 2000, the total recorded landed catch of inland fisheries was 253.5 thousand ton (GAFRD, 2001). This represent about 35 percent of the total fish production of Egypt and 74.5 percent of the capture fish. Inland water fisheries include the fisheries of Delta Lakes, Fayum and the Nile system. The catch of the Delta Lakes summed to 141.2 thousand tons representing 55.7 percent of the inland water fish. The catch of the Nile system (the river, irrigation canals and lake Naser) was 99.3 thousand tons representing about 39.2 percent of the inland water catch.

The catch of inland water, on the contrary to the marine fisheries, was steadily increasing over the period from 1992 reaching its maximum in 1998, after which time it started to decline. Table 1 shows the trends of change in total inland water catch, the catch of the Delta Lakes and that of the Nile System including lake Naser.

It can be observed from Table 1 that the change in total inland catch is a result of the increase of the catch of the Nile System more than the Northern Delta lakes. The increase in the catch of the Nile was a result of the increase in the catch of the river and canal more than being affected by the decline in the recorded catch of Lake Naser. Although the catch data of Delta Lakes showed lower rate of increase, this is due to the continuous reduction in its area by draining for land reclamation.

Water and land area to produce a ton of fish went down to 3500 cubic meters of water and the land area to 0.083 feddans (GAFRD, 2001). The market value of the produced ton of fish in such a system is about 6500 pounds. The value of this production can be ten times higher than that produced through any other agricultural activity utilizing the same kind and volume of water (APRP, RDI Unit Report No. 130, Feb. 2002).

The future development in fish production activities depends largely on the increase of production from pond culture systems. The activity can utilize waters with total dissolved salts up to 4 ppt. Pond culture, on the other hand, depends largely on hatchery-produced fingerlings. Such hatcheries cannot produce the required fingerling unless supplied by water with salinities lower than 1 ppt. The present policies of land reclamation in the wetlands of the Delta Region (where most of pond aquaculture activities are practiced) can result in dramatic reduction in both the area and water available for the activity.

Another important source of aquaculture production is the integrated fish culture in rice fields. This activity presently supplies 8.3 percent of aquaculture production. The harvest of this activity will be very much affected by the planned reduction of rice areas and the development of rice crops that requires less water and is harvested after a shorter growing season.

Aquaculture in floating cages is currently practiced on a very limited level. Cage culture is a form of intensive farming with an average production of 25 kilograms per cubic meter of cage space. The activity is presently practiced in primitive form in a single area of the Nile. The development of the activity can facilitate a massive increase fish production with very low operating cost and infrastructure. The environmental impact of the activity is low.

The present policy of the Ministry of Public Works and Water Resources is prohibiting cage culture in the Nile and main canal based on precaution against pollution and hydrological problems. A properly designed cage managed in a responsible way can cause no problems. Accordingly, such an important fish production opportunity in a country facing shortage in water and suitable land should be considered in any National Development Strategy.

Other Approaches to Fish Production through Aquaculture

Adopting a system of integrated aquaculture with desert agriculture is a potential field not exploited in Egypt. This activity maximizes the utilization of water resources. Fish can be grown in high-density (Up to 75 kilograms / m3) intensive water recycling system where fresh water is recycled with 10 percent renewal every day. Such fish farms are modular and can be constructed of different number of tanks that its effluent can cover the irrigation requirements of the planted land. Such systems should be introduced to investors in the desert-land reclamation area in the form of pilot units with technical support. The system was applied with success in desert countries with similar environmental conditions (Saleh, 1995). The system, on the other hand, requires good technical knowledge and finance that cannot be available for the majority of small-scale farmers.

Aquaculture is also an activity known to be used in waterlogged or salt land. Aquaculture is in extensive use as a side activity in salt land reclamation. Fist that can tolerate high salinity levels (mullet) are stocked in shallow ponds constructed on the land. Growing fish will be an added value to the washing operation. This activity can be applied in association with El Salam Canal irrigation project especially in El Tina Plain.

Aquaculture is an activity that can utilize brackish ground water. In desert areas where water with total salts contents of up to 10 ppt, aquaculture can be the only activity that can assure high return from the utilization of such water. Intensive Eels and tilapia culture can be very successful in such environment. The activity requires good technical knowledge and suitable investment.

Fisheries vs. Crop Production

A recent study carried out by the Agricultural Policy Reform Project (APRP) showed that for activities that were established years ago, analysis results indicated that fisheries are more profitable than crop production, due to the soil's deterioration, its unsuitability for cultivation, and the relatively high expenses that lead to weak crop production when compared to fish production. The cost/revenue ratio is 1: 2 (i.e., one earns double what s/he spends). That

explains why beneficiaries of the reclaimed lands risk turning their lands into fisheries despite the fact that they are violating the law.

Regarding expected revenues on future investments, the APRP study indicated the following:

i. Crop production project: The NPV at commercial interest banking rate of 11 percent is approximately L.E. 8,700 for the rice and berseem rotation; approximately L.E. 1,400 for the cotton and wheat rotation, and approximately L.E. 5,200 for the cotton and berseem rotation. The IERR on the invested capital is 19 percent for the first rotation, 13 percent for the second rotation, and 17 percent for the third rotation.

ii. Fisheries development project on reclaimed lands: The NPV at discount factor of 11 percent is LE 86,500. This value is 10 times the estimated value for the crop production project. The IERR on invested capital is 42 percent, more than double the rate of the crop production project.

Conservation and development of Delta lakes is vital for individuals and the country because the use of the lakes in fishery production is more profitable than in crop production. Thus the following issues should be addressed:

- Continuing to dry out or reclaim lake lands will lead to decreased water surface areas that are presently allocated for fishery activities. This action would result in over fishing and would sharply reduce the fishery stocks. Thus, fishery activities would not be sustainable.

- Drying out the coastal zone areas will affect water depth level, and would have a negative impact on the region's fishery resources. As well as fish hatcheries and the incubation of fry, especially tilapia, which is the major production of the northern lakes.

- Corrective actions must be taken on the legal status of existing fish farms is the northern lakes regions. Especially those farms that are established on reclaimed lands. This reform could be achieved through agreement between GAFRD and GARPAD under the framework of MALR.

- Maximize the water resources that are allocated for reclaiming vast areas in these regions by encouraging investment in establishing fish farm projects. This action would contribute positively to increasing the growth rate of the agricultural sector, generating more jobs, and maximizing income.

- Intensify the efforts of the government and the private sector to solve production problems in the newly reclaimed lands. These lands have the potential to become more productive. To ensure success, reclamation and cultivation programs should focus on the regions that possess a fresh water supply. Additionally, this focus would avoid wasting scarce water resources through repeated land leaching in order to reduce the soil's high salt content.

Recommendations

- Delta lakes are important sources of fish and it employs hundreds of thousand of people. The survival of the lakes and continuity of its production depends on keeping suitable flow of the low salinity agriculture drainage water.

- The water allocation policy towards aquaculture in ponds should be reviewed on bases of economical return per cubic meter of water compared to other crops in the same region.

- The ban on cage culture in the Nile and main canals can be reviewed and studied scientifically to find a solution that can permit the activity without harming the river.

- Increasing the levels of coordination between the different authorities to protect and improve the present fish resources.

- Encouraging the transformation of traditional fish farming into developed semi-intensive systems.

- Encouraging the integration of desert agriculture with intensive aquaculture for the maximum utilization of the limited water resources.

- Despite the importance of and potential for growth in fisheries and aquaculture, we do not recommend that USAID make investments in this area. It is not in USAID's comparative advantage to invest in this sector. However, to the extent there are policy issues, such as those discussed above, these issues certainly would be within the scope of a policy project.

LIVESTOCK AND POULTRY

Overview

The livestock and poultry sub-sector is an important source of cash income to family farms, offering relatively higher opportunities for family employment, and providing manure and draft power to crop production. It was estimated in the only available farm budget survey data, that the livestock sector utilized some 40 percent of the total agricultural man power labor supply, and 71 percent of the total women labor available in agriculture (Fitch & Soliman, Livestock Economy in Egypt, 1982). Women are particularly prominent in the livestock sector, especially on family farms. They participate in all animal husbandry processes (including feeding, watering, milking), processing, and marketing. The livestock and poultry sub-sector is traditionally highly integrated with the crop sub-sector. It was estimated that 40 percent of the total value of farm livestock production, in the form of animal power and manure, is a direct input to crop production, and that 22 percent of crop products (mainly winter berseem clover) are direct inputs to livestock production. Given the

increasing use of motor powered machines, the value of animal power has declined somewhat but is still significant.

Ninety percent of the livestock is intensively raised on smaller farms (i.e. less than 3 feddan), in the irrigated cropping region. These small farmers produce 80 percent of all milk and dairy products, 80 percent of all beef, and 70 percent of all mutton. The latest available detailed agricultural census (1990) showed that 99 percent of all large ruminant holdings were herds of less than 10 head. Of these, 19 percent were owned by landless farmers and 63 percent by owners of less than 3 feddan. In fact, 68 percent of all large ruminant holdings were herds of less than 3 heads. Of these, 22 percent were owned by landless farmers and 68 percent by owners of less than 3 feddan. Small farmers are much less important in poultry, producing only 27 percent of total broiler production.

Egypt's livestock and poultry inventory has increased over the past decade. See Table 4-24 in the cattle sector, 69 percent were indigenous, 4 percent foreign, and 27 percent mixed breed.

Table 4-24: Livestock Inventory, 1999

	Million		Distribution (%)			
	1991	1999	Delta	Middle	Upper	Desert
Cattle (head)	2.68	3.42	49	28	19	4
Buffalo (head)	2.94	3.33	54	17	22	7
Sheep/goats (head)	7.53	7.70	31	22	31	17
Broilers (head)	240	323				
Egg Production (mt)	138	159				

Source: MALR

The sector competes with crop production for direct feed use, since livestock and poultry consume corn, barley, wheat and pulses. Livestock also competes directly for land because during the winter a large proportion of land is devoted to production of berseem clover. During the summer, forage is not produced as extensively and there is often a seasonal shortage of animal roughage. Therefore, the livestock sub-sector is a main consideration in cropping decisions, and vice versa.

As improvements in income and technology continue to influence Egyptian consumers, more food is processed and packaged. A commercial livestock and poultry supply industry and a national marketing system are emerging for a number of new products such as cheese, ice cream, processed meat and packaged eggs. However, this industry is characterized by a number of inefficiencies that are reflected in high product losses in milk, meat and egg assembly and transportation, hatching chicks, and the handling of live birds. Such losses reduce volumes and lead to a reduction in quality and in producer prices. Lack of proper transportation results in high milk losses. Marketing of live birds that are slaughtered at retail or at family homes also results in a high degree of waste in transporting live birds and in loss of the by-products.

The last available family budget survey (1995/96) shows that 40 percent of family expenditures are for foods of animal origin. There are major opportunities for farmers if GOE

goals for increasing per capita consumption are to be met. See Table 4-25. This is especially important with regard to USAID's presence in the livestock sector, since most meat and milk is produced on small and medium sized farms, whose increased income is most effective in creating rural employment.

Table 4-25: Livestock /Poultry Consumption Data

	1995-96 Consumption (Kg/capita)	GOE Annual Growth Goal (%)
Red meat	7.15	2.4
Poultry meat	8.75	2.8
Milk	14.02	3.6
Dairy Products	7.00	
Eggs (number)	90.30	2.9

Sources: 1995-96 Family Budget Survey, GOE Long Range Agricultural Plan

The livestock and poultry sector consists of a chain of integrated sub-sectors—on farm production, marketing, processing, and inputs. These are examined below. Efficiencies/inefficiencies in any one of these sub-sectors impacts the efficiency of the entire sector.

Dairy

Production

Total milk production has increased with a 4.8 percent average annual growth rate from 2.3 million mt in 1990 to 3.8 million mt in 2001. Table 4-26 shows the composition of domestic production, along with milk equivalent net imports (exports are negligible).

Table 4-26: Milk Supply, 1990, 1997-2001

	1990	1997	1998	1999	2000	2001
			000 mt			
Buffalo	1,250	1,890	2,022	2,018	2,030	2,051
Cow	974	1,324	1,352	1,597	1,638	1,679
Sheep	53	91	93	93	93	93
Total Production	2,277	3,305	3,467	3,708	3,761	3,823
Milk Equivalent Net Imports	606	561	526	521	729	617
Total Supply/Apparent Consumption	2,873	3,852	3,984	4,188	4,472	4,420
			%			
Buffalo share	43.5	49.1	50.8	48.2	45.4	46.4
Cow share	33.9	34.4	33.9	38.1	36.6	38.0
Import share	21.0	14.5	13.2	12.3	16.2	12.9

Source: Faostat

Domestically produced cow milk has recently gained market share while all other sources of supply are declining. Since Egyptians traditionally prefer buffalo milk, this probably indicates that cow's milk probably yields greater profitability for the farmer, or, in other words, has a lower DRC. Imports' decreased share of the total market reflects the fact that average annual growth in domestic production and product availability (4.8 percent) has outpaced the 3.8 percent annual growth rate in consumption. It is expected that the application of WTO agreement measures, especially the gradual phasing out of internal and export subsidies by the major international exporters, EU and New Zealand, will positively affect domestic producers by improving their price competitiveness.

The intensive commercial system operates large and medium-scale farms, raising some 200,000 Holstein cattle, beside seasonal commercial herds of lactating buffalo cows. These farms produce 20 percent of all milk production, which is used mainly for pasteurized milk, processed dairy products, and fresh milk for urban markets. The seasonal commercial buffalo herd system, which contributes 14 percent of total fresh milk production, keeps lactating buffalo cows for production, selling them for slaughter when they are dry, and replacing them with lactating animals. In spite of its relatively high production costs, buffalo milk continues to be strong because of consumer preference. However, it is expected that buffalo milk will lose market share due to the lower production cost of cow milk, and increasing hygiene awareness among consumers.

Buffaloes are the main dairy animals in Egypt. Buffalo's milk farm-gate price is almost twice as much as cow's milk. Two percent of the buffalo herd is owned by commercial farms (50 head or more); farmers with about 10-15 head own 8 percent; and 90 percent are owned by smallholders. The total buffalo calf crop is estimated at 1.1 million heads/year.

Production, fertility, and calf mortality comparison are shown in Table 4-27. Data is not available for commercial and small buffalo milk yields, however the small farms yield is almost certainly below those of the commercial farms.

Table 4-27: Livestock production, Fertility, and Mortality Data, 2000

Type	Production (Mt/lactation/head)	Fertility (%)	Calf Mortality (%)
Buffalo	2.55-3.06*		
- Commercial farms		80-85%	5%
- Small farms		65%	10-15%
Cattle			
- Local breed	0.8	65-70%	10-15%
- Holstein	7.0	85%	2-5%

Adjusted to 4 percent fat milk
Source: MALR

Ninety percent of livestock (for both milk and meat) is intensively raised on smaller farms (i.e., less than 3 feddan) in the irrigated cropping region, producing 80 percent of all milk and dairy products. The last available detailed agricultural census data (1990) shows that 99 percent of all large ruminant holdings are herds of less than 10 head. Of these, landless farmers own 19 percent, farmers with less than 3 feddan own 63 percent. In fact, 68 percent

of all large ruminant holdings are herds of less than 3 heads. Of these, landless farmers own 22 percent, and farmers with less than 3 feddan own 68 percent.

Value

Animal sector value, cost and value-added information available from MALR aggregates red meat, poultry meat, milk, eggs, wool, an insignificant amount of honey and beeswax, and manure (since 1990). Excluding manure, in order to obtain comparable data, the total value of animal production was estimated in 1999 at LE 18.335 billion (compared to LE 6.813 billion in 1990). This was equal to about 28 percent of the total value of agricultural production in 1999 (compared to 27 percent in 1990).

Total cost of livestock inputs was estimated at LE 12.18 billion in 1999 (LE 3.76 billion in 1990). Value added of the total livestock farm production in 1999 was estimated at LE 8.50 billion, at the farm level, representing 17 percent of the total farm agricultural value added at the farm level. Comparable numbers for 1990 were LE 3,759 million for total cost of livestock inputs, and value added of LE 3,054 million (16 percent). These numbers underestimate total sector value and value added somewhat because they do not include the value of draft power or of manure.

Only total value is available for the various animal sub-sectors. Dairy sub-sector total value in 1999 was LE 5,383 million (29 percent of total sub-sector value, excluding manure). In 1990 total value of the dairy sub-sector was LE 2,169 million, 32 percent of total sector value.

Marketing

About 43 percent of the milk produced in small farms goes to family consumption in rural areas. Thirty-five percent is directed to the fresh market while rural families process the rest, 22 percent, into butter and cheese. This is mainly due to the inefficiency of fresh milk marketing facilities, especially cooled transportation and storage. The existing capacity of assembly centers and the lack of cold chains in transportation and in storage facilities sometimes limit the amount of milk that can be moved from rural areas. Where this is the case, it is a disincentive to dairy producers to improve herd genetic structure and develop new production technologies. This also forces them to consume and convert a large part of their milk production to less-value-added products such as ghee and salted cheese.

Market surplus milk is collected in several ways. Some fresh milk is collected from small farms by wholesalers. Middlemen in some concentrated areas perform assembly functions through village collection points. Public assembly centers assemble less than 100,000 mt of market surpluses. This system gives priority to larger farms equipped with cold facilities, rather than to small farms who are not only paid less but are further constrained by long delivery queues. Private assembly centers managed by middlemen for large wholesalers have

become more popular for small farmers because of their flexibility, even though they lack accurate means for measuring fat percentage. The marketed

About 55 percent of total imported milk is in the form of dairy products, mainly butter, cheese, and ghee, and about 45 percent is in the form of milk powder used for manufacturing. A negligible amount of milk, Domietta white and Ras (hard) cheese is exported to Gulf markets.

Processing

Milk produced on commercial farms is delivered to dairy plants for packing as pasteurized or UHT liquid milk, either pure or mixed with reconstituted milk made of imported milk powder, or for dairy products, especially white cheese. Recent policy reform has activated regulations of milk labeling to distinguish between fresh and reconstituted milk. A recent regulation exclusively limits the use of reconstituted milk from imported milk powder to the publicly owned Misr Dairy Company for producing inexpensive white cheese.

Except for one public plant (Misr), the dairy industry is mainly private. There are 600 registered traditional dairy plants. These use primitive modes of production, high salt percentage for preserving, and pack in unsuitable cans. There are also 119 modern dairy plants. These modern plants use 10 percent of total milk production to manufacture sterilized milk, UHT milk, white cheese, hard cheese, yogurt, butter, and ice cream. The total capacity of the modern plants is estimated at 931 thousand tons. While there are 17 large-scale dairy processors, small-scale dairy processors capture 85-90 percent of the modern dairy products market. However, large-scale processors dominate the production of some dairy products, such as liquid UHT milk. The large-scale processors have successfully campaigned through their trade association to raise public awareness of the health hazards posed by unpackaged milk and dairy products.

Feta cheese is the most important processed dairy product in Egypt. Its local production has increased and was estimated at 385,000 tons in 1999. Feta cheese accounts for around 80 percent of total cheese production. Cheese imports levels have declined to only 4.1 percent of the total domestic cheese market.

Comparative/Competitive Advantage

Livestock is protected by border tariffs and quotas. This protection, and milk producer profitability, are likely to remain and may be necessary to assure the profitability of some Egyptian milk producers. Different available studies (Fitch, Soliman and others) show that Egypt has a comparative advantage (DRC<1) for buffalo milk production, especially under the traditional system. However, these same studies show a comparative disadvantage (DRC>1) in milk production from commercial buffalo herds and from local cows under traditional holdings. A 1995 World Bank data indicates the DRC's of 1 or less for "livestock products". The increasing share of market being attained cow milk, including decreased

imports, would seem to indicate that cow milk is more competitive than buffalo milk and certain imported products. Application of WTO agreement measures will increase the cost of major foreign suppliers of milk and milk products.

Egypt clearly has a comparative advantage in producing berseem, and especially short berseem, a major component of livestock feeding rations (DRC estimates are in the region of 0.4-0.8). Berseem also makes good use of water. This suggests that expanding berseem clover area will increase value added in the agricultural sector, subject to market and demand constraints. This high demand on fodder reflects the high domestic demand for animal products, since the demand on fodder is a derivative demand from the consumer

Constraints and Opportunities

There are constraints in the dairy sector at the farm level, as well as in post-production marketing and processing functions.

Animal husbandry and milk handling practices at the farm level are often inadequate and/or improper. For example, USAID's AgLink project found such elementary production inhibiting practices as feeding berseem before it was sufficiently dry, and milking to the very "last drop" of milk. It also found sanitation could be improved by raising the roof of animal sheds to permit drying of muck, and elimination of a practice to put wet muck on the cow's teats (thereby increasing the risk of mastitis and other infections, and contaminating the milk.). In addition, feed rations are less than optimal; however this is probably as much a question of affordability as it is lack of knowledge. This situation gives rise to important low-tech, low-cost technology transfer opportunities, such as the AgLink examples. Such improvements will improve the quality of milk production (and the dairy farm is the vital link in sanitation), increase productivity, and reduce costs (for example, through improved animal health, reduced mortality).

Animal health, feed, and credit limitations are also constraints, and are discussed in the Input section below.

Beyond the farm gate, there are constraints in assembly, transportation and processing. The most serious are in assembly, where inadequate facilities reduce the incentive for farmers to increase production. This is true not only of GOE assembly facilities, but also private sector facilities. There has been some improvement in private sector facilities serving or operated by modern private sector processors that produce quality products. Continued improvement is a matter of educating the consumer as to the value of products that have been handled in a sanitary manner, as well as increasing consumer incomes that will allow purchase of such products. There are also losses in quality due to lack of refrigerated transportation, however this is a constraint that is usually addressed after more elementary issues are resolved. Many opportunities for improving industry performance are rooted in industry structure or related to consumer preferences accompanying increased income. However, there are also opportunities in assembly and processing operations. There may be an opportunity to privatize GOE assembly operations, moving their ownership and operation to dynamic

producer associations and/or cooperatives. Smaller, traditional processing plants will benefit from technical assistance to processing companies that upgrade their sanitation and reduce their costs.

Red Meat

Production

Total red meat production has increased from 386,000 mt in 1990 to 694,000 mt in 2001. Table 4-28 shows the composition of domestic production and imports of meat and meat products. The data excludes small amounts of camel and pig meat, as well as rabbit (white) meat that which currently adds about 70,000 mt to meat supply.

Table 4-28: Red Meat Supply, 1990, 1996-2000

	1990	1996	1997	1998	1999	2000
000 metric ton						
Buffalo	161	208	256	266	277	302
Cattle	143	244	248	252	232	239
Sheep/Goat	82	91	93	95	113	117
Total Production	386	543	597	623	633	658
Imports—meat/meat preparations (net)	156	114	130	137	181	201
Total supply/apparent consumption	542	656	726	749	802	858
%						
Buffalo share	30	32	35	36	35	35
Cattle share	26	37	34	34	29	28
Sheep/Goat share	15	14	13	13	14	14
Import share	29	17	18	18	23	23

Source: Faostat

The data shows buffalo increasing it market share, while cattle ‘s share has remained about the same over the past five years, considering that most imported product is cattle meat

Imports of live cattle for farming and slaughter are highly volatile, and sometimes significant. Table 4-29 shows trade of live animals of the major ruminants used for meat and milk productions.

Table 4-29: Trade in Live Ruminants, 1995-2000i (Head)

	1995	1996	1997	1998	1999	2000
Cattle	168,315	705	43,301	87,660	163,756	136,561
Buffalo	15,911	45,680	7,425	1,340	46,301	96.957
Sheep	——	10,352	40,819	(314)	8,508	317,639
Goats	(150)	(28,074)	(16,418)	(16,762)	——	10,074

Note: Figures appearing in parentheses are net exports
Source: Faostat

Ninety percent of livestock (for meat and milk) is intensively raised on smaller farms (i.e., less than 3 feddan) in the irrigated cropping region, producing virtually all buffalo, 80

percent of all beef, and 70 percent of all mutton and goat. The last available detailed agricultural census data (1990) shows that 99 percent of all large ruminant holdings are herds of less than 10 head. Of these, landless farmers own 19 percent, 63 percent are owned by landholders of less than 3 feddan. In fact, 68 percent of all large ruminant holdings are herds of less than 3 heads. Of these, landless farmers own 22 percent, and 68 percent are owned by landholders of less than 3 feddan.

The majority of calves and culled animals, which are mainly produced by small farmers, are slaughtered directly, without fattening to produce 80 percent of domestic meat. A small percentage of the dairy/beef calves and culled animals are fattened in commercial feedlots, which produce 20 percent of all beef. There are generally two meat supply seasons: winter (berseem clover) season (November to May), summer (off berseem clover) season (June to October). In the winter season, the supply is more stable with relatively higher prices; in the summer season, most of the small farms supply their calves at lower prices, owing to the lack of green fodder.

Most of the small ruminants are raised in the extensive desert system. It provides 30 percent of all mutton production.

Value

As mentioned in the dairy section, only total value data was available for the animal products sub-sectors. In 1999, the red meat sub-sector accounted for total value of LE 8,494 million or 46.1 percent of total animal sector value (excluding manure). This compared with LE 2,674 million (39.3 percent) in 1990.

Marketing

Domestic slaughtered red meat production represented 77 percent of the total supply in 2000. Slightly less than 65 percent of the animals were slaughtered in public slaughterhouses, with the remaining amount handled by private facilities due to lack of sufficient public refrigeration spaces or consumption habits. Imported meat is primarily low-cost frozen product sold to low-income consumers and for manufacturing in processed food products. Importation of cattle steers has declined in recent years due to the regulatory ban imposed on mad cow disease exporting countries.

Domestic animals are sold live in village or livestock markets, by the head, without weighing. There are some 120 livestock markets that are publicly owned and managed and a few complementing private markets. Livestock markets are not specialized, but only one in Cairo handles camels. These markets are usually a bare, fenced space of land, with almost no facilities. Each market works on one fixed day per week. Similar types of animals are assigned a specific area in the market. There are no auctions or central system for price discovery. However, these markets remain the focal point of cattle and buffalo exchange,

since livestock producers sell their animals whenever they need cash, rather than produce for a market economy.

Livestock are moved by truck to public slaughterhouses, located near urban consuming areas. Meat passes directly from the slaughterhouses to central meat markets, where retailer butchers purchase carcasses from wholesalers. Carcass beef is trucked to retail stores. Only a small proportion of retail stores are equipped with refrigeration facilities. A very few retail grocery chains have started to compete with butcher shops in the higher income locations. They also usually purchase carcasses from wholesalers and process them into different meat cuts in the back room of their stores. It is unlikely that supermarket retailing of beef will gain much prominence in the near future, as most of the lower income consumers are still not able to afford more than crude cuts of meat.

Male buffalo calves are mainly slaughtered at 60-80 kg live weight as vetello (baby) beef. Only 270,000 head of females were used in 2000 to replace the culled buffalo cows, while 230,000 were illegally slaughtered as vetello. The calf crop of local cattle is 900,000 head, of which 50 percent are male calves fattened to a slaughter weight of 300 kg only, rather than their potential live weight of 450 kg or more. Some 250,000 head of female calves are used for replacements, while the rest are slaughtered illegally as baby beef.

Processing

Location of the slaughterhouses in consuming, rather than producing areas is due to the fact that the transport of meat is usually more expensive than that of livestock, and by the lack of a cold chain from slaughterhouses situated in rural producing areas.

There are 411 public meat slaughterhouses; only 9 of them are mechanical. Their total capacity is about 12.2 million head per year. The total number of legally slaughtered head in 2000 was only 2.1 million. Maintaining sufficient slaughter capacity to accommodate the wide fluctuations in marketing due to the cattle cycle is good industry economics, however, current capacity utilization of less than 20 percent not only represents wasted monies in investment, but also increases the cost of slaughtering. The innovation of vacuum-packing processed meat began helping the establishment of the meat packing industry, and putting more sanitary product in the market, starting late 1980s. However, almost no vacuum-packed meat cuts now are available from domestic suppliers.

Some cattle and buffalo, as well as most sheep and goats, are slaughtered informally. It is common practice, especially in rural areas, that butchers buy animals from local markets, kill them, hang them from a tree, and use axes to chop off portions of the meat that are sold directly to consumers wrapped in paper.

Comparative/Competitive Advantage

As mentioned above, livestock is protected by border tariffs and quotas. While that protection remains, livestock production for meat is likely to remain profitable. The aforementioned studies (Fritch, Soliman, and others) show Egypt having a comparative disadvantage (DRC>1) in red meat production from cattle and buffalo bulls and steers (including vitello buffalo), and commercial feedlot fattening.

Constraints and Opportunities

As with the dairy industry, there are constraints at both the farm and post farm gate levels. Existing animal husbandry techniques can be improved to reduce costs and increase productivity. The examples cited under dairy regarding feeding of berseem and maintaining dryer cattle yard areas also apply to cattle raised for meat. This creates opportunities for low-tech, low-cost technology transfer opportunities. Animal health, feed, and credit limitations are also constraints, and are discussed in the Input section below.

The lack of standards in livestock trading is a disincentive to production of better livestock. As mentioned above, cattle are sold by the head. While individual animal weight is given some importance by the buyer, that importance is not very obvious. Standards pertaining to weight classifications, and meat quality and health (as gauged by appearance) would create a direct connection in the farmer's mind between animal husbandry practices and income received for the farmer.

The slaughtering industry is in need of major improvements. There is major overcapacity, thus increasing per unit costs of all in processing operations. Few plants employ modern techniques. These deficiencies are directly attributable to GOE investment in slaughterhouse facilities in the past. They overbuilt, and they do not have the money to modernize. The entire industry, and consumers, would benefit from a rationalization of the industry that would increase capacity utilization, thereby decreasing costs that could result in reduced prices to consumers and/or facilities modernizations (which would also lead to reduced costs).

Poultry

Production

Broiler meat production has increased at an annual rate of 9.6 percent since 1990. There have been virtually no imports of frozen broilers during the last decade. This was due to the ban imposed on imports starting 1986, then replacement of the ban with an 80 percent tariff following the WTO agreement in July 1997, later reduced to 70 percent. Production of other poultry products (duck, goose, pigeon, turkey) has also increased, but not as rapidly. As a result, broilers have increased their share of the poultry market from 72 percent in 1990 to 83

percent in 2001, where it has been relatively stable since1997. See Table 4-30. There is a relatively insignificant trade in live poultry broilers—currently about 1 million head of broilers (less than 1 percent of total production), and less than 500,000 head of ducks and turkeys are imported annually.

Table 4-30: Poultry Meat Supply, 1990, 1997-2001 (000 mt)

	1990	1997	1998	1999	2000	2001
Broiler	195	441	431	485	513	539
Duck	32	22	35	29	42	42
Goose	28	41	41	42	42	42
Pigeon/Turkey	17	21	20	23	23	24
Total	271	525	527	579	620	647
Broiler share (%)	72	84	82	84	83	83

Note: All numbers are net of negligible imports and/or exports
Source: Faostat

Table egg production has not increased either as rapidly or as consistently as broiler production. See Table 4-31. There are virtually no imports of table eggs or egg products.

Table 4-31: Table Egg Production (000mt)

1990	1997	1998	1999	2000	2001
152.0	168.4	168.1	159.3	176.7	199.6

Source: Faostat

Commercial, industrialized, high technology poultry systems produced 73 percent of all broilers and table eggs in 2000. There are 12,800 broiler farms with total capacity 508.6 million head. They operated at 67 percent of their capacity in 2000, which increased cost of production. Only 780 (6 percent) of these farms are larger than 20 thousand head, and represent 21 percent of the total broiler capacity. Commercial farms with 5,000-20,000 head produced 77 percent of total production. However, more than 30 percent of these smaller farms shut down with the removal of feed and credit subsidies, since they were not able to operate profitably without these subsidies. The feed conversion rate of broiler production is only 1:2.4, mortality rate is 12 percent, and marketable live-weight after 42 days is 1.4 kg. Such low technical efficiency levels can be attributed to low-quality feed and nutritional value.

The commercial poultry system also includes 1,300 table egg farms with a total capacity 5.7 billion eggs. These farms operated at only 52 percent of capacity in 2000. Only 30 percent of these farms are vertical (that is, have cages), but they account for 78 percent of the total capacity.

The poultry industry is supported by an integrated chain producing grandparent stock, parent stock, and chicks. All pure line breeds are imported. They are the main input for the three grandparent stock farms, producing 3.2 million broiler parents and representing 64 percent of parent production supply. The balance is imported. There were 335 broiler parent stock farms

in 1999, with total capacity of 8.1 million parents that could produce 1.1 billion eggs per year. These farms provide fertile eggs to hatcheries that, in turn, provide day-old chicks for broiler farms. The actual fertile egg production was only 53 percent of total capacity in 1999. There were 23 layer parent stock farms in 1999, with total capacity of 687 thousand chickens that could lay 115.3 million eggs per year. The actual egg production was only 37 percent of this capacity. The actual hatched eggs in 618 traditional hatcheries in 1999 were 113 million, producing 66.7 million chicks (59 percent hatch.) Ninety-six modern hatcheries produced 350 million eggs in 1999, producing 259 million chicks (74 percent hatch).

Value

As mentioned in the dairy section, only total value data are reported for the various animal sub-sectors. In 1999 the total value of the poultry meat sub-sector was LE 3,315 million (18.1 percent of the total sector). In 1990 the total value was LE 961 million (14.0 percent). Egg production total LE 959 million (5.2 percent) of total sector value in 1999, compared to LE 932 million (13.7 percent) in 1990.

Marketing

The main marketing channel for live chickens is through local traders to dealers, wholesalers and retailers. Slaughtered whole chickens are channeled (cooled or frozen) to wholesalers and retailers including supermarkets and food institutions.

Processing

In 2000, there were also 170 public poultry processing plants, only 20 of which are mechanical and modern, 4 semi-mechanical, and the balance manual and traditional. The private sector owns 12 poultry processing plants, all of which are modern and mechanical. In addition there are thousands of small shops that custom slaughter poultry and rabbit for individual customers. The total capacity of modern slaughterhouses is 110 million birds/year and has remained the same over the past decade. Modern slaughterhouses operated at 28 percent of capacity in 2000. The total capacity of the traditional slaughterhouses is 10.6 million birds per year with actual used capacity of 53 percent. The main reasons for such high idle capacities are the consumer preference to buy live birds rather than dressed poultry, and high transportation costs to the slaughterhouses.

Comparative/Competitive Advantage

Different available studies (Fitch, Soliman and others) indicate that Egypt has a comparative advantage for these products—1 or less in commercial poultry broilers and commercial table eggs. The economic literature shows that estimates of net farm income, return on investment, and return on usage of feed unit are all favorable for these products. However, the smaller

commercial poultry broiler enterprises are profitable only because of the high (70 percent) tariff protection. Different studies (DEPRA, 1997, and APRP, 1999) showed that these tariff levels will continue protect the Egyptian broiler industry under the current international technologies and prices. To comply with the WTO, the upper limit of this tariff should not exceed 50 percent starting in 2004. This indicates the need to increase smaller poultry enterprise efficiency, mainly through some kind of vertical integration to reduce costs but also through improved poultry husbandry.

Constraints and Opportunities

As with livestock, there are constraints at the farm and industry levels. In speaking of the farm level, we refer to smaller commercial operations only, although some of the constraints are also applicable to large commercial operations.

Small commercial broiler operations that are not part of an integrated system, that is, aligned with a processor, lack access to poultry husbandry techniques, except where that is provided by input suppliers. This is because the MALR has little in terms of a poultry husbandry extension service, and donor foreign aid programs in animal science have focused on livestock. This forestalls knowledge and adoption of even elementary improvements of which they are not aware. In addition, weight losses in transportation and loss of the viscera value in the extensive custom slaughter practice reduces the price they receive for their birds. Smaller egg producers also realize reduced income due to losses in transportation resulting from multiple handling, inadequate packaging, and use of unrefrigerated trucks. Animal health, feed, and credit limitations are also constraints on production, and are discussed in the Input section below.

Inputs

Feed

Green fodder, dry roughage, feed concentrates and mixed feeds, and non-conventional feeds are used in the Egyptian livestock and poultry feeds. Green fodder provides two thirds of total digestible nutrients (TDN) and three quarters of digestible crude protein (DCP) in ruminant nutrition. Egyptian berseem clover is the only major green winter fodder. There is an over-use of clover feed in winter season, while, in summer season, there is always a shortage of green forage, apart from limited production of alfalfa and drawa (immature corn crop). Farmers mainly shift in summer to dry roughages. Berseem clover production enjoys a good comparative advantage (DRC estimates are in the region of 0.4-0.8) and also makes good use of water.

Dry roughage includes hay and crop straw. The total production of all these materials and crop residues is 14-16 million tons. However, only 30 percent of this production is available for ruminant feeding. This contributes for 18 percent of the TDN for ruminant nutrition.

Because of its low content of DCP, dry roughages do not significantly contribute DCP to ruminant nutrition.

Feed concentrates include grains, by-products of milling, vegetable oil extraction, rice milling, and sugar cane processing. They contribute 18 percent of the total TDN, and 24 percent of the DCP used in animal feeds, and about 15 percent and 18 percent of the total TDN and DCP in poultry rations. Feed concentrates are sold in cube form, packed in 50 or 75 kg jute bags.

The total capacity of ruminant feed and poultry mills is 5.2 and 5.0 million tons, respectively. 2000 data show the number of ruminant feed mills is 128, about 90 percent of which are publicly owned. An estimated 26 percent of ruminant feed mills are idle. Conversely, 90 percent of the 193 poultry feed mills are privately owned, of which an estimated 39 percent are idle. The used capacity of both types of feed mills has dropped from 60 percent in 1985 to 30 percent and 20 percent respectively, in 1999, due to the shift of commercial feedlots and to large dairy and poultry farms doing their own on-farm feed mixing to insure quality and reduce high overhead processing costs. Mills sell feeds to medium and small farmers through middlemen, who decide the feed quality and price. They exercise monopoly power by offering small farmers credit facilities.

The poultry feed industry operates with a huge idle capacity. The absence of bulk handling equipments and procedures increases losses and costs.

The main constraint for feed production is the shortage and/or high cost of ingredients. Cottonseed cake, wheat, bran and corn are the main feed ingredients. They are available in limited amounts, and imported product is relatively expensive. This has resulted in a recent trend to produce more non-conventional ruminant feeds. These feeds use corn stalks, sorghum stalks, corncobs, rice straw and hulls, and vegetable and fruit residues. Some mills produce a livestock feed containing rice straw, urea, and molasses.

The two main components of poultry feeds, yellow corn and soybeans, represent 70 percent and 20 percent of the total produced feed, respectively. Almost 100 percent of yellow corn and 80 percent of soybeans are imported. Yellow corn is a new crop in Egypt. Its area has increased to 91 thousand feddan, representing only 4.3 percent of total corn area planted in 1997.

The GOE used to subsidize feed and feed ingredients and enforced low prices for manufactured feeds. This was accompanied by full governmental control on imports of ingredients and by quotas to feed mills. This promoted an inefficient industry in terms of productivity and profitability. With the removal of subsidies, a more efficient feed industry has emerged. In addition, the feed industry has received technical assistance in producing lower cost feeds from foreign aid projects. The EU sponsored the Animal Feed Quality Improvement Project, which developed the technology for treating straw and crop residues with ammonia to increase feeding value. Supplementation with molasses was also included. MALR extension staff disseminated these technologies, and established eight centers for ammonia feed distribution in the Delta. The GTZ has supported the Non-Traditional Fodder

Project in three villages. Its objective is to integrate crop residues and by-products in animal feeds at the farm level. Accordingly, MALR has implemented some extension packages. USAID's AGLINK, Africare, and CARE projects have provided direct delivery of technical assistance to livestock farmers.

Livestock Health and Reproduction

Livestock technical and veterinary extension services are provided through MALR's Livestock Production Departments and Veterinary Departments in the Governorates. Critical disease control campaigns are ongoing. However, budgets are insufficient to improve services. The EU initiated a program in 1994 to support the privatization of veterinary services by strengthening existing institutions, providing training, pricing of services to farmers, and identification of public roles.

Artificial insemination services are also monopolized by the same MALR departments. However, bulls are only available in one out of three to four villages. The total number of artificially inseminated cattle cows in 1999 was 105.8 thousand (only 7.9 percent of total elder female cows in the same year), with 70 percent positive results. The total number of artificially inseminated buffalo cows was 28.9 thousand (just 1.9 percent of total elder female buffaloes), with only 66 percent positive results. The Canadian Animal Production Technology Project provides technical services in areas of embryo transfer, artificial insemination and animal health.

The Food Sector Development program of the EU has allocated LE 200 million to provide technical services, artificial insemination service, a dairy board, marketing system development, data collection and market information, dairy quality improvement, and a credit line of LE 150 million for dairy farmers as a revolving fund to develop modernize and expand their operations. Another LE 50 million has been allocated for training purposes on all levels. Twenty villages in each of five targeted areas have been selected to date to receive these services. Some positive impact has been already shown, especially in adopting corn silage production to improve summer nutrition.

The IDRC of Canada has initiated a Pilot Project for developing a milk recording system. The project has established a data processing lab within the College of Agriculture at Cairo University that can handle data of 100,000 lactating cows. The FAO has provided a Technical Cooperation project for extending this center's services into a full-scale national dairy herd improvement system, including executing genetic improvement programs, improving management practices of dairy herds, and developing a friendly-farmer-use information system.

The GOE offers little or no health and veterinary services for small poultry farmers, and the large commercial farms generally have their own or contract for services from a private veterinarian.

Finance

Credit for small livestock farmers is offered through PBDAC. However, such credit is not available for those who do not own land or buildings to use as collateral. Loans for establishing commercial farms and importing stocks, equipments and feedstuffs are also available. Producers are asking PBDAC to accept cattle as collateral, and suggesting that this change can be accompanied by a special livestock insurance system to guarantee loans repayment. PBDAC interest rates are 11-15 percent, lower than commercial banks (12.5-14 percent) but higher than EU program loans (6.5-8.5 percent) and social fund loans (7-9 percent).

The MSSP project of the EU has provided a revolving credit line facility for financing livestock and poultry farmers with moderate interest rates to modernize their operations and establish infrastructure facilities. USAID has recently established a revolving fund of US$30 million to finance a credit line to bring back the Veal Production Project. Farmers are offered bank loans of LE 700/head to raise and fatten the male buffalo calves to the live weight of 450 kg. Farmers are free to buy and sell their animals and feeds. The GOE has allocated an additional LE 200 million for this revolving fund. A board of trustees of Buffalo Producers Association and MALR is managing the fund with the CIB bank. Approximately 250,000 animals have been fattened since 1997 under this program.

Cattle and buffalo insurance is provided through a specialized MALR authority. The total number of insured heads at MALR in 1999 was 252.6 thousand of all ruminants, representing only 1.6 percent of the total inventory. Recently, private insurance companies have been allowed to provide similar services to livestock.

Recommendations

It is recommended that USAID develop a strategic intervention to assist smallholder cattle and buffalo farmers and their supporting sub-sectors. Such an intervention will increase the competitiveness of hundreds of thousands of smallholders, thereby maximizing the employment creation potential of their increased income. Further, the livestock sector suffers from an inefficient and investment stifling GOE presence, and inadequate MALR extension, situations a well-planned intervention could alleviate. The poultry sector, by contrast, is largely in the hands of private companies having the resources to address their problems.

The interrelatedness of milk and red meat production requires a USAID strategy to address issues common to both sub-sectors. There are also issues specific to the dairy sub-sector that need to be addressed.

Common issues that need to be addressed include:

- **Policy.** Border protections should be reduced. This will not only bring Egypt into compliance with forthcoming WTO requirements, but also be an incentive to all participants in the livestock sector to become more competitive. Incidentally, USAID

should also pursue removal of border protection regulations in the poultry sector. USAID should also pursue policies that will rationalize the meat and dairy processing industries, closing down inefficient plants and encouraging complete privatization of Misr Dairy and GOE slaughterhouses and feed mills. The recently enacted GOE policy limiting the use of imported non-fat dried milk for production of inexpensive cheese to MISR Dairy should be lifted.

- **Feed.** Technical assistance should be provided to the feed industry to increase operating efficiency and feed quality. Concentrate feed grades and standards should be strengthened and enforced. The feasibility of providing commodity credits for feed ingredient imports from the United States should be explored.

- **Credit.** Smallholders need credit to upgrade herd quality and size, and to purchase milk-holding equipment that preserves milk quality. Assembly operations, existing and new, need credit to upgrade/establish their facilities and to acquire refrigerated trucks to transport milk to processing plants. Processors may also wish to avail of credit to purchase refrigerated trucks. Such a credit program will provide a significant market for sale of U.S. manufactured equipment.

- **Animal Health and Reproduction.** A two-pronged approach is needed, namely, MALR capabilities should be upgraded, and a private sector capability should be fostered. Both would be assisted by changing MALR's policy of no/low cost provision of animal health products and artificial insemination to one of at least covering the full cost of materials used. Industry suppliers and knowledgeable MALR and private veterinarians should be used to train other veterinarians as trainers in disease prevention and treatment. The trained veterinarians would extend the knowledge and techniques they gain throughout MALR and to private sector veterinarians. Financial support and/or commodity credits could be used to fund herd upgrading through artificial insemination and importation of pregnant Holstein cattle and dual purpose breeding bulls.

- **Market Information.** Deficiencies in the system of collecting and disseminating market information to farmers should be identified and the existing system strengthened using Governorate MALR offices, producer associations, cooperatives, and other means to better disseminate information to farmers.

- **Support Industry Groups.** Producer associations, cooperatives, and industry associations have the potential to provide members of collective services, much like USAID is experiencing with its work in the horticulture sector. Many, however, need assistance in the basics of association management and in coming together as associations to procure products and services, lobby the GOE for needed changes in policies and regulations, and develop new services their members will use.

- **Extension.** Development and delivery of low-tech, low cost technology transfer packages, and training of extension agents in their delivery. These technology packages will make use of techniques already discovered by USAID's AgLink project, and projects of other donors. This activity should be modeled on the APRP program to take non-

traditional horticultural export crops to medium and smallholders, that is, it should involve dynamic producer associations and cooperatives, MALR Governorate extension officers, meat processors, and suppliers of animal health products.

Addressing cattle and buffalo milk issues requires an integrated approach to improve the entire sector—animal husbandry, on-farm quality, assembly, transportation, and processing. Specific issues include:

- **Extension.** In addition to the extension comment above, the dairy component of a strategic intervention should include technical assistance to compliment individual farmer who have taken project loans to improve herd quality and properly store milk. Suppliers, local assembly centers, producer associations, and cooperatives might provide this technical assistance.

- **Assembly.** Technical assistance should be provided to support assemblers that have taken project loans to improve and/or expand their operations, as well as to other processors that are simply looking for ways to improve their operations. Equipment suppliers can provide some of this assistance.

- **Processing.** Technical assistance should be provided to milk processors to improve operations, quality, and product offering.

USAID should address these issues in coordination with on-going donor livestock sector projects, both USAID and other donor funded. Generally these programs are limited to selected Govenornates, or have a limited scope of assistance provided. The opportunity for USAID is that of using limited resources to integrate strategically needed interventions to broaden and extend the reach of all donor projects working in livestock. This will result in a far more reaching project, and greater leverage in increasing sector efficiency, medium and smallholder income, and rural employment generation that will be the case if USAID designs a totally independent strategy.

CHAPTER FIVE
POLICY AND POLICY IMPLEMENTATION ISSUES CRITICAL TO EGYPTIAN AGRICULTURE

OVERVIEW

Egypt and its agricultural sector face a daunting array of policy and regulatory challenges. In a hierarchy of issues, those such as WTO Readiness and Exchange Rate Policy would probably rank highest. The reason is that they have or will have profound impacts on the economic performance of the entire nation. But other, narrower, issues are almost as important. Cotton Policy is a sectoral issue. But because Egypt has made little progress in this crop—which enjoys a clear competitive advantage—it needs to be continuously on USAID's radar, though not the object of a separate technical assistance-oriented program.

Policy reform and implementation in Egypt is a gradual process, but one that has seen important changes in the structure and operation of the agricultural sector. Egyptian agriculture is more responsive to domestic and international market forces, less constrained by GOE involvement in production and marketing decisions and more open to competition than ever before. Much of this progress is due to USAID's commitment to high quality policy analysis and constructive interaction with the government and private sector and detailed monitoring and evaluation. However, it is clear that policy constraints continue to inhibit Egypt from maximizing the comparative advantage that it has in most commodity systems. The task is not completed.

The environment in which policy reform and its implementation occur is changing rapidly in Egypt. We see several factors that account for this evolution. First, as Egypt becomes more integrated into the global economy, its policies must conform to compliance requirements of WTO and other trade agreements. Global competition also places a premium on policies that reduce production and marketing costs through efficient customs services, effective use of natural resources such as water and low cost production inputs. The growing role of the private sector is the most dramatic change affecting how policies are formulated and implemented. Business and trade associations, with significant assistance from USAID, are becoming a major force in the policy process. However, these associations are not yet capable of fulfilling this policy advocacy role entirely on their own. Finally, given this assessment's emphasis on fast growth in agriculture as a prerequisite for large increases in farm and rural non-farm employment, the lack of a policy focus on the productivity and competitiveness of smallholders is a serious shortcoming.

The principal policy and regulatory issues in this section are categorized as follows:

- **Macroececonomic** issues, including economic and trade policy, and exchange rate policy.

- **Sectoral** policies and regulations, such as practices that impede Cotton, horticulture, or other key sectors.
- **Institutional** issues, such as Customs and Agricultural Extension Services.
- **Infrastructure** issues, such as Transportation.
- **Natural Resources** issues, such as Land and Water.
- **Legal Issues** such as Land Tenure.

Space considerations dictate that the Team cannot provide a comprehensive catalog of all of these types of issues, or provide great detail on any of them. However, this section delineates the most important areas needing further attention.

MACROECONOMIC ISSUES

Trade Policy[22]

This section covers economic policy issues, encompassing trade policy, exchange rate policy, and sectoral policies and regulations. It cannot provide great detail on these topics, but attempts to delineate the most important areas needing further attention.

Background

Egypt is a party to several important trade agreements including WTO (the GATT agreement), the Egypt-EU agreement, COMESA, and the Arab Free Trade Agreement. In terms of importance for Egypt's trade and particularly agricultural trade, the WTO and Egypt-EU agreements are the most important.

The fundamental principles of the GATT agreement are as follows:

1) **Most favored nation (MFN) treatment**—All countries must be treated, with respect to trade terms and conditions the same as the most favored nation in trade; that is, all countries must have the same treatment.

2) **National treatment**—Nations must treat goods imported from any other WTO member the same as identical domestically produced products.

[22] This section draws heavily upon two APRP reports: "Trade Agreements and Issues Important for Egypt" by Wallace E. Tyner, December 1999, and "Agricultural Sector Readiness for WTO" by Edgar Arizanino (draft 2002).

3) **Reduction of trade barriers**—Each country in its offer was expected to agree to reduce trade barriers over a period of time.

4) **Tariffication of non-tariff barriers**—Countries were expected to eliminate non-tariff barriers such as quotas and convert them to tariffs, which would be reduced over time.

In addition to these four basic principles, there were important elements underlying the agreement:

1) **Transparency**—Countries were expected to publish their trade rules and regulations and make them easily accessible to trading partners. In addition, changes in rules were also to be handled in a transparent manner and communicated publicly. One mechanism that was established to accomplish this transparency was the WTO Trade Policy Review Mechanism (TPRM) under which member nations are supposed to notify the WTO of changes in policy.

2) **Consultation**—Countries are supposed to use informal and formal consultation to avoid formal dispute settlement procedures.

3) **Dispute resolution**—A set of procedures for dispute resolution were established.

4) **Special needs of developing countries**—Developing nations (including Egypt) are entitled to special and differential treatment (SDT), which usually translates to longer adjustment periods for certain provisions and recognition of special needs in other cases.

5) **Fair trade/competition**—The agreement specifies rules for application of anti-dumping and countervailing duties.

6) **Safeguard measures**—In the event of a rapid surge in imports, countries can be permitted to impose additional temporary duties if such a provision was included in their GATT offer. Also, there are a number of other types of safeguard provisions covering a wide range of conditions.

The Doha Round of WTO trade negotiations has been launched. Agriculture issues are center stage in these discussions, and Egypt is playing a major role as chair of the agriculture committee.

Egypt has had a preferential trade agreement with the E.U. since 1977, and has recently signed a new agreement. Four important guiding principles of the new agreement are as follows: 1) it cannot be less “free trade” than the previous agreement; 2) it cannot be less open and “free trade” than the general WTO agreement; 3) the aggregate monetary value of all quotas must result in equal treatment for all the Mediterranean countries; and 4) it cannot be in conflict with the Egypt-Arab free trade agreement. The E.U. has or is in the process of negotiating similar agreements with all the Mediterranean countries.

Generally, the new agreement permits Egyptian manufactured products (except textiles) in duty free. Egyptian duties on European manufactured goods are reduced on a time schedule that varies with the classification of the goods. In agriculture, the new agreement expands windows and quotas in some cases and adds some new agricultural products. In general, there are not major changes in the agreement for agriculture. There is, however, a provision, to re-open discussions three years after signing the agreement. The Egyptians hope at that point to be able to gain greater market access for some important Egyptian agricultural exports.

The rest of the trade section covers important trade issues that will be faced in future WTO, EU, and other trade negotiations.

Increased Market Access

Increased market access was perhaps the greatest demand of the developing countries in the GATT round and today is the greatest disappointment resulting from that round. Clearly, it will be very important for Egypt and other developing countries to gain greater market access in the current round. Egypt gained increased access in its EU trade agreement. In fact, Egypt generally does not come close to meeting its quotas for agricultural products into Europe. This is a two-sided coin—it illustrates the problems Egypt has encountered with delivering quality products into the EU market, and at the same time, it highlights potential for the future. Both the US and the EU make use of tariff rate quotas, meaning that up to some level, goods enter at no or low duty rates. But beyond that level, the duties can be prohibitive. Egypt also makes use of this mechanism to limit imports.

Textiles are a special case in that the Multi-Fiber Agreement (MFA) governing trade in textiles is scheduled to expire in 2005, and all existing quotas will be transformed into tariffs. Since Egypt at present is not close to reaching its quota level of exports into either the US or EU, this could mean it will be increasingly difficult for Egypt to compete with other textile exporting countries once the MFA expires.

Anti-Dumping Levies and Export Subsidies

Anti-dumping levies have been an important impediment to trade for developing and developed nations alike. The basic principle in the GATT agreement is that a member may not impose an anti-dumping duty unless it determines that there are dumped imports, material injury to a domestic industry, and a causal link between the dumped imports and the injury. Dumping is calculated based on a comparison between the price of the good in the country of origin or export and the export price (the price of the good in the importing country). If the export price is lower than the domestic price in the exporting country, after adjustments for transport, etc., then dumping can be deemed to have occurred. However, in principle, the other two conditions listed above also must hold for anti-dumping duties to be applied.

While the principles are clear, the calculation procedures leave lots of room for manipulation of the data. The U.S. has been particularly aggressive in application of anti-dumping duties. What is needed in this round of negotiations is a significant tightening of the rules for calculation of dumping and injury.

Egypt is in a precarious position regarding anti-dumping issues. While sometimes seen as tools used by developed countries (especially the US) against others, Egypt has recently been guilty of export subsidies that could in the future subject it to dumping claims. Egypt has used export subsidies for citrus, textiles, rice and other commodities. While Egypt claims the subsidies are WTO legal, this claim is dubious at best. Even with the generous and somewhat nebulous "safeguard" provisions in WTO, it is doubtful that Egypt's export subsidies would be deemed WTO legal. Nonetheless, some country would have to press the case for the issue to be raised, and that may not happen for political reasons.

SPS Regulations

Sanitary and phyto-sanitary (SPS) regulations are another contentious area in trade relations. Egypt believes (probably with just cause) that the EU has used SPS rules to keep out Egyptian potatoes when European production has been high. Clearly, Egypt needs to press for more scientifically based and more expeditious handling of SPS claims in the next WTO round. However, it is a two-way street, as Egypt in the past has used SPS rules to keep out foreign cotton and meat. Egypt must be prepared to apply SPS rules just as it would have other governments do so.

In some ways, the private sector is effectively setting the standards in the SPS arena for many products. Particularly in Europe, the supermarket chains are specifying not only the required characteristics for the final product, but also the processes (chemicals used, labor rules, packaging and handling, etc.) that must be used in the production and distribution process. Europe GAP (Good Agricultural Practices) has become the standard. Egyptian producers must be able to meet the private sector requirements if they are to be competitive in European markets.

Domestic Agricultural Subsidies

The developed world spends hundreds of billions annually in agricultural subsidies (mainly in the U.S. E.U., and Japan). This high level exists even given the limits that were placed on subsidies in the GATT round. Table 5-1 illustrates the subsidy level that prevailed in 1998-2000 in selected developed countries.

Table 5-1: Average Agricultural Support, 1998-2000 (US Dollars)

Nation	Per Farmer	Per Hectare
U.S.	20,803	120
E.U.	16,028	762
Australia	2,894	2
New Zealand	336	3
Canada	NR	51

Even with these high subsidy levels, the U.S. and E. U. are not currently in violation of their GATT agreements. Much of the subsidy payments are considered green or blue box and thus exempt, and the remainder that is amber box falls within the stipulated limits. Despite the legality of the payments, there is little doubt that the high subsidy levels have induced additional production, which has resulted in lower world prices for many commodities. So developing countries are entering the Doha round feeling that they did not achieve market access for their commodities and that they are being hammered by low commodity prices induced by these developed country subsidies. For Egypt, low world prices for rice and cotton have clearly hurt the value of exports of these commodities. On the other hand, low wheat and corn prices have reduced Egypt's import bill for these commodities. The lower world prices of these commodities have led to indirect protection of Egyptian farmers through domestic procurement prices higher than world prices.

State Trading

Efforts were made in the GATT round to significantly reduce or eliminate the role of state trading organizations. However, little happened, so reducing state trading is back on the agenda for the Doha round. Egypt makes heavy use of state trading on both the import and export sides. Wheat imports are handled by the state. Cotton and rice exports are managed by state owned or controlled organizations. Thus, if the developed counties are successful, Egypt will need to change significantly the way it handles trade in major agricultural commodities. No doubt, Egypt will resist, but the irony is that removal of these state trading organizations would probably be the best thing that could happen to improve the efficiency of the Egyptian agricultural commodity trading systems.

Intellectual Property Rights and Biotechnology

Egypt has yet to conform to the IPR requirements of the GATT agreement, which was due in January 2000. So called 'breeder's rights" legislation has been stalled in the legislature for two years. Egypt, with its rich supply of human capital in this area has much to gain from adoption of intellectual property rights protection. As of this writing, the general sense was that the legislation would be adopted this year such that IPR could become a reality in Egypt. Doing so could open the door to entry of more foreign seed companies and additional seed research and development in Egypt.

Transparency and Consultation

One of the greatest complaints of Egyptian exporters is the lack of transparency in EU trade regulations. Transparency was one of the guiding principals of GATT, but clearly, we have some distance to travel to achieve the needed transparency. Egypt will need to push for stronger rules enforcing transparency in import rules and duties in the Doha round.

Trade policy is clearly at the heart of an export oriented growth strategy. This section has summarized some of the major issues, but there are many more issues not only with the WTO round but also with bilateral negotiations with the U.S., AFTA, COMESA, and others. Trade policy analysis and reform must be a key component of a future reform program for the Egyptian economy and especially for the agricultural sector.

Exchange Rate Policy

Exchange rates are very important in determining the relative prices of imports and exports. Over the past year, Egypt has devalued its currency by a bit over 30 percent, from LE 3.40 per U.S. dollar to LE 4.50-4.60 per dollar. Because of this devaluation, imports are now about 30 percent more expensive in local currency and Egyptian exports are more competitive on world markets.

The extent to which exports respond to currency devaluation depends upon the price sensitivity (elasticity) of the export commodity. Oil exports may not be very price responsive (inelastic demand), particularly given the cartel oil marketing arrangement in which Egypt participates. But exports of agricultural commodities such as cotton, rice, horticultural crops, and textiles are all very price sensitive. Lower export prices (in foreign currency terms) should be a strong stimulus to export demand.

Also, because Egypt has such large currency inflows through foreign aid, its currency is appreciated over what it would be without the large inflows (a form of “Dutch disease”). Agriculture and other export sectors are hurt most by this currency appreciation.

Even though Egypt has devalued its currency over 30 percent, it may need to go further. The parallel market exchange rate ranges between LE 5 and 6, more recently closer to 6. An additional 25-30 percent devaluation would have a very positive impact on the competitive position of Egyptian exports. If Egypt is to succeed with an export oriented growth strategy, it cannot tax exports through an overvalued exchange rate.

Privatization and Competitiveness

One of the biggest general problem areas relates to slow progress in privatization of public sector companies. In several cases (see the wheat and rice sections below for illustrations), some initial progress was made in privatization of public companies. But progress stalled leaving the companies in a public/private limbo land. As market conditions changed, the

government felt compelled to intervene to aid the companies. Government aid has taken several forms (advantageous competitive regulations, processing subsidies, export subsidies, etc.), but has always led to greater distortions and to larger and more complex public sector entanglement in potentially private markets. These implementation problems have at best been quite costly and at worst yielded disastrous results. This failure to follow-through with privatization plans has had serious adverse impacts on Egyptian agriculture. In every sector there are competitiveness policy issues as well. Import taxes on inputs to export crops serve to render the export crops less competitive. For example, high import duties on refrigerated trucks and equipment increase costs of delivering quality horticultural products to market.

Poverty Alleviation

Poverty reduction is a major objective of almost every development agency. Yet in Egypt, the data on poverty is incredibly poor. The 2001 World Bank Country Assistance Strategy reports that poverty in Egypt is within the range of 22 to 48 percent of the population, with 7-10 percent of the population deemed to be ultra-poor. About two-thirds of the poor (and three-fourths of the ultra-poor) live in rural areas. The depth of poverty is estimated to be considerably worse in rural Upper Egypt.[23] To really understand who are the poor and how they can best be helped, we need much better data and analysis of that data. There is better information on who are the poor, where they are, etc. in most other developing countries than in Egypt. It will be important for much more complete analysis of poverty to be done, perhaps in coordination with other donors and the Poverty Reduction Strategy Paper (PRSP) process.

Natural Resources Policies

Land and Water Policy

Water is an immensely valuable resource in Egyptian agriculture. Yet, the value of water does not figure into farmer's cropping decisions because water is not priced. Many countries have political difficulty pricing water at its opportunity value. So an important policy issue is what other policy instruments might be available to move farmers towards decisions that are "consistent with" water pricing. For example, for many crops, the government establishes procurement prices. Clearly, to the extent procurement prices continue to be used, they could be instrumental in moving farmers towards cropping decisions reflecting a reasonable scarcity value for water. There might be other possibilities, such as taxes on pesticides particular to crops that use water inefficiently. The point is that much more analysis on policy alternatives to send water scarcity signals to farmers needs to be undertaken. The analysis could result in a menu of alternatives with the anticipated consequences of each alternative delineated.

[23] World Bank, Country Assistance Strategy for the Arab Republic of Egypt, June 2001, pp. 4-5.

Toshka

Toshka is a massive new lands project to which the Government of Egypt is fully committed. It will represent a substantial proportion of the new lands planned for the next decade or so. For that reason it is built into the production targets presented in this report. That occurs because the growth of cotton and horticulture area are roughly comparable to the net new lands planned and therefore the expansion in their area is not matched with decline in other crops. Of course that does not presume a precise match between the new lands and the specified area growth. The employment modeling does not take into account that the new lands tend to be distributed in much larger holdings and therefore to much higher income people than the old lands, and that consequently the employment multipliers to the rural non-farm economy will be lower.

Toshka will also take a significant proportion of the total water supply. The effect may be to tighten water supplies to the old lands and make improved water management more urgent than otherwise. Since evapo-transpiration rates will be even higher than the average for Egypt, efforts to conserve water through drip irrigation may be important.

Other issues that will arise with Toshka are the impact on horticultural production and exports from the smallholder old lands, the potentials for isolating short staple or other cotton varieties in this area to service the domestic textile industry, and land distribution policy.

Sectoral Policies and Regulations

Horticulture

Some of the policy issues important for horticulture have been mentioned earlier. In addition, following are other sector specific issues needing further attention:

- Privatization of the seed business is important, but it needs to be accomplished so as to assure that a competitive market will result. One way of assuring competition is to make sure the markets are open to international competition. Another is to create several competing firms. These alternatives need to be carefully evaluated.

- Seed registration needs to be streamlined. To the extent that it costs longer and is more expensive to bring seeds to market in Egypt compared with competing countries, the horticultural sector in Egypt is disadvantaged.

- Pesticide rules and regulations need to be examined to assure that competition exists and that Egyptian regulations ensure upholding the TRIPS agreements.

- There is a need for establishing a legal framework to promote contracting between small producers and horticultural marketers and exporters.

These issues are illustrative of the horticultural policy issues that have already or will emerge.

Cereals

Many of the issues in the cereals sector relate to government interventions in procurement, marketing, or milling. For wheat, much of the inefficiency is related to administering the subsidized baladi bread system. The decision to have a subsidized bread system is political, but doing it in such a way as to 1) provide maximum benefit to the targeted populations, 2) achieving the subsidy objectives at least cost, and 3) minimizing distortions elsewhere in the supply chain are economic issues that need to be addressed. There are some changes in the system that could be made to enhance achieving each of these three objectives, while maintaining the subsidy program. Our focus in future policy analysis in this area should be on examining the alternatives and their consequences. For example, wheat public sector mills compete with private sector mills in the fino flour market. The competition is not on a level playing field because of (sometimes hidden) subsidies received by the public companies. If the public sector mills were restricted to the baladi system, the private fino system could function efficiently for that supply chain. Also, the costs of the baladi system would be easier to track and control.

In the rice sector, public mills competing with private mills also pose a serious problem. In general, the mixed public private sector markets have not worked well because the public companies are not subject to the same rules and market disciplines as private companies. It will be very important in the future to either entirely privatize the public sector companies or to segregate the markets in which they operate.

Cotton

Egypt has considerable potential to increase cotton production and exports. Policy changes will be required to achieve that potential.[24] The most urgent reform needed is liberalization of the seed cotton market. Evaluation of the alternatives, sequencing, and consequences of this liberalization needs to be completed. Accompanying measures such as floor prices may be needed. Starting with ELS varieties may be prudent. Many other reforms are needed in the processing sector as well.

Livestock

Some of the policy issues related to livestock revolve around market information systems and quality control of blended feeds and feed ingredients. Public ownership or control of

[24] World Bank, *Arab Republic of Egypt: Toward Agricultural Competitiveness in the 21st Century—An Agricultural Export-Oriented Strategy*, December 2001.

slaughterhouses also is an impediment to progress in this area. Extension services also need to be improved.

This section has provided illustrations of policy issues for each of the topical and sub-sector areas. Many more policy issues exist and/or will arise. USAID work in policy analysis needs to be flexible to permit resources to be allocated to important issues as they emerge or as targets of reform opportunity arise.

Also, it is very important that whatever policy project is developed be designed in such a way as to permit substantial training of Egyptian policy analysts. It would be ideal to have a policy analysis unit attached to the Minister's office as the principal counterpart for any USAID policy project.

Institutional Issues

Customs

The private sector is virtually unanimous in identifying Customs as one of the most serious constraints to trade and investment. Their major complaints include:

1. The slow process of refund of the customs duties paid under the drawback system, used by exporters who use part of their imported materials to produced goods for export.

2. The high custom duties on capital goods imported for renovation and upgrading, not for initial star-up of production.

3. Outdated Customs Law 66 (1963).

4. Lack of transparency and procedural guidelines.

5. Customs duties levied on imported samples.

6. Lack of a proper mechanism to ensure that Egyptian commodities presented in trade fairs abroad are not subject to tariffs when they are returned to Egypt.

7. Lack of understanding of GATT requirements, particularly on valuation, and absence of training in these new procedures.

8. GOE Decrees not fully compliant with GATT.

9. Failure to introduce automation, risk management and post-clearance audit, which should involve all relevant agencies being linked electronically.

10. Focus on revenue-generation rather than national good, a change private sector leaders feel requires a fundamental change mindset to that of a service-oriented agency.

11. Failure to Introduce bonds and sureties and implement 20 percent immediate release of goods without inspection.

12. Tendency of Customs to view shippers' declarations as false rather than true.

13. Customs' frequent refusal to accept documentation from its own offices.

14. Customs' attitude that imports are a threat to the economy, rather than frequently a support for exports.

15. Systemic delays resulting in demurrage and storage costs that are paid in hard currency and add to the price of the goods and to the cost of doing business in Egypt.

16. Lack of a uniform—and uniformly applied—standards and testing system, impeding trade. For example, laboratories that are not accredited and do not provide up-to-date technology or timely services, leading to foodstuffs sometimes being kept at a port for 2-3 weeks because of a backlog at the few available laboratories.

17. Lack of links between different ports, with each port following its own system.

18. Customs' fear that automation will lead to a cutback in manpower and curtailment of corruption.

Customs officials tell the private sector they are working on solutions to all of the above issues. Following a recent seminar involving Customs officials, private sector representatives, and USAID, a senior USAID official said Customs should:

- Move away from extended post-arrival clearance procedures to a more streamlined system and post-import audit system;

- Introduce a pre-arrival clearance system;

- Remove conflicts of interest that exist in the inspection and arbitration processes;

- Incentives must be changed and improved to create a service-oriented system;

- Introduce practical solutions that are straightforward and transparent. As it is now there are no consistent and fixed procedures that are followed in all ports;

- Stop controls and procedures for exports; and

- Credit system needs to be reinvigorated with more funds made available for potential exporters.

While Customs remains a significant constraint to trade, there are some indications that its institutional mind-set is beginning to change. A prominent member of the Food Committee of the Federation of Egyptian Industries[25] (FEI)[26] senses a refreshing new receptivity on the part of the Commissioner of Customs and his senior staff to the need to change both attitudes and management and implementation procedures to improve Egypt's enabling environment. The FEI and many other private sector business support organizations report that they will continue to advocate for specific changes in dysfunctions listed above.

Agricultural Extension Service

Egypt's official agricultural extension system-based in several agencies of the Ministry of Agriculture and Land Reclamation, the cooperative movement and in certain other public sector agencies-has proven itself effective in getting technical innovations into the hands of Egypt's farmers and other rural producers. This work in both crop and livestock sectors has achieved notable results.

However, recent policy reforms in Egypt have begun to alter the face of the Egyptian countryside. Farmers now have the freedom to choose what to grow, how to grow it, and to whom to sell their crops. Market forces are taking hold, and new agribusinesses are emerging every day.

As the agricultural economy grows, specializes and becomes more export-oriented in this era of full market liberalization, stakeholders realize that they need information that MALR extension and research institutions and staff should provide. Many of these needs —market information, economic analysis of the returns to investment in specific cropping patterns or equipment, information about processing and storage, etc. —have not been available in the past from the state services.

Richer farmers can pay for these services from private agencies and have begun to do so. Many Egyptian agribusinesses hire international consultants when needed, and many more hire Egyptian expertise from the universities, the Agricultural Research Center or private sector agricultural service companies. However, medium-scale and small-scale farmers, many of whom provide (or wish to provide) export-grade production to processors, traders, packers and exporters, badly need support from public sector extension and research services.

The Agricultural Policy Reform Program has been working closely with the MALR to improve the provision of agricultural extension services and to define the role of the public sector research and extension in a liberal, private sector led, free market agricultural economy.

In its focus on research and extension reform in Egypt, APRP's work has passed through two distinct phases. First, APRP-RDI worked to define the new policy of government research

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[25] Tarek Tawfik, Chief Executive of Farm Frites, a major food exporting firm.
[26] The FEI is a government-sponsored multi-sector business association.

and extension services within the specifications of Tranche II. In its second phase, APRP has moved to implement this new policy in the pilot Governorates under Tranche III and Tranche IV.

Redefining the role of the public sector research and extension institutions is a major organizational change effort, and the success of this effort requires the active participation and support of all groups-from field extensionists and governmental officials to exporters, growers, and cooperative leaders. To ensure this active participation and support, representatives of all key groups have been involved in each of the phases of the reform project. This has entailed participation in meetings and workshops in Upper, Middle, and Lower Egypt as well as in Cairo. APRP has also worked with MALR research and extension agencies, as well as with rural organizations, cooperatives, and the private sector to implement the policies developed at these seminars in the pilot Governorates.

Agricultural Research

Slow agricultural growth, with food production rising more slowly than population growth, is a root cause of the economic and food deficit problems. To meet development objectives, Egypt must increase its food supply and exports, develop its human and institutional capacities, technology packages, delivery systems and physical infrastructure.

One solution for improving agricultural performance in Egypt lies largely in the transformation of its agriculture through effective National Agricultural Research System (NARS) capable of producing productivity enhancing technologies.

Rational use of suitable technologies could increase labor and land output, reduce production costs and improve agricultural productivity. Besides technologies, proper transformation requires production and marketing policy reforms, institutional and infrastructure restructuring, adequate inputs, and sound crop and livestock management.

The potential for increasing agricultural output in Egypt is great. Crop and livestock yields under farmers, conditions are markedly lower than results obtained from research trials. Agriculture is central to economic development, and agricultural research is needed to increase the productivity of the sector. The importance of agricultural research for sustainable agricultural development has been increasingly realized, together with the need for coherent policies to support and guide national agricultural research institutions (NARIs) as one element of NARS in Egypt.

Enhancing the research capacities of NARS requires combined, integrated and sustained interaction of all the elements involved in agricultural research planning, technology generation, adaptation and validation, transfer and utilization, including the active collaboration of policy-makers, educators, trainers, extension workers and the clients. Strong and effective NARS require sustained political will, support and commitment, linked with appropriate policies and research management, together with defined priorities, coherent objectives, qualified and motivated research scientists, trained technical support staff,

adequate research facilities, sustained adequate funding, effective coordination and intensified on-farm involvement. Almost all NARS in Egypt compete to satisfy these essential requirements. They all require to varying degrees, research capacity building and capacity improvement, particularly in human resources development, and the assessment of performance and impact as an ongoing requirement for institutional development. For sustainable agricultural growth and environmental protection, NARS must include research on natural resources management in the research agenda.

Biotechnology

Productivity increases and cost decreases are crucial to agricultural growth in Egypt. Both require continued attention to the development of cultivars that are particularly suited to the country's unique agro-ecology, production systems and land tenure situation. While conventional plant breeding has always one of Egypt's strengths, global competitiveness in modern agriculture necessitates the use of biotechnology as well. Agricultural biotechnology is a collection of scientific techniques, including genetic engineering, used to modify or improve plants, animals, and microorganisms. These techniques enable scientists to move genes (and therefore desirable traits) in ways they could not before, and with greater ease and precision

Genetic engineering was formally introduced in Egypt in 1989, when the National Agricultural Genetic Engineering Laboratory (NAGEL) was established within MALR, initially with UNDP support. Three years later the MALR authorized the foundation of the Agricultural Genetic Engineering Research Institute (AGERI), which is a discipline-oriented institute located institutionally and physically within the ARC.

Genetic engineering can be used constructively for many different purposes, but for Egypt arguably the most relevant applications are crop protection and improved tolerance to heat stress, drought and salinity. Crop protection applications are particularly important because repeated use on the same land and crops of high levels of herbicides, fungicides and pesticides has not only led to resistance within pests and diseases of economic importance, but also to high costs of production and high pre-harvest and post-harvest losses. Crop tolerance applications are also important because high cropping intensity has led to salinity and salt water intrusion in some production areas, and because Egypt's agricultural frontier can only be expanded by moving farther into the desert and/or by reclaiming degraded lands.

AGERI is already engaged in critical research in the areas of crop protection and tolerance, as the activities below indicate:

Virus Resistance

- Production of Transgenic Local Varieties of Squash Plants and Some Varieties of Melon Plants Resistant to Zucchini Yellow Mosaic Potyvirus (ZYMV)
- Developing Genetically Engineered Resistance to Potato Viruses

- Development of Improved Strategies for the Control of Faba Bean Necrotic Yellows Virus (FBNYV) in Food Legume Crops of West Asia & North Africa
- Engineering of Tomatoes to Induce Resistance to Tomato Yellow Leaf Curl Virus (TYLCV) from Egypt
- Whitefly Biotypes & Biotype Specific Transmission of Geminiviruses in Egypt & Arizona
- Development of Virus Resistance in Plants Using Ribosome-Inactivating Protein (RIP) Genes
- Production of Transgenic Banana Plants Resistant to Banana Bunchy Top Virus (BBTV) and/or Banana Cucumber Mosaic Cucumovirus (Banana-CMV)
- Establishment of a Regeneration & Transformation System in Cucumber

Insect Resistance

- Isolation & Identification of Bt Toxin Gene from Local Isolates in Egypt
- Development of Potato Tuber Moth Resistance in Potato
- Maize Transformation for Development of Stem Borer (Sesamia cretica) Resistance Using Bt Genes
- Production of Transgenic Egyptian Cotton Plants (Gossypium barbadense L.) Expressing Insecticidal Toxin Gene(s)
- Generation of Genetically Modified Baculoviruses for Insect Pest Control
- Development of Transgenic Insects Using Transposon Elements for Autocidal Pest Control
- Protein Engineering, an Efficient Approach for Controlling Viruliferous Whiteflies

Fungal Resistance

- Isolation & Characterization of Chitinase Gene as a Plant Defense Gene against Fungal Infection
- Genetic Variability within Fusarium oxysporum sp. lycopersici
- Genetic Characterization of Certain Ascochyta sp. Using Random Amplified Polymorphic DNA (RAPD)

Nematode Resistance

- Molecular Characterization & Identification of the Most Important Species of the Root-Knot Nematode (Meloidogyne spp.)

Stress Tolerance

- Characterization & Identification of Stress-Related Genes from Local Habitat in the North-West Coastal Region of Egypt
- Cotton Improvement for Heat & Salt Stress Tolerance
- Development of Transgenic Wheat with Improved Salt & Drought Tolerance
- Development of Transgenic Barley with Improved Tolerance to Abiotic Stress

AGERI is also involved in the breeding of Durum wheat for the Mediterranean Region using in vitro and genetic transformation tools, in genome mapping for rapeseed, in identifying linkage relationships of important trait loci in tomatoes, in the fingerprinting of elite maize lines using molecular markers, and in bio-molecular engineering.

Complementing the know-how of a core staff of some 25 senior scientists, some of whom hold joint appointments with universities, AGERI has developed constructive collaborative relationships with other international centers of excellence. For example, the work on potyvirus resistance in cucurbits is being carried out with MSA and Cornell. Research on managing resistance to potato tiller moth is conducted with Michigan State University. Work on development of geminivirus resistance in tomato is done with Scripps Research Institute. Research on whitefly biotypes and biotype-specific transmission of geminivirus is carried out along with the University of Arizona.

AGERI's facilities appear to be appropriate to its mission and objectives. They include:

- A central facility;
- 12 well-equipped laboratories;
- A BioComputing & Networks Unit;
- A preparation/washing facility;
- A supply and chemicals repository;
- Controlled environment chambers (140m2) and a conventional multispan fiberglass greenhouse (307m2) used to host the transgenic plant material for acclimatization;
- A new state-of-the-art containment facility (412m2) based upon a University of Arizona design and complying with the biosafety and EPA regulations, which will allow the safe handling of materials in experiments dealing with the degree of gene expression in transgenic plants; and
- An open field experimental station (1.5 acres of land) for field testing of genetically engineered plant material

Thanks to the human and physical infrastructure described above, AGERI seems to play a leadership role within Middle Eastern and North African agriculture, serving as promoter, facilitator or host for regional and international training events and workshops.

Recognizing the need to closely link biotech research and related support activities with its public and private stakeholders, while operating in a business-like manner appropriate to the biotech industry, in 1994 AGERI set up the Genetic Engineering Services Unit (GESU) as a commercial arm of the institute. GESU provides and sells reagents, kits and diagnostics produced by genetic engineering and molecular biology for agricultural production. For the public sector, it officially conducts seed quality control for the MALR Seed Registration and Certification Committee using molecular markers. GESU services offered to the private sector include: (a) production of elite germplasm via tissue culture; (b) production of diagnostic ELISA and PCR kits for detection of major phytopathogenic viruses; (c) protein fingerprinting using SDS-PAGE and Isozymes; (d) DNA fingerprinting using molecular markers; (e) custom analytical services; (f) custom oligonucleotide synthesis; (g) molecular

imaging; and (h) densitometric analysis. Items (a) and (b) are the most likely to be used frequently and routinely by commercial agriculturalists.

AGERI has declared that it considers collaboration with the private sector to be a high priority, and that it intends to keep the private sector fully informed of research and development in the field of genetic engineering and biotechnology in Egypt through: circulation of newsletters and reports; inviting representatives of the private sector to workshops and seminars; participation of the private sector in the design of products' research and development; and representation of the private sector in the governing board of AGERI. The assessment team did not have sufficient time or resources to corroborate this.

AGERI is also conscious of the both the need and the opportunity to generate a financial return from its research. With that in mind, two for-profit entities were set up in 1997 to commercialize AGERI biotech products. BIOGRO International S.A.E. was established in Cairo as an Egyptian stock company, while BIOGRO International, Incorporated was established as a Delaware corporation.

As an example of what might develop, scientists at AGERI and the University of Wyoming have been involved in collaborative research studies funded by USAID/Cairo for the past six years which involve Bacillus thuringiensis (Bt), a bacterium which kills insects. The research efforts led to the development of a biological pesticide, based on a highly potent strain of Bt called C-18 isolated in the Nile Delta. C-18 not only is extremely potent, it is effective against a broad range of insects represented by the orders Lepidoptera (moths), Coleoptera (beetles) and Diptera (mosquitoes) as well. An additional significant feature of C-18 is its capacity to kill nematodes. Research and development of C-18, carried out by the AGERI/Wyoming research teams, has led to the commercial development of this organism as a biopesticide to be manufactured and marketed as AGERIN, with potential sales worldwide.

In sum, biotechnology in general, and genetic engineering in particular, are advancing rapidly in Egypt. While it is too soon to judge impact, AGERI's vision, strategy, research agenda, and collaborative arrangements all seem to be on the mark in terms of relevance and appropriateness. While some of AGERI's research to date has already been funded by the U.S. Government through U.S.-Egypt Joint Science and Technology Board, and other efforts directly by USAID, the assessment team encourages USAID to continue to provide such support, possibly in greater amounts and possibly through an endowment that will provide more stability and long-term sustainability. If the latter cannot be established directly in the hands of the MALR or GOE, an alternate mechanism such as the seed association ESAS should be considered as the vehicle. Such an endowment should probably be kept separate from a competitive research fund for horticulture and other key industries, which would co-fund lower cost, non-biotech research activities that are not so strategic in nature as those described above.

Agricultural Marketing and Support Systems

APRP has made substantial progress in improving agricultural statistics in Egypt, but much more could be done. It is quite useful to have accurate area forecasts early in the season to better manage the available water. Improved market information systems also would be useful in the horticultural crops area.

Legal Issues

Land Tenure[27]

Historical Background. The two major political changes Egypt has experienced since the early 1950s have also had major economic and social impacts, particularly on the agricultural sector.

Prior to that time, Egyptian agriculture was characterized by a free market and private enterprise. In 1952, the GOE enacted the Agrarian Reform Law—as part of its transition to a planned economy. Among other impacts, this measure imposed a significant constraint on the private sector by limiting individual land ownership to a maximum of 200 feddans (later reduced even further). Its purpose was not to attack the principle of private ownership; the excess feddans were distributed to landless farmers. It was intended to curtail the political power of large landowners by weakening their economic base.

Prior to the land reform, about 0.1 percent of total owners (about 2.8 million) held about 20 percent of the land; at the other end of the spectrum, about 94 percent of the total owners held about 36 percent of the land. In 1965, at the highest end of the scale about 0.13 percent of total owners (3.2 million) held around 7 percent of the land, while at the lowest end about 95 percent of the total held 57 percent of the land.

This stage in land reform lasted until the late 1980s, with the beginnings of economic adjustment. The agricultural sector took the lead in these changes, and GOE intervention was eliminated by the mid-1980s.

According to the last agricultural census in 1990, total holdings reached 2.9 million, covering about 7.9 million feddans. Approximately 2 million owners (68 percent of total holdings) held 5.1 million feddans (65 percent of total lands), while 0.9 million (31 percent of total holdings) held about 1.8 million feddans (22 percent of total lands). According to these statistics, more than two-thirds of the total land area in 1990 was owned and cultivated by landlords, and only about 10 percent of the total area was rented (either for cash or through sharecropping).

[27] Based on a Vision Paper prepared by APRP, 2002.

Land reform increased the average size of small properties from 0.8 to 1.2 feddans in 1965 and to 2.7 feddans in 1990. The very large estates (which had covered about 20 percent of the area in 1952) disappeared, and the medium-size landowners retained their share of the cultivated area. However, the reform's aim was not to satisfy the land hunger of all tenants and landless workers. Rather, land reform sought limited improvements in the distribution of wealth and benefited the upper section of the low-income group.

Until recently, cooperatives and their associated credit banks displaced the private sector actors as suppliers of inputs and credit and became the major marketing channels for the most important crops. In the mid-1980s, when the agricultural sector started the liberalization process, the private sector again became the dominant force, displacing the GOE with regard to agricultural inputs. The Principal Bank for Development & Credit (PBDAC), however, is still the farmer's main source of credit.

Since 1952, the GOE has sought to address the problems of small landholdings and poverty through a series of land reforms, cooperative management pooled farms, public-sector investment in land reclamation, a program to maintain farmers' incomes through price intervention, and a special program for graduates. The objective of the graduate program is to give young poor people (i.e., the graduates) the opportunity to obtain their own land to cultivate. Subsidies and stipends are given to the graduates to support them in the first years of settlement, fulfilling one of the GOE's economic goals. But the land titling policy is not conducive to achieving the GOE's social goal, because the only benefits accruing to the graduates are those derived from cultivation. They are unable to achieve real economic gain because they do not have direct ownership of their resources. They are only slightly better off than farm laborers. And few of these measures have done much to resolve the problem of landless laborers.

Constraints. Despite significant reforms under the liberalization and privatization of Egypt's economy, the body of legislation regarding land distribution and titling is huge, with six formal laws, hundreds of decrees and regulations, and a regulatory framework governing reclamation, land allocation, and ownership of new lands. In addition, a large number of public agencies and authorities have law-enforcement authority, and ownership rules and procedures for distributing land vary from one law or decree to another. Thus, despite the substantial gains achieved by the GOE in land issues since the mid-1960s, land tenure and its associated issues remain a serious source of concern and confusion to the agricultural community, especially to small farmers.

For example:

- **Owner-Renter Agreements.** The standard one-year contract currently in force is inconsistent with the three-year crop rotation common in Egypt. To maintain soil fertility and ensure proper land use, the GOE should consider altering this contract to three years. In addition, monitoring the economics of crop production should be performed to establish indicative rental values in the different regions and for different cropping patterns. These non-binding and indicative rates would be used to guide both landlords and tenants

- **Valuation.** Rental values should be determined through market forces (i.e., supply and demand for agricultural land, as well as costs of other inputs and the value of production).

- **Absence of a Land Market.** Establishing a land market is necessary in the near future. The absence of such a mechanism acts as a serious constraint on investment and productivity. Formal land markets would operate in a free market economy based on supply and demand for agricultural land. Owners of land would have full property rights. Users, occupiers or tenants of old and new lands should be able to cultivate as they wish and owners buy, sell or rent land at will and at prices derived from free market conditions. Providing the basis for developing a land market is a necessary condition for an operating liberal economy. Farmers should be able to buy, sell or lease land. They should not be shackled to five feddans of land for years. They should be able to realize in land value that which results from a land market. Good farmers will be able to expand their holdings and generate productive employment for others.

- **Land Titling.** Two important factors that will continue to affect private-sector participation in increasing productivity are the current methods for distributing and granting title to land. Distributing land to those who can use it to achieve the highest returns, and permitting those who receive the land to possess title with full and unambiguous ownership will contribute in improving rates of return. Since 1964, creating a land title registry has been an important goal of the GOE. To do so, Egypt passed a law to convert land ownership records from the person-based "deed" recording system to a "parcel-based" title registration system. A Title Registration System (TRS) is currently preferred worldwide because it generally offers secure rights to landholders and reduces disputes and litigation over land. It also makes land transfers easier and cheaper and allows farmers to receive credit from both public and private lending institutions. Among many other benefits, possession of title would free up of billions of pounds of investment resources currently frozen because title is not given to farmers. The graduates and small landholders who have reclaimed land are among the poorest of Egypt. Yet they are not given the opportunity to fully exploit the land resources they farm.

A clear title through purchase of the land would provide low-income people with a real asset that they could use for their own economic benefit and would provide the basis for investments in the project areas. This could include small- and medium-scale agribusiness activities, land improvement, investment in permanent tree crops, and investment in other income- producing business.

- **The Cadastral System.** The cadastral system in Egypt is out of date. Mapping of land parcels is occurring, and attempts are being made to match individual pieces of land with owners. But the legal status of ownership is not well defined due to the reluctance of inherited individuals to correct their legal status on the land that they owned. Data from the ongoing RDI study on land tenure show that the inadequate cadastral system constrains the development of the land market. The current system is also inadequate as a base for assessing agricultural land tax.

- **Situation of the Graduates.** Land distribution and titling for the graduates' ownership is particularly prolonged and complicated. Ownership is granted to graduates only after payment of a nominal sum of money over a period of 30 years, with no provision for early settlement. Without the land title, many graduates are not free to sell or lease the land and are unable to obtain loans for investing in additional infrastructure or land improvements. The billions of pounds of assets frozen due to lack of title indeed has a depressive effect on the economy as a whole, representing a large loss of investment funds.

The USAID-funded APRP project has recommended three options for resolving the most serious problems among graduates:

- **Option 1:** Allow graduates to purchase the land outright for LE 3,330 when they take possession. Title is bestowed immediately.

- **Option 2:** Establish a program through a commercial bank to provide mortgages for graduates to purchase the land. Among other things, this would facilitate development of a land market.

- **Option 3:** Offer graduates the modified payment terms and title indicated above, but include some restrictions so that certain GOE objectives would be realized, i.e. farmers would be allowed to sell or lease their lands, but could not divide the parcels into pieces smaller than 2.5 feddans; land could only be used for agriculture, etc.

Infrastructure Issues

Transportation

The existing transportation system for all agricultural products is expensive. In addition, it results in significant loss of product and quality for horticultural products. Numerous improvements have been made in recent years in transporting produce to export markets, including increased availability of airfreight space, reduction of airfreight costs, development of sea-shipment capability for table grapes and strawberries, reduced transit time to northern EU markets with sea-truck transport using Italian Slovenian ports, increased refrigerated container availability, and more efficient port procedures. In addition, a new cold holding facility is being constructed at Cairo International Airport.

However, much remains to be accomplished if the transport system is to play its role in reducing costs and maintaining product for both export and domestic, horticultural and other agricultural products. This will require changes in GOE policy as well as industry changes to improve existing product handling and movement.

Constraints exist for all three modes of transport—land, sea, and air. They are listed below.

Land Transport

- Poor road conditions and roadside service facilities, resulting in high maintenance costs;
- A generally old truck fleet—both flat bed and refrigerated;
- High tariff on imported refrigerated trucks and refrigerated boxes (45 percent), in spite of a 1998 Parliamentary decree reducing the tariff to 5 percent;
- Restrictions on imports of truck over five years old;
- High tariff on imported tires (40 percent) and high cost/low quality of local recaps;
- High rates and lack of competition resulting from absence of a truck broker system adequate information on rates;
- Poorly trained drivers; and
- Egyptian and regional restrictions on cross-border trucking, specifically prohibition of back-haul loads.

As a result of these constraints, Egyptian trucking rates are very high, as much as 50 percent higher than in nearby countries. High operating costs give Egyptian truckers added inducement to overload flatbed trucks, which in the case of perishables, results in significant product loss, further damage to roads, and reduction in the number of flatbeds available to haul containers because they cannot be overloaded.

Sea Transport

- Poor port facilities for refrigerated containers on the Red Sea;
- Lengthy inspection procedures on imported container food shipments, thereby resulting in demurrage charges, interest charges on money tied up in inventories, need for larger container inventory, and port congestion; and
- Implementation of plans to privatize port services has been slow. Where this has happened (allowing foreign shipping agents), services and/or costs have improved.

These constraints result in reduced container availability (especially critical for fresh produce) and higher costs than would otherwise be incurred.

Air Transport

- Lack of adequate cold store facility at Cairo International Airport (should be corrected by December 2002) and no cold store facilities at other locations for horticultural product shipments (for example, Aswan, Luxor);
- Insufficient air cargo space and cargo handling equipment; and
- Lack of competition in cargo handling services resulting in high charges.

These constraints restrict opportunities for timely shipments to market, increase their cost, and create risks to product quality.

POLICY AND REGULATORY RECOMMENDATIONS

This section has provided illustrations of policy issues for each of the topical and sub-sector areas. Many more policy issues exist and/or will arise. USAID work in policy analysis needs to be flexible to permit resources to be allocated to important issues as they emerge or as targets of reform opportunity arise.

Foreign aid involvement in Egypt over the past two decades also evokes quite a range of emotions and assessments. In a recent analysis of Egyptian development, Weiss and Wurzel argue that Egypt's strategic position in Middle Eastern politics enabled aid flows and other special considerations that created an illusion of economic well-being that mitigated the need and pressure for fundamental economic reform.[28] In general, the authors condemn the entire history of international organization (World Bank, IMF) and bi-lateral donor aid as having been counter-productive.

Interestingly, the authors were relatively positive on the USAID Agricultural Policy Reform Project (APRP):[29]

> *"The US Agricultural Reform Policy Program is an example of effective aid linked to a strict conditionality."*
>
> *"... the USAID Agricultural Policy Reform Program is a comprehensive attempt to enforce a strict market approach to Egypt's agricultural sector. Significant changes have been achieved."*

The very important changes that have been achieved in the APRP project have been carefully documented elsewhere and do not need to be reiterated here.[30] The major point is that even some who are quite negative on Egyptian progress in general see very positive results from this project. Also, given the extremely difficult circumstances for the Egyptian economy following the events of 9-11, the comfort zone described by Weiss and Wurzel no longer exists, and Egypt may well be ready to move more aggressively on policy reform.

USAID and the Government of Egypt have a long and successful history of working together in agricultural policy. The current APRP project has achieved many successes, and Egypt has made significant progress in policy reforms related to agriculture. Despite the successes, there remains much to be done. There have also been problems in implementing some of the reforms that have been accepted.

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[28] Dieter Weiss and Ulrich Wurzel, *The Economics and Politics of Transition to an Open Market Economy: Egypt*, OECD, 1998.

[29] Weiss and Wurzel, p.198 and p. 164.

[30] ARD-Raise, "A Midterm Assessment of the Agricultural Policy Reform Program in Egypt," April 2000; Rollo Ehrich, "Assessment of the Impact of APRP on the Egyptian Agricultural Information System (draft)," November 2001; and "Gary Ender, Accomplishments in Agricultural Policy Reform in Egypt, 1997-2001 (draft)," March 2002.

APRP and to some extent the previous policy project operated through benchmarks/indicators negotiated with the Government of Egypt each year. According to Ender, about 80 percent of some 200 benchmarks/indicators were either met or exceeded, which is quite a strong success rate. Yet, anyone who works in Egypt knows that there are many remaining trade and domestic policy distortions that remain.

Recommendations

- USAID should orient Policy Reform, Implementation and Monitoring to focus on the policy priorities based on the strategy of stimulating fast growth agriculture as the means to increase smallholder income and rural non-farm employment.

- USAID should target policy activities on a select number of commodity systems (horticulture, smallholder livestock and cotton) and a manageable number of macro and cross cutting issues (exchange rates, water policy, WTO and trade agreements). Policy reforms in macro-economic areas, such as exchange rates and cross cutting issues, such as water should be coordinated with other USAID offices to reinforce USAID influence.

- Building on USAID's efforts to monitor and verify policy implementation, additional efforts should be made to ensure that implementation occurs at operational levels in commodity systems. Continued support to trade associations in their policy role is one promising way to focus attention on the execution of policy reforms.

- USAID should make a concerted effort to transfer policy analysis capabilities to Egyptian institutions, public and private, over the next five years. The progress of trade associations holds promise as one element of this strategy. However, by their nature these groups are not disinterested, objective sources of policy advice. Neither is the MALR. Other institutional options should be examined.

Future Policy Analysis

In the future, policy analysis will be needed in several areas to help the move to a more market oriented economy and to support productivity enhancing technical assistance in other areas such as horticulture. The needed analyses can be classified along either topical or commodity lines. We propose a matrix of topical and commodity issues, which is illustrated in Table 5-2.

Table 5-2: Policy Matrix by Topic and Commodity

Topic	Commodities			
	Horticultural Products	Cereals	Cotton	Livestock
Trade and exchange rate policy				
Agricultural marketing and support systems				
Natural resources policies				
Privatization and competitiveness				
Poverty alleviation				
Institutional issues				
Legal issues				
Infrastructure policy				

A policy project designed to enhance capability to increase productivity, economic growth, and employment would need to cover at least these areas. In the sections above, we described analysis that will be needed for each of the cells in this matrix.

Also, it is very important that whatever policy project is developed be designed in such a way as to permit substantial training of Egyptian policy analysts. It would be ideal to have a policy analysis unit attached to the Minister's office as the principal counterpart for any USAID policy project.

CHAPTER SIX
THE ROLES OF THE PRIVATE AND PUBLIC SECTORS

PUBLIC-PRIVATE COOPERATION—KEY TO AGRICULTURAL PROGRESS

With agriculture contributing some 17 per cent of Egypt's GDP, and a far higher percentage of its employment, the sector is an important component of the country's economy. In a globalized future, Egypt's ability to maintain and grow agriculture's contribution to the economy will depend increasingly on improved public-private cooperation. The reason is that the public sector is the principal, though not the only, determinant of the enabling environment for private sector trade and investment.

The experiences of USAID-funded activities such as APRP, ALEB, HEIA and ATUT demonstrate that public-private cooperation can be achieved. However, USAID and other donor project experiences also demonstrate the difficulties involved in forging lasting public-private relationships that not only help formulate new policy and other initiatives but, equally important, work together to ensure that these initiatives are actually implemented. How well prepared are the private and public sectors today to meet the economic growth challenges facing Egyptian agriculture?

Egypt's Private Sector

Historical Background

Prior to the mid-1950s, Egypt had a robust private sector. Trade and business associations existed and were influential in effecting changes in government policy and its implementation. However, during the 1960s and beyond there was an ideological sea-change in Egypt's political, social and economic environment. Impacts on business were widespread. The Federation of Egyptian Industries (FEI) and its industry chambers of commerce were nationalized. With this act, the private sector became near invisible. It chose to keep a low collective profile and use personal relationships to achieve its business objectives. This was the beginning of the "crony capitalism" that characterized this period—and whose legacy continues to act as a constraint to Egypt's growth and development.

It was only in the early 1990s that this situation began to change. This was largely as a result of the economic restructuring and structural adjustment program instituted with the support of the International Monetary Fund (IMF).

It was at that point that the Government of Egypt (GOE) began positioning the private sector as a vehicle for change. The GOE realized that the private sector could be a tool to increase the global competitiveness of Egyptian firms. The subsequent public-private dialogue contributed to the private sector's conviction that there was an urgent need collectively to

participate with government in policy reform measures and the removal of constraints to economic growth.

The Critical Role of Business Associations

Historically, business associations have played a vital role in Egypt's economic growth. Earlier in this century, the lobbying efforts of the Federation of Egyptian Industries (FEI) did much to establish a positive policy environment for economic growth. In 1926, the four-year-old FEI and other private sector groups successfully advocated for a national policy granting preferential trade advantages for the textile industry.

During the past few years, there has been a dramatic proliferation of private sector business support organizations. These include both general business organizations and sector-specific trade associations. These groups have grown both in numbers and in sophistication over a relatively short time. This trend is ongoing. Today, business support organizations are working with increasing efficiency with government entities and with donor-supported projects designed to strengthen organizations of this type. As these business associations development of Egyptian agriculture and the enabling environment in which it operates.

The principal reason is that member-driven, well-organized associations are one of the best mechanisms to:

- Continuously scan the legal, regulatory, competitive environment at home and abroad, thus helping the sector to better anticipate and manage both internal and external threats and opportunities;
- Anticipate and disseminate the meaning and benefits of technology change;
- Manage crises, such as pesticide-related detentions of exported products, food contamination or plant quarantine problems;
- Identify critical policy issues, and play a lead role in analysis, consensus-building, and advocacy;
- Conduct generic promotion of commodities and product groups of interest in target markets;
- Stimulate or sponsor collaborative research; and
- Provide central services such as training, buyer contacts, information, competitive intelligence, fora for policy discussions, opportunities to network within and outside the industry, product quality certifications, and mentoring.

Associations in the Agriculture-Agribusiness Sector

While Egyptian private sector trade associations in the agricultural sector are still in their infancy, over the past few years they have shown rapid growth,[31] not only in numbers but also in the sophistication of the techniques they utilize. For example, some of these embryonic institutions have been among the first in Egypt to adopt a "backward and forward linkages" approach to membership and advocacy. These associations have recognized the potential value of including in their activities firms that supply raw materials, inputs, equipment or ancillary services, as well as those that purchase the resulting products. This technique of expanding association membership to a broader set of economic actors appears to be increasing the power of collective action.

Other associations have begun to prepare policy agendas and policy analyses that form the basis of their representations to Government. In many instances, these initiatives have been undertaken in collaboration with projects funded by USAID and other donors. In some instances, this triangular collaboration between associations, donor projects and the GOE has resulted in significant improvements in the enabling environment for agriculture.

Some of these associations and their experiences are described below.

Egyptian Seed Association (ESAS). ESAS has approximately 140 members, including 50 that are seed producing companies, with the balance divided among seed distributors or representatives of multinational seed companies, traders, plant breeders, and suppliers or support service companies.

The experience of ESAS provides an example of successful collaboration between a private sector association, a USAID-funded project, and the GOE.

When the Agricultural Policy Reform Program (APRP) started five years ago, it recognized that reliable seed of appropriate crop varieties was critical to agricultural development. APRP undertook an assessment of the situation in the seed sector and compared it with what a dynamic and efficient seed sector should look like.

The assessment revealed a seed sector that was still dominated by public sector production. The government produced 90 percent of all seeds of self-pollinating crops, wheat, rice, and faba bean. Mandatory registration of new varieties was expensive and time consuming and considered a barrier to introducing new varieties. It typically took over three years to get a registration approved. There was no clear procedure for licensing to the private sector varieties developed by ARC. The government viewed private seed companies with suspicion and dialogue was limited.

[31] Growth in the number and diversity of associations in the agricultural sector can be judged from the list included in Annex. These represent associations that attended a round-table discussion convened by the Team Leader of the Agriculture Sector Assessment Team.

ESAS, then a small one-year-old group of private seed companies, shared APRP's vision of a competitive private seed industry and was ready to enter into a dialogue with Government to achieve it. The APRP-ESAS partnership took a number of initiatives. For example:

- APRP worked with the leaders of ESAS to define a Mission statement and a strategic plan. This participatory process defined the objectives of ESAS.

- APRP helped the membership of ESAS to define its policy and regulatory reform agenda. This involved identifying and prioritizing the policy and regulatory bottlenecks members felt were most pressing. This established an agenda for action. It listed the regulations that needed to be changed, analyzed each regulatory bottleneck, and identified the advocacy tools that could be used to effect changes.

- APRP supplied an expert in the maize seed industry to work with members of ESAS to review the Egyptian maize seed industry and recommend policy changes. Joint studies were conducted of the market for seeds of wheat, maize and rice; policies of the ARC for releasing new varieties; problems of mandatory registration, regulations prohibiting the screening of new varieties, and legalization of plant variety protection. Each study led to regulatory reform recommendations.

- The partnership then developed an advocacy campaign. This usually involved meetings with key officials, development of draft regulations for consideration, and workshops to facilitate dialogue between ESAS and government officials. Sometimes the recommendations led to benchmarks—written agreements between the government of Egypt and USAID—to undertake certain key reforms. The clout of the benchmark, combined with the advocacy work of ESAS, was often (but not always) successful in achieving change.

- The APRP/GOE/ESAS collaboration has resulted in both policy reforms and institutional strengthening.

Reforms

- New variety release policy;
- Quicker registration of new varieties of vegetables;
- Legalization of variety screening; and
- Draft plant variety protection legislation.

Institutional Strengthening

- ESAS has become part of the institutional landscape for seed policy.

- It has gained a place at the table with government during seed policy discussions, and a place in the People's Assembly when discussing seed law.

- It has become a source for training, internal quality control, and international business contacts.

- It provides a place to discuss public-private partnership in research and development, particularly in biotechnology.

Today, more than twenty private companies produce seeds of wheat, rice and faba, supplying over 30 percent of the market. Fifteen private companies produce maize seed, covering 80 percent of the market. Six private companies now own their own seed processing plants and many have created their own distribution networks. Screening of new vegetable varieties has been legalized and the cost and time it takes to register a new vegetable variety has been cut in half. At least one company is exporting high value hybrid vegetable seed to Europe.

Horticulture Export Improvement Association (HEIA). HEIA was established in conjunction with the ATUT project, which has provided direct technical and financial exports. HEIA members handle the vast majority of fresh fruit and vegetable exports. HEIA is composed of more than 150 exporters of fresh horticultural products, and is currently expanding into processed food

HEIA has numerous objectives and programs, but the overarching mission is to improve the capacity of Egyptian exporters to export high quality horticultural products. HEIA has a quality control staff that offers direct technical assistance to member grower/shippers, but also assists non-member producers that wish to sell to HEIA members.

HEIA has an active policy advocacy committee. HEIA highlights policy constraints in its newsletter, and as several HEIA members also belong to the ACC, policy issues are brought to the attention of the Minister of Foreign Trade during regularly scheduled monthly meetings. One noteworthy example of advocacy involved HEIA's effort to establish a perishables terminal at Cairo. In early 2000, shortly after HEIA signed a contract with GOE allowing HEIA to design, build, and operate the terminal, GOE abruptly cancelled the contract. HEIA and the ACC quickly arranged a meeting to publicize the cancellation and invited print and TV reporters, and members of the People's Assembly. The perishables terminal is now under construction.

HEIA’s members are primarily growers. Yet suppliers of such inputs as insecticides, fertilizers, seeds, and packaging materials now represent approximately 12 per cent of the membership; and providers of services such as transportation, freight forwarding, and cold storage facilities, constitute an additional four percent of members.

The association has organized itself by commodity groupings, i.e. there are Councils for table grapes, strawberries, melons, nurseries, green beans, and cut flowers. The participation of suppliers and service providers serves to strengthen each of these groups. The councils frequently invite service providers and suppliers—whether or not they are HEIA members—to their meetings. The objective is to collectively negotiate lower prices and improved quality for services and inputs.

This approach has been successful in a number of instances. For example:

- The Cut Flower Council was able to buy cartons for export by collective purchasing.
- The Mango Council applied the same principal in negotiating with the Ministry of Agriculture to collectively import new varieties from nurseries abroad at lower prices than they were paying the same nurseries as individual buyers.
- Other Councils have had similar experiences in collective buying of insecticides and fertilizers.
- Better deals were reached with transportation companies providing refrigerated containers for international shipment of table grapes, green beans, and strawberries.
- This system of collective leveraging also helped when HEIA was advocating the construction of the perishable Terminal in Cairo Airport Transit Area. HEIA approached Egypt Air to seek out means of constructing a cooling terminal at Cairo Airport. Egypt Air in turn suggested that talks be held with the Ministry of Economy and the Airport Authority. Once the association and the airline company presented the issue, the Ministry agreed that HEIA could proceed with the project under a 15-year BOT ("Build Operate, Transfer").

Although HEIA's interactions with the GOE are, by definition, sometimes adversarial, they are more often based on cooperation. For example, HEIA is currently providing training for 600 agronomists of the MALR's Extension Service in eight Governorates. The objective is to upgrade the horticultural knowledge of MALR personnel to enable them to share new information to the small growers in their regions. The project also includes Study Tours for small growers and non-HEIA members from Upper Egypt. These small growers visit the farms of HEIA members who are implementing new technologies.

Crop Life Egypt. Crop Life Egypt (CLE) is made up of importers and distributors of pesticides and agro-chemicals. The members represent multinational pesticide producers in Egypt; e.g., Bayer, Rhone Poulanc, Sengenta. CLE's objectives are to achieve a transparent and fair system of pesticide registration and import licensing. The association is active in advocating for policy change. CLE regularly participates in APRP and GTZ/CSPP workshops related to the pesticide industry, and has been a strong supporter of the APRP/CSPP pesticide dealer certification program.

The thorough product testing that a proper registration system requires is critical for maintaining a supply of safe and effective pesticides for Egyptian farmers. Multinationals with large R&D budgets for new product development have financial interest in registration that prevents imports of low-cost, unsafe and/or ineffective pesticides. Import licenses of registered products are granted annually by MALR. CLE members are concerned about the lack of transparency in the process that often results in arbitrary volume allocations to CLE members, GOE entities (El Bourse and the military-operated formulators), and the five largest Egyptian formulators.

Egyptian Association of Traders of Seeds and Agricultural Pesticides (EATSAP). EATSAP is a small association of that offers representation for the approximate 4,000 pesticide dealers in Egypt. The association's objectives are to improve the business environment for pesticide dealers. Though EATSAP is earnest in its desire to advocate for policy change, it lacks the organizational structure, and has a small base of members relative to the size of the industry, to make it an effective tool for policy change. Nonetheless, EATSAP has energetically participated with ARPR and CSPP in an ongoing certification program for dealers.

Egyptian Agribusiness Association (EAGA). EAGA is using a similar approach to enhance the competitiveness of the food industry and to build membership. The core founders of EAGA are involved in the food processing business, but the founders also included several service companies involved in packaging as well as shipping and growing, i.e., owners of large farms that are supplying food processing companies or are exporting fresh produce themselves right now. EAGA has 140 members.

Inviting non-food processing companies or their CEOs to join EAGA is helping to build both backward and forward linkages. The founders of EAGA decided to open the doors to all complementary firms, especially bigger companies as well as owners of large farms. The food processing members are Full Members, and can serve on the Board in order to ensure that the services developed will go first to the core industry members EAGA also allows in non-food companies as "associate, non-voting members" to help them improve the quality of Egypt's processed foods.

Egyptian Milk Producers Association (EMPA). The Egyptian Milk Producers Association (EMPA) was founded in 1998 to improve and promote milk production in Egypt by improving performance and productivity.

EMPA'S dairy farmer members have a linkage with the milk processors (forward linkage) and EMPA or EMPC its 'sister' organization, the Egyptian Milk Producers Company, has relationships (backward linkages) with many suppliers, to facilitate commercial trading between dairy farmers and suppliers.

Egyptian Cold Chain Association. ECCA, founded in December 2001, is dedicated to raising awareness of the need to bring perishable foods from grower to consumer in one continuous cold chain. The fledgling organization has signed a cooperation agreement with the International Association of Refrigerated Warehouses, and is preparing a strategic plan for presentation this month. ECCA received initial help from ALEB and will work with APRP on policy issues.

Egyptian Exporters Association (EEA/Expolink). EEA/ExpoLink is a general private-sector export promotion organization that receives substantial funding from USAID. It serves a number of industrial and service sectors designated as part of USAID's Growth Through Globalization project. These include agriculture and agribusiness. Services have in the past focused heavily on taking Egyptian companies to international trade fairs, and providing

technical assistance to prepare these companies to become exhibitors. It has done little in policy advocacy, though its new strategic plan calls for an ambitious program in this area. Nor until recently has EEA been aggressive in building membership. Agriculture, moreover, does not appear to be a priority sector for EEA. For all these reasons, the Team believes that the organization might better deploy its resources in support of the many other sectors for which it is responsible.

Exclusivity: A Clear and Present Danger

Some associations, after having been started by the larger firms in their respective sub-sectors, appear to have limited their membership to firms of this size. Others can be faulted for failing to aggressively pursue new members. Yet the unique advantage of an association is the size and variety of the constituency it can mobilize. Moreover, if agriculture is to grow and become more competitive, associations will need to develop services menus that benefit smaller players as well as larger ones. Associations have an enormous potential to help smallholders—through policy advocacy, transfer of technologies, dissemination of best agricultural practices, and provision of market and price information. Reaching smaller producers is difficult because of their numbers, their locations, and their more limited ability to pay. And it is made more difficult by the limited resources of most Egyptian associations. Yet relatively modest amounts of donor funding could be of enormous help in expanding association membership to those who arguably need the most help, the small farmer. Associations should not fall into the trap of appearing to be merely group versions of the individual "crony capitalism" that has constrained Egypt's growth in the past. Associations must not only pursue new, smaller members but must also give them a voice in association affairs and decisions.

USAID Strategy

To sustain and accelerate private sector organizations, USAID has developed a strategy to encourage and strengthen associations as well as continuing to provide assistance to individual firms—some 786 this year alone. All of this assistance is, in various ways, designed to enhance the global competitiveness of Egyptian industry and agriculture, company by company. Helping companies collectively is complimentary to helping them individually. USAID is well aware of the potential power of collective leveraging of an industry's resources, as opposed to the tradition of individual companies making individual representations to individual government officials—often on a personal basis.

As of this date, USAID has made direct grants to the Horticultural Export Industry Association (HEIA), the Egyptian Exporters Association (EEA/ExpoLink), and CARE's pilot project with small farmers in Upper Egypt. It has also created an association component—Business Association Strengthening Activity (BASA)—within its NGO Support Center. BASA provides small grants and training to associations.

Interventions by USAID-funded Projects

As noted in the APRP/ESAS partnership explained above, USAID-funded projects have played key roles in the formation and development of associations in the agriculture sector. For example, the ATUT Project (Agricultural Technology and Utilization Transfer) was instrumental in founding and mentoring the Horticultural Export Industry Association (HEIA), now a recipient of USAID funding in its own right. The ALEB Project (Agriculture Led Export Business Activity) has actively worked with a number of associations, and has played a seminal role in the creation of EAGA—the Egyptian Agribusiness Association—the first organization of its kind in recent Egyptian history. The USAID-funded AgLink Project has worked closely with associations representing milk and meat producers. As noted earlier, USAID is also funding the BASA program within its NGO Support Center.

Association Sustainability

In an emerging country setting, the issue of the long-term sustainability of trade and business associations remains problematic. Association success depends largely on their ability to accurately identify and communicate with their larger constituencies regarding perceived needs, and their capacity to develop and deliver a menu of services that member companies will see as valuable and will be prepared to pay for. Yet it is unlikely that Egypt's associations will achieve full sustainability—100 percent self-financing—in the near term. There are three reasons.

First, the industries they represent are nascent. Secondly, they need to stimulate new entrants who will not be willing or able to pay before they succeed as businesses. Thirdly, there is a time lag between the provision of help and the realization of benefits. From the very start, associations must be cost-conscious and strive to attain reasonable levels of cost recovery, but during their formative years private associations often perform development functions that might be done by government in other contexts. Donor support to fill in the "development gap" is usually a good investment because of the externalities that the organization of a vibrant private sector usually generates.

Other Forms of Collective Action

Associations are only one of the mechanisms open to the private sector to exert influence. As the private sector itself matures, we would expect individual businesses with kindred goals or interests to combine in an ad hoc manner to achieve a specific objective. This is, in fact, happening already with firms that are receiving help from USAID-funded projects. Transferring this mode of combination to the policy advocacy arena can be a relatively small step. Moreover, there are many opportunities for the private sector to work with other stakeholders. For example, either associations or groups of individual companies could make far more effective use of the Egyptian academic community. Members of that community bring both analytical expertise and increased credibility. Many would be interested in

consulting arrangements to prepare policy analyses, options for solutions, strategic plans, or research into how other countries have solved or approached a particular problem or issue.

NGOs, while legally not "associations" in Egypt, share some characteristics with associations. For example, both types of organization are not-for-profit, and both depend largely on voluntary contributions and participation. NGOs are already making significant contributions to agricultural development (see Section II, USAID Interventions in Agriculture). Since NGO's can often serve as cost-effective mechanisms for delivering resources to local groups with which they have an on-going relationship, in the future USAID should be encouraged to make even greater use of these gifted organizations.

USAID's Administrative Problems

Associations, NGOs and other small organizations often require relatively small amounts of money. From USAID's point of view, processing a $20 million contract requires as much paperwork as processing a $20,000 grant. USAID does not have the resources to take on this administrative burden. One solution to the problem would be a larger-scale program with authority to make relatively modest grants to smaller associations and NGOs. Criteria, benchmarks and checks and balances will need to be developed.

Cooperatives, Farmer Associations and NGOs

Cooperatives in Egypt are largely moribund. Though no longer "controlled" by the GOE, the government's stamp nevertheless remains on most of the older cooperatives. Yet this form of voluntary organization has been of significant value in other countries. Cooperatives can become the vehicles through which technology and best practices can be effectively transferred, especially to smaller farmers. They can reduce production costs through group purchasing, as some associations are already doing. They can engage in economic activities such as packing, cooling and processing that raise member incomes. And they can learn the skills of group marketing to reach the critical quantity necessary to meet larger-scale competition.

Because of the GOE's long history of control of cooperatives, some producers at the village or regional level have formed Farmers' Associations. These groups are attempting to perform many of the services of cooperatives. But they also have the effect of imposing yet another layer of institutional hierarchy on an already confusing patchwork.

In the case of cooperatives, if the GOE would simply "get out of the way," this would allow farmers at the village level to organize their own cooperatives, and encourage associations and larger-scale USAID-funded projects to provide ongoing assistance. The effective cooperative could be a meaningful tool for agriculture in Egypt.

The CARE pilot project in Upper Egypt has adopted yet another strategy. It has organized mini-NGOs at the village or regional levels. These fledgling organizations are intended to

replicate CARE itself, and by so doing reach greater numbers of small producers. USAID should be encouraged to monitor this creative approach in the future.

The experience of another NGO, Africare, is described below.

Small Farmer Export Production and Marketing in Wadi el Saayda-Africare. Africare has been working with small farmers in the Wadi el Saayda area near Edfu in Upper Egypt since 1997. The first phase of the Wadi el Saayda Project ("Assistance to the New Settlers in Wadi el Saayda") was funded by USAID at $3.2 million over the period 1998-2000. The present project, ("Small Farmer Export Production and Marketing in Wadi el Saayda"), has been funded by the GOE through the APRP Cash Transfer for $1.2 million over the 2000-2003 period. Its goal is to develop the capacity of the small farmers in Wadi el Saayda to produce and successfully market high quality horticultural crops for export and domestic markets.

Wadi Saayda comprises 28,000 feddans of formerly desert land. The GOE has invested approximately LE 300 million in irrigation infrastructure. It is the first of several desert land reclamation sites in Upper Egypt, and offers six feddans and jobs to 4,000 settlers (3,000 landless and 1,000 graduates). When completely settled and under cultivation, Wadi Saayda will increase total irrigable land by 20 percent in Aswan Governorate.

With the assistance of Africare, small farmers in Wadi el Saayda have become successful producers of high value horticultural crops for the export and domestic wholesale markets. The project has introduced two horticultural crops, Gallia Ideal melons and Paulesta variety green beans. Melons have been exported to the UK, while beans were exported to Italy. Domestic markets are also important. The major portion of each season's production is sold in wholesale markets throughout Egypt, predominantly in the El Obour outside Cairo, Aswan, Alexandria, Luxor, Kom Ombo and Edfu. Joint research trials in green bean and melons were undertaken with the USAID-funded Agricultural Technology Utilization and Transfer Project (ATUT). Five different planting dates and crop varieties trials were undertaken

The Public Sector

Ministries in the Government of Egypt have earned the unenviable reputation of being overstaffed, poorly managed, suspicious of the private sector, and hesitant to rise to the challenges of globalization. Much of this is a legacy of the politics of the past, and much of it is doubtless true.

Examples, during the recent past alone, are plentiful. The GOE has been slow to prepare itself for the WTO. It has enacted decrees that have remained unimplemented for years. It has unnecessarily placed roadblocks in the path of the private sector. Its Customs Service is notorious for failure to expedite exports and for applying import policies that add significantly to domestic production costs.

Nevertheless, there are things only Government can do and actions only Government can take. Moreover, there have been encouraging signs that change is occurring, albeit slowly. Over the past five years, various GOE Ministries have worked successfully with the private sector through APRP, other donor projects, and private sector associations. The GOE's working relationship with APRP has been based on benchmarks for accomplishment agreed to by both parties, and by cash transfers that are made when a benchmark is achieved. APRP, however, is coming to an end. Whether the GOE would continue to be enthusiastic about policy reform were cash transfers to end is problematic.

However, if cash transfers are still to be included in a new policy program, the Team recommends that these triggered less by issuance of decrees and more by measuring execution of policies and regulations.

Following are some of the key areas affecting agriculture most and in which the GOE should strive to achieve significant improvements:

- **Customs.** The Customs service has been explored in a previous section. Its reform is one of the keys to agricultural (and other) economic growth in Egypt.

- **Extension Service.** The MALR currently has some 6,000 extension agents and subject-matter specialists. The overwhelming consensus among those interviewed by the Assessment Team is that the staff of this service is poorly informed, inefficiently organized, underpaid, and—on occasion—corrupt. Numerous credible individuals contacted by the Assessment Team have reported that extensionists often have private clients "on the side", and make their most valuable new information available only to these private clients, rather than to their entire constituencies.

On the other hand, USAID-funded projects, business support organizations, and NGOs have been working with extensionists in a number of ways, primarily centered around "on-the-job" upgrading of their skills and delivery methods. Some are provided with modest stipends to cover their transportation costs. In many instances, extension agents have been found to be enthusiastic to learn, to improve, and to provide better services to their clients.

The Assessment Team recommends a four-pronged approach to upgrading the Extension service. First, the MALR must be prepared to devise more effective management systems to ensure that the Extension Service is empowered to share the MALR's expertise and information on a continuous and timely basis. Second, the MALR should be receptive to developing and delivering ongoing world-class training to extensionists and subject matter specialists. Third, associations, USAID projects, and NGOs should expand their work with staff members of the Extension service. Fourth, a benchmarking system should be developed by the private sector entities working with extensionists, and this should continue to include modest incentive payments to individual extensionists who meet pre-agreed goals.

RECOMMENDATIONS—PRIVATE SECTOR

- USAID should reaffirm and expand its support for a diverse mix of legitimate, relevant private sector organizations, whether simply informal networks at the start, or formal associations later on.

- Most associations in Egypt continue to require intensive and on-going training in virtually every aspect of association management, fund-raising program and service menu development.

- Associations should be required to make cash-or-kind contributions to their own development. Members of the Board should play a leadership role in fund-raising in this area.

- Associations need to learn how to define policy areas critical to their industry, to analyze policy and technical issues, to arrive at a member consensus regarding a policy agenda, and to make professional and credible presentations to appropriate constituencies and policy-makers.

- Associations need to develop mechanisms to continuously monitor progress toward adoption and/or implementation of the reforms for which they are advocating.

- Some associations need help in becoming more transparent, more democratic and more inclusive.

- Boards of Directors of Associations need additional training to better understand the requirements of corporate governance and oversight, and the distinctions between governance and executive management.

- There is a need for an association-coordinating group of some kind—either formal or informal—to help ensure that collective action can be optimized and that Ministries and other constituencies are not inundated in more advocacy efforts than they can reasonably consider.

- Associations should continue to represent the views of the backward and forward linkages in their supply chain, rather than only their particular link in the chain.

- Associations—and their individual members—should explore new forms of collaboration and, in particular, should make greater use of the academic community.

- USAID should consider making financial and technical resources available to private associations, probably on a matching and competitive grant basis, so that they can contract out policy analysis, applied research and industry promotional services

RECOMMENDATIONS—PUBLIC SECTOR

- The GOE must demonstrate the determination and political will to clean up the Customs Service. This is perhaps one of the most important initiatives to reduce real costs and thus help to increase competitiveness.

- The GOE has already demonstrated its capacity and willingness to work closely with USAID-funded projects in the policy area. This has helped change its perception of the private sector as its natural enemy. This work needs to be expanded, including but not limited to the policy area.

- The GOE needs to continue to work on a wide range of priority policy issues, notably its readiness for the WTO and exchange rate policy (see Chapter Five).

- The Extension Service is both a management problem and a financial problem. The management problem is improving the access of the Extension Service, at ground level, to the vast reservoir of knowledge and information in the MALR and other GOE Ministries, and better equipping extensionists to deliver high quality service and advice to their intended customers. The financial problem is how to compensate extensionists who do their jobs well. The key to the latter challenge may well be increased cooperation with private sector entities, resulting in de factco privatization of parts of the Service.

- The absence of an Intellectual Property Law has been a major constraint to growth in agricultural investment. The measure currently in Parliament should go far toward solving this problem, but the ingrained behavior of individuals toward intellectual property also requires the government's attention. This is partly an enforcement issue, partly an education issue.

CHAPTER SEVEN
RECOMMENDED AREAS FOR FUTURE USAID INTERVENTION

DISCUSSION OF ALTERNATIVE STRATEGIES

Finding just the right mix of investment options is always difficult whether it is an individual designing her investment portfolio or a donor choosing where to allocate scarce development resources. Parallel to the individual's decision, the donor decision must be made taking into consideration what are the development objectives, what degree of risk can be tolerated, what opportunities exist, etc. In this analysis, we have identified three priority areas for USAID investment:

Improved policy analysis and implementation. There are many areas in the Egyptian agricultural and food system where improved policy will have a tremendous impact on the efficiency of the system and therefore on the rate of growth and job creation in the sector and in linked sectors.

Horticultural production for domestic and export markets. There is considerable potential for increasing small farmer income and rural job creation through increased productivity and diversification of domestic crops produced primarily for domestic consumption. Also, Egypt clearly has a comparative and competitive advantage in horticultural production. With values of water use exceeding 1 LE per cubic meter (ten times the value of water use in sugar production), horticultural production makes good use of scarce water resources. To achieve the potential of the sector there must be improvements in technology, increased efficiencies in the supply chain, and changes in policies related to the sector.

Smallholder livestock production and distribution. There is considerable potential for increased productivity in livestock production in Egypt. To realize the gains will require better extension of knowledge on existing production systems plus adaptive research on improving livestock productivity under Egyptian conditions. Also, policy reforms in the supply chain for livestock products will be needed.

These areas differ in many respects, specifically what we will call target population, risk factors, and impact on economic growth, poverty reduction, and job creation. Table 7-1 summarizes the differences among the areas.

Table 7-1: Differences Among Recommended USAID Intervention Areas

Intervention Area	Target Population	Risk Factors	Impact on Growth, Poverty Reduction, and Job Creation
Policy	▪ Depends upon the scope of the policy project ▪ Likely to have fairly broad impacts touching horticulture, cereals, livestock, cotton, and other areas	▪ Project can only be successful if the GOE is willing to seriously consider and implement policy reforms	▪ In many cases, it will be difficult to measure precisely direct impact, but evaluations can be done both ex post and ex ante on the impact of policy changes
Horticulture: Traditional crops primarily for the domestic market	▪ Hundreds of thousands of small farmers who grow traditional crops	▪ Income growth is necessary for continued growth in domestic market ▪ Must develop effective technology transfer methods for small farmers	▪ Growth achieved through increased and more diversified hort production
Horticulture: non-traditional crops primarily for export	▪ Fairly narrow target population consisting initially of larger growers and traders ▪ May be potential to expand activity to smaller producers through associations and cooperatives	▪ Access to the European market will be critical ▪ Egyptian producers and marketers must be willing and able to meet European market quality standards	▪ The greatest economic growth potential exists in this area, as value added is quite high ▪ Job creation in field and packing house labor ▪ Depending on the scale and location of production, poverty reduction could be lower than other areas
Small-holder Livestock	▪ Target population is the large number (and widely distributed) of farmers, including many women, who produce livestock products as part of their farm output ▪ Also the rest of the supply chain (and ultimately consumers) would be impacted by project activities	▪ Success depends upon being able to render the extension system more effective and to produce adaptive research that meets the needs of Egyptian producers	▪ Enhanced farm income (and poverty reduction) through productivity gains in livestock production, but potential gains are not as high as for horticulture ▪ Increased incomes are more widely dispersed ▪ Potential gains for women who engage in livestock production

So what we have tried to do in creating this set of recommendations for USAID is to develop a balanced portfolio that achieves significant and widespread economic growth and job creation. The components of the package are designed to achieve a balance among poverty reduction and pure economic growth objectives as well as sufficient diversification so that the total portfolio would achieve gains even if parts of it are not successful. For example, if Europe does not open its horticultural markets or if the Egyptian producers cannot meet the quality standards, the traditional domestic project components could still succeed. Thus, the

recommendations from this analysis provide great opportunities to achieve USAID's objectives while at the same time provide diversification and balance to the package.

Of course, USAID could decide it wants to create a different package. For example, if it deems the risks of success in smallholder livestock to be too great, it could choose to put all its resources in policy and horticulture. Or if it decides that the growth impacts from horticulture are likely to be too concentrated, it could limit this component to activities essential to preserve the gains already made and ensure sustainability of the sector. Or USAID could determine that the Egyptian government is not interested in policy reform or developing policy analysis capability and allocate its resources to the other two areas. The point is that any number of scenarios could be developed as combinations of different weights on the three areas identified in this analysis as priority areas.

In this analysis we have provided our assessment of the impacts and potential gains to be had from investments in each of these areas. It is up to USAID and the GOE to determine what mix of these activities best meet their overall objectives. The team's assessment is that the priorities should be policy, horticulture, and livestock in that order.

This section presents a summary of the areas the Assessment Team recommends for future USAID intervention. First, the Team believes the Mission should:

REAFFIRM COMMITMENT TO AGRICULTURAL DEVELOPMENT

It should do so by designing programs based on five key elements:

1. Increasing agricultural incomes to stimulate increased rural non-farm employment.

2. Improving the productivity and competitiveness of smallholders to achieve increased incomes.

3. Broadening current horticultural export programs to build up domestic horticulture's competitiveness and better link it with exports and integrate the fresh and processed segments of the industry.

4. Improving the smallholder livestock sector as a means to increase agricultural incomes, especially for women who dominate this sector.

5. Targeting policy reform and implementation linked to the achievements of points 1-4.

The programmatic implications of these five elements suggest that USAID should:

CONTINUE POLICY REFORM AND IMPLEMENTATION ACTIVITIES

The environment in which policy reform and its implementation occur is changing rapidly in Egypt. Several factors account for this evolution. First, as Egypt becomes more integrated into the global economy, its policies must conform to compliance requirements of WTO and other trade agreements. Global competition also places a premium on policies that reduce production and marketing costs through efficient customs services, effective use of natural resources such as water and lower cost production inputs. The growing role of the private sector is the most dramatic change affecting how policies are formulated and implemented. Business and trade associations, with significant assistance from USAID, are becoming a major force in the policy process. However, these associations are not yet capable of fulfilling this policy advocacy role entirely on their own. Finally, given this assessment's emphasis on fast growth in agriculture as a prerequisite for large increases in farm and rural non-farm employment, the lack of a policy focus on the productivity and competitiveness of smallholders is a serious shortcoming.

Given this context, the Team has identified a set of policy issues in descending order of priority. USAID need not create separate programs to address these issues. However, the Assessment Team suggests that USAID needs to continuously monitor—and, on occasion, intervene with the GOE—regarding:

- Policies that seriously constrain the productivity and competitiveness of agriculture, as well as other sectors of the Egyptian economy. Exchange rate policy, reform of the Customs Service and the reduction of State involvement in trading are the top three issues.

- Policies that have impacts on agriculture as a whole or multiple commodity systems. Water policy is the most significant.

- Policies that affect the productivity and competitiveness of specific commodity systems. Current cotton policies create major distortions in this system and deserve USAID's continued engagement. Other significant policies include the importation and registration of cultivars in horticulture and sanitary standards in livestock.

To achieve these objectives, the Assessment Team recommends that:

- USAID should orient Policy Reform, Implementation and Monitoring to focus on the policy priorities based on the strategy of stimulating fast growth agriculture as the means to increase smallholder income and rural non-farm employment.

- USAID should target policy activities on a select number of commodity systems (horticulture, smallholder livestock and cotton) and a manageable number of macro and cross cutting issues such as WTO readiness, exchange rate policy, water and land management, transport, land tenure and a number of others.

- Policy reforms in macro-economic areas, such as exchange rates and cross cutting issues such as water should be coordinated with other USAID offices to reinforce USAID influence.

- Building on USAID's efforts to monitor and verify policy implementation, additional efforts should be made to ensure that implementation occurs at operational levels in commodity systems. Continued support to trade associations in their policy role is one promising way to focus attention on the execution of policy reforms.

- USAID should make a concerted effort to transfer policy analysis capabilities to Egyptian institutions, public and private, over the next five years. The progress of trade associations holds promise as one element of this strategy. However, by their nature these groups are not disinterested, objective sources of policy advice. Neither is the MALR. Other institutional options should be examined.

Continue and Broaden Support for the Horticulture Sector

Interventions should encompass both domestic and export, and traditional, non-traditional, and new product and market opportunities simultaneously. In the NTAE sub-sector, USAID's assistance should focus on solidifying the success of products already in the system, adding value through innovation, introducing and commercializing new products, incorporating small- and medium-holder participation where feasible.

In the traditional sub-sector, USAID's assistance should focus on developing and delivering appropriate technologies for production and post-harvest handling using innovative private and public-sector delivery mechanisms, and also on improvements in the domestic distribution and marketing systems.

For processed horticultural products, emphasis should be given to introducing seeds and Good Agricultural Practices tailored to the needs of processors, while reinforcing supply relationships between contract growers and the processing companies.

Develop a Substantial Technical Assistance Program in the Livestock Sector

- This program should cover the full supply chain, with its first priority to the smallholder milk production sector and its associated meat production.

- Special emphasis should be placed on private sector growth and development in marketing, including chilling plants, and production services from mixed feeds to veterinary services.

- Given the already dominant role of women in this sub-sector special effort must be made to enable them to expand their livestock enterprises through access to credit, advisory services, and other mechanisms.

- The USAID processed food project has found export potential for specialty dairy products, particularly to the Gulf States. There should be an interaction of that project with this recommended program.

CONTINUE SUPPORT FOR PROCESSED FOODS AND AGRICULTURAL PRODUCTS

- Over the last several years, the Egyptian food processing industry has expanded exports significantly, assisted by USAID's ALEB project. The sense of the industry seems to be that the best opportunities for the future will lie in the Gulf, in the EU and to a lesser extent in the Former Soviet Union and COMESA countries.

- In the more mature Gulf countries, especially Saudi Arabia because it has invested so much in the same industry, the provision of ingredients in bulk form may actually hold more promise than incremental increases in finished, consumer-oriented items

- Regarding processing technologies, freezing and dehydrating seem to hold more promise than traditional canning, which has become extremely sensitive to scale and unit costs.

- Potatoes in frozen form are often mentioned as a winner. Once the strawberry production volume rises enough, and IQF capacity is installed, IQF strawberries are likely to be an important new product as well.

- Among dried and dehydrated products, onions are probably the most important commodity, but potato flakes are also likely to be important. Since the grape varieties used in Egypt are different than those used in the US, it may be possible to export golden raisins to the US as well.

- Tomato production is large and important to Egypt. Therefore, it would make sense to mount a major effort to make the processed tomato industry more competitive as well. This will require efforts on all fronts, starting with varieties, cultural and handling practices to ensure high processing yields and food safety even where small farmers are involved as suppliers.

- Since Egypt has such a large population, of which a reasonable proportion is middle class or above, and since the tourist trade is so important, there are certainly growth opportunities in the substitution of imports in major hotels and in developing more value-added products and presentations. If the proper investments are made, Egypt could become a major supplier of fresh cut produce to the Gulf States and possibly even the Southern Mediterranean.

- As 2005 approaches, Egypt’s suppliers will also be trying to open the Egyptian market. Time is short to upgrade and make the entire industry more competitive.

CONTINUE TO SUPPORT THE DEVELOPMENT OF PRIVATE SECTOR TRADE ASSOCIATIONS AND NGOS

The success of agriculture in Egypt's future will depend increasingly on improved public-private cooperation. The experiences of USAID-funded activities such as APRP, ALEB, HEIA and ATUT demonstrate that this is an achievable goal. However, USAID and other donor project experiences also demonstrate the difficulties involved in forging lasting public-private relationships that not only help formulate new policy and other initiatives but, equally important, work together to ensure that these initiatives are actually implemented. Private sector business support associations and non-governmental organizations have already demonstrated that they have the will and, in an increasing number of cases, the capacity to work with Government to effect positive change.

However, as USAID considers its future options, the Assessment Team believes it should factor the following factors into its consideration:

- Most associations in Egypt continue to require intensive and on-going training in virtually every aspect of association management, fund-raising and program development.

- Associations require financial support, often on a very modest scale. This could be achieved if a larger USAID project had a grant-making authority. This would also relieve USAID of the administrative burden of processing small grants. However, associations should be required to make reasonable cash-or-kind contributions to their own development. Members of the Boards of Directors of these associations should play a leadership role in this area.

- Associations need to learn how to analyze policy and technical issues and to make professional and credible presentations to appropriate constituencies. Associations could make far more extensive use of the academic community in Egypt.

- Associations need to develop mechanisms to continuously monitor progress toward adoption and/or implementation of the reforms for which they are advocating.

- Some associations need help in becoming more transparent, more democratic and more inclusive.

- Boards of Directors of Associations need additional training to better understand the requirements of corporate governance and oversight, and the distinctions between governance and executive management.

- There may be a need for an association-coordinating group of some kind—either formal or informal—to help ensure that collective action can be optimized and that Ministries and other constituencies are not inundated in more advocacy efforts than they can consider carefully.

- Associations should continue to represent the views of the backward and forward linkages in their supply chain, rather than only their own sector or sub-sector.

ANNEX A

HORTICULTURE

Historical & Projected ATUT Client Production Capability

Note: Projections for ATUT clients. Export potential refers to the volume of the total

	Actual					Estimates		
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2007**	**2012**
STRAWBERRY								
Producing Area (fed)	460	475	485	655	1,015	1,200	2,500	5,000
Gross Yield	3,700	5,200	6,300	9,200	16,200	19,200	45,000	90,000
Export Potential (MT)								
-Europe	600	600	600	800	1,300	2,900	12,600	33,800
-Gulf	1,100	1,400	1,500	2,100	2,900	6,700	18,900	33,700
-Total	**1,700**	**2,000**	**2,100**	**2,900**	**4,200**	**9,600**	**31,500**	**67,500**
TABLE GRAPE								
Producing Area (fed)	520	730	1,109	1,152	1,704	2,142	5,066	2,600
Gross Yield (MT)	2,600	4,000	5,000	6,300	8,500	9,600	30,400	57,000
Export Potential (MT)								
-Europe	1,100	1,800	2,700	4,600	5,600	6,700	19,400	41,000
-Gulf	700	800	900	1,200	1,000	1,000	4,900	4,600
-Total	**1,800**	**2,600**	**3,600**	**5,800**	**6,600**	**7,700**	**24,300**	**45,600**
FINE GREEN BEAN								
Producing Area (fed)	-	-	100	1,100	1,205	3,000	7,000	11,000
Gross Yield (MT)	-	-	Trial	12,500	19,000	66,600	148,800	297,000
Export Potential (MT)	-	-	-					
-Europe	-	-	-	4,300	12,300	42,400	93,800	200,500
-Gulf	-	-	-	-	-	-	10,400	22,300
-Total	**-**	**-**	**-**	**4,300**	**12,300**	**42,400**	**104,200**	**222,800**
Cut Flowers								
Producing Area (fed)	-	-	-	-	84	151	600	2,000
Gross yields (stems mm)	-	-	-	-	23,500	52,100	246,000	960,000
Export potential (stems mm)								
-Europe	-	-	-	-	10,500	31,700	157,200	673,900
-Gulf	-	-	-	-	600	1,500	17,400	74,900
-Total	**-**	**-**	**-**	**-**	**11,100**	**33,200**	**174,600**	**748,800**

crop that meets the quality requirements of the markets. It has no relations to actual market volume requirements.
Source: ATUT, unpublished, February 11, 2002 projections.

Farm Revenue & Expense Data

Table 1. Strawberries - Without Nursery

Revenue	LE/Feddan
Export Product	47,200
Domestic Product	9,000
Total	56,200
Expenses *	
Royalty / transplants	14,120
Land & preparation	1,570
Fumigation	4,666
Fertilizer	1,700
Irrigation & Fertigation	3,966
Tunnel & Beehives	4,200
Pest & Diseases Control	1,120
Harvest	3,746
Tools	340
Total	35,428
Profit	20,772

* Excludes capital investment and depreciation of irrigation system, interest and rent.
Source: ATUT – Unpublished estimates March 2002.

TABLE 2. FINE GREEN BEANS

Revenues	LE / Feddan
Export Product	5,200
Domestic Product	675
Total	5,875
Expenses *	
Land Preparation	100
Seeding	750
Fertilizers	1,630
Weed Control	60
Pest & Diseases Control	290
Irrigation	170
Harvest	648
Tools	340
Transport	150
Total	4,138
Profit	1,737

* Excludes capital investment and depreciation of irrigation system, interest, and rent.
Source: ATUT – Unpublished estimates, March 2002.

Table 3. Atriplex Cut Flowers

	LE/Feddan
REVENUE	36,894
Expenses *	
Seed	920
Supplies (netting, poles, tools)	2,270
Growing costs	7,038
Harvesting costs	4,876
Total	15,104
PROFIT	21,790

* Excludes capital investment and depreciation of irrigation equipment, interest, and rent.
Source: ATUT – unpublished estimates, February 12, 2002

TABLE 4. REVENUE AND COST COMPARISON, SELECTED CROPS

	Maize	Valley Potato	Bobby Bean	Rice	Wheat	New Lands Potato	Fava Bean	Cotton	Fine Bean
LE / Kg									
Total Revenue	0.53	0.70	0.70	0.66	0.83	0.98	1.29	2.53	2.00
Expenses *									
Seed	0.04	0.17	0.13	0.02	0.04	0.12	0.05	0.06	0.15
Fertilizers	0.09	0.05	0.07	0.05	0.07	0.10	0.05	0.21	0.15
Pesticides	0.02	0.01	0.04	0.01	0.02	0.04	0.05	0.28	0.06
Mechanization	0.06	0.03	0.01	0.09	0.12	0.02	0.09	0.19	0.03
Hired Labors	0.09	0.04	0.04	0.07	0.09	0.04	0.10	0.67	0.14
Total	0.29	0.30	0.28	0.25	0.34	0.32	0.34	1.41	0.54

Gross Margin	0.24	0.40	0.42	0.42	0.49	0.66	0.94	1.12	1.46

*Excludes capital investment and depreciation for irrigation system, interest, and rent.
Expenses and Gross margin may not add due to rounding.
Source: APRP Report No. 106 “Horticulture Competitiveness Study: Green Bean and Potatoes”, February 2000

Comments on Trade Discrepancies

Research on trade data turned up discrepancies between GOE, Faostat, and ATUT client records. In these instances we made judgments on which data to use based on cross-data comparisons and interviews with knowledgeable people in the industry. Information on the inconsistencies we encountered follow.

TABLE GRAPE

Issue: Table grape export volume

Available data:

	1997	1998	1999	2000	2001
	Metric tons				
Faostat	498	507	451	1,875	NA
ATUT (clients)	1,800	2,600	3,600	5,800	6,600
GOE Quarantine					6,060*

* Estimate based on actual exports through November.

Decision: Use ATUT client reported shipments. It is more consistent with Quarantine data.

STRAWBERRY

Issue: Strawberry export volume

Available data:

	1997	1998	1999	2000	2001
	Metric tons				
Faostat	600	727	854	338	NA
ATUT (clients)	1,700	2,000	2,100	2,900	4,200
GOE Quarantine					6,117*

*Estimate based on actual exports through November

Decision: Use ATUT client reported volumes. Difference between ATUT client and Quarantine reported data may be that ATUT clients report on a crop year basis, while Quarantine reports on a calendar year basis. This may not explain the entire difference and indicates the possible exports by growers/shippers who are not working with ATUT. If this is the case, the data used may be lower than actual, but is not of sufficient size to be relevant to the conclusions drawn.

Selected Import Data

Table 1. EU-15 and Gulf States Table Grape and Strawberry Imports, 1990-2000

Year	Table Grape			Strawberry	
	EU-15	Gulf States		EU-15	Gulf States
	Metric tons				
1990	166,451	55,298		27,312	1,195
1991	194,859	53,353		39,248	969
1992	219,878	70,016		25,461	4,913
1993	209,590	68,434		27,045	7,340
1994	230,701	75,810		25,932	3,851
1995	228,253	76,146		30,069	1,488
1996	228,644	77,763		24,729	3,104
1997	240,469	72,850		28,494	1,058
1998	260,985	72,662		27,176	1,550
1999	309,854	61,013		30,424	1,628
2000	337,867	61,139		36,338	1,631

Source: Faostat

Table 2. EU Imports of Fresh Grapes, 1999, MTs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SOUTH AFRICA	18,721	20,978	25,987	16,732	11,952	8,802	1,251	15	4		455	6,879
CHILE	2,313	12,391	25,710	20,106	12,289	2,754	894	272	852		231	745
TURKEY	118		20			25	518	8,064	11,633	12,669	8,124	1,021
USA	32	23	8	30	844	1,133	219	961	1,102	3,753	6,118	2,567
ARGENTINA	1,888	3,620	3,772	2,000	1,006	74						642
INDIA			147	5,634	3,817	230	32				9	
ISRAEL				1	397	3,302	3,561	364				
BRAZIL	347	26	10	83	861	821	934	48			896	2,291
AUSTRIA	17	126	57	33	2	4	1	510	1,262	1,321	556	559
CYPRUS						181	3,290	417	13			
MEXICO	0				1,325	2,004	419			9	7	
EGYPT					8	1,810	729	2				1
FINLAND	77	199	346	337	243	131	1	1				
NAMIBIA	646	39	21	15							165	252
PERU	53	12									419	604
MOROCCO						136	640	16				
AUSTRALIA		5	8	285	308	36	39					
Other	46	76	166	201	4	164	121	118	635	73	48	84
Total	**24,258**	**37,495**	**56,252**	**45,457**	**33,056**	**21,607**	**12,649**	**10,788**	**15,501**	**17,825**	**17,028**	**15,645**

Source: Eurostat

Table 3. EU Imports of Fresh Grapes, 2000, MTs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
South Africa	19,039	32,617	30,504	19,419	10,445	1,259	102	4	52	1	492	10,267
Chile	3,475	11,204	27,566	18,442	15,087	5,882	536	134	27		68	157
Turkey	115	1					811	10,560	13,684	17,111	6,362	2,678
Argentina	4,323	7,462	5,768	2,064	799	59	48				1	272
USA	34		218		1,016	1,346	483	1,231	1,177	4,973	6,142	1,371
India			336	4,816	3,950	260	22		38		23	4
Brazil	314	57	1	27	751	1,277	530	50		2	1,164	3,469
Israel					5	2,090	4,213	305				
Austria	358	1,073			1		140	146	339	1,376	521	1,148
Mexico					444	3,381	279	5				4
Cyprus						41	2,141	1,136	312			
Egypt					1	1,776	1,697	93				
Namibia	373	89	8								162	1,193
Australia		2	30	588	744	29						1
Peru	87	18	30								508	639
Morocco				7	20	479	485	15	:			
Sweden	3	1	35	9	371	3	44	54	13	11	11	48
Finland				13	349	10	5			8		
Saudi Arabia						24	4	35	203	59	54	
Hungary								116	109	67	49	
Other	36	1	186	29	26	187	0	31	60	24	94	21
Total	**28,157**	**52,525**	**64,682**	**45,414**	**34,009**	**18,103**	**11,540**	**13,915**	**16,014**	**23,632**	**15,651**	**21,272**

Source: Eurostat

Table 4. EU Monthly Imports of Strawberries, 1998

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
POLAND	0	0	47	0	0	10198	1852	215	483	20	20	0
MOROCCO	400	1467	3780	837	368	50	0	0	0	0	0	299
UNITED STATES	136	61	36	22	19	553	978	418	638	448	36	26
ISRAEL	215	211	23	0	0	0	0	0	0	0	44	382
ROMANIA	0	0	0	0	0	792	0	0	1	21	1	0
AUSTRIA	0	8	18	16	6	107	113	110	103	1	1	1
NORWAY	0	0	0	0	0	0	186	250	2	0	0	0
EGYPT	123	96	10	0	0	0	0	0	0	0	13	146
SWEDEN	0	0	0	3	13	225	38	18	0	0	0	0
KENYA	1	7	8	8	0	1	15	36	15	19	27	48
MEXICO	39	2	0	0	0	0	0	0	0	3	37	104
AUSTRALIA	0	0	0	0	0	0	0	0	5	69	56	42
SLOVENIA	0	0	0	0	109	21	0	24	0	8	3	0
Other	14	6	3	17	18	185	44	25	2	7	6	14
Total	**928**	**1858**	**3925**	**903**	**533**	**12132**	**3226**	**1096**	**1249**	**596**	**244**	**1062**

Source: Eurostat

EU Imports of Strawberries, 1999,
MTs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MOROCCO	695	2,778	6,222	1,221	606	306					94	659
POLAND						6,008	3,053	478	376	267	81	
USA	89	26	39	25	198	201	394	581	466	359	144	18
ISRAEL	429	290	65	1						1	40	708
NORWAY							610	304	10			
ROMANIA					2	828						
EGYPT	193	76	71	5							24	390
AUSTRIA				16	2	197	426	48	2	3	4	1
SWEDEN		4	0	5	17	201	165	85				
MEXICO	26	6	20								31	69
AUSTRALIA	3									15	69	63
Other	53	23	54	13	79	124	36	1	14	39	107	82
Total	**1,488**	**3,203**	**6,471**	**1,286**	**904**	**7,865**	**4,684**	**1,497**	**868**	**684**	**594**	**1,990**

Source: Eurostat

Table 6. EU Monthly Strawberry Imports, 2000, MTs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Morocco	1,863	6,421	8,434	1,971	483	18	24				13	964
Poland					17	7,645	2,326	447	479	70	4	15
Israel	661	280	41	1							60	624
USA	118	48	3	21	295	207	540	181	103	64	2	5
Egypt	294	157	110	8							53	461
Austria		3	38	39	146	272	37	27	0	1		0
Norway							323	145				
Australia										15	74	31
Sweden		0			0	31	25	7	0	0	0	0
Turkey	11	0	20				20					7
Mexico	18				5						20	12
Switzerland			9	15	19				1			
China											44	0
Brazil											33	4
Argentina	2									3	24	7
Other	11	30	11	15	25	2	1	9	0	2	10	6
Total	**2,978**	**6,939**	**8,666**	**2,070**	**990**	**8,175**	**3,296**	**816**	**583**	**155**	**337**	**2,136**

Source: Eurostat

Table 7. EU Monthly Green Bean Imports, 1999, MTs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
KENYA	1,708	1,703	1,831	1,941	2,012	1,809	1,391	1,142	1,548	1,863	2,151	2,231
EGYPT	1,742	517	1,275	2,852	3,091	548	66	2		988	3,786	3,654
MOROCCO	644	734	1,199	3,968	3,230	977	14		2	922	1,779	1,786
SENEGAL	856	1,522	1,898	727	24						13	538
ETHIOPIA	572	904	1,049	522								133
ZIMBABWE	276	235	251	249	373	298	167	175	146	189	386	370
BURKINA FASO	642	913	601	30							8	406
ZAMBIA	77	70	134	181	216	304	277	121	131	178	159	121
GAMBIA	261	172	175	215	99	54	14	5		1	1	41
TURKEY	6	8	22	22	56	75	99	59	74	65	49	31
DOMINICAN R.	57	41	49	54	47	52	49	38	30	31	35	36
MALI	130	79	36	7							11	89
JORDAN	87	91	82	46	4	2					3	6
UGANDA	9	8	22	34	23	23	28	11	34	30	60	30
SOUTH AFRICA	56	64	59	26	10	20	12	2	3	11	5	5
POLAND							80	45	43	49		12
HUNGARY			3			47	86		1	24	24	
MADAGASCAR	10	17	59	14							25	19
Other	38	67	52	10	28	28	11	9	15	7	16	53
Total	**7,171**	**7,172**	**8,797**	**10,898**	**9,213**	**4,237**	**2,294**	**1,609**	**2,027**	**4,358**	**8,511**	**9,561**

Source: Eurostat

Table 8. EU Monthly Green Bean Imports, 2000, MTs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
KENYA	1,712	1,449	1,813	2,197	2,328	2,274	2,071	1,423	1,648	2,213	2,195	2,208
EGYPT	1,889	983	796	2,452	2,236	1,161	137	17	31	1,108	3,575	3,502
MOROCCO	1,251	754	2,217	3,915	4,847	2,083	47		288	1,820	3,120	3,168
SENEGAL	1,357	2,103	1,512	354	101						30	442
ETHIOPIA	608	958	1,180	644								100
ZIMBABWE	202	132	154	172	157	173	171	102	164	172	207	145
BURKINA FASO	684	531	611	23							42	547
ZAMBIA	169	165	111	119	212	277	365	289	314	295	264	224
GAMBIA	151	136	93	110	54	59	38	1	12	1		28
TURKEY	6	5	33	73	119	139	39	95	66	45	57	23
DOMINICAN R.	23	36	53	53	45	53	41	34	32	31	37	37
MALI	158	58	30	7							20	135
JORDAN	62	76	74	55	12	5	3		1	2	4	6
UGANDA	11	9	29	46	8	12	3	1	15	27	14	11
SOUTH AFRICA	37	34	32	22	14	18	15		2	3	8	7
POLAND	24				1	22	87	118	56	6		
MADAGASCAR	18	29	42	22							5	21
SUDAN	69	75	13									
Other	59	211	98	30	18	47	102	41	40	74	42	42
Total	**8,490**	**7,744**	**8,891**	**10,278**	**10,152**	**6,323**	**3,119**	**2,121**	**2,669**	**5,797**	**9,620**	**10,646**

Source: Eurostat

Table 9. Selected Cut Flower Species Sold at the Netherlands Auctions, 1997-99.

Species	1999 rank	1997	1998	1999
		thousand pieces		
Gypsophilia	10	145,306	170,620	190,084
Solidago	12	138,773	163,586	175,376
Limonium	15	100,930	84,139	90,230
Helianthus	17	63,965	67,785	76,464
Carthamus	NA	20,000	20,000	20,000
Molucella	NA	20,000	20,000	20,000
Total		488,974	526,130	572,154

Note: Species are those selected for ATUT promotions.
Source: The Federation of Netherlands Flower Auctions, VBN (1999) as reprinted in CBI's publications European Flower market, 2000. First four species as stated in the publication; last two estimated, as they do not appear in the top 25 species.

Domestic Consumption of Horticultural Products
1990-1999

	Crop Value LE million	Exports LE million	Apparent Consumption LE million current	Deflator 1986=100	Deflator Adjusted to 1999=100	Apparent Consumption LE 1999 million	Growth %
1990	5,813	398	5,415	190.7	.648	8,356	-
1991	6,691	535	6,156	227.2	.773	7,963	(4.7)
1992	6,932	539	6,939	239.1	.813	8,535	7.2
1993	8,645	477	8,168	208.3	.708	11,537	35.2
1994	10,859	407	10,452	226.4	.777	13,451	16.6
1995	14,103	697	13,406	242.2	.823	16,289	21.1
1996	17,711	591	17,120	265.7	.903	18,959	16.4
1997	16,554	479	16,075	286.2	.973	16,521	(12.9)
1998	16,827	636	16,191	287.3	.977	15,572	0.3
1999	18,056	463	17,593		100.000	17,593	6.2

Source: Horticultural crop values and exports – Economic Affairs Section, MALR; Deflator – CAPMAS Yearbooks

Horticulture Product Export Projections
2002 – 2012

INTRODUCTORY COMMENT

USAID's most direct intervention in the horticulture sector has been the ATUT project. It has worked with large private sector companies that are willing to risk the capital required to develop non-traditional exports. This Agricultural Assessment has recommended that USAID continue this activity, that it also work with small and medium shareholders to develop their capacity to serve both the domestic and export markets with traditional and non-traditional crops grown primarily for the domestic market but having some export potential, and that it continue a policy reform intervention. The projections in this Annex assume USAID will adopt these recommendations.

Table Horticulture Annex 6 below shows our projections for potato, orange, and "all other" traditional crops and for the specific crops on which ATUT is currently focused. The assumptions underlying these projections are outlined in the following pages. We believe these assumptions are not unrealistic. Their realization will require continued USAID involvement as well as a sound, cooperative approach between the private sector and GOE export promotion offices on traditional products.

Actual exports will not unfold as projected. Some of the assumptions will prove wrong and agricultural exports tend to move in a more volatile fashion. But the trend is clear: non-traditional export products fostered by USAID interventions will become the driving force in Egyptian horticultural exports in this decade. This is a major change, and emphasizes the importance of USAID's continued interventions to establish the critical mass necessary to sustain the structural changes it is helping bring about.

Table Annex Horticulture 7
Horticultural Crop Export Projections
2002-2007, 2012

	2002	2003	2004	2005	2006	2007		2012
	000 metric ton – cut flowers mm stem							
TRADITIONAL CROPS								
Potato	150.0	153.0	156.1	159.2	163.4	165.6		182.8
Orange	85.0	90.0	95.0	100.0	102.0	104.0		114.9
All Other	230.0	234.6	239.3	244.1	249.0	253.9		280.4
Total	465.0	477.6	490.4	503.3	514.4	523.4		578.1
Growth		2.7%	2.7%	2.6%	2.2%	1.8%		2.0%
NON-TRADITIONAL CROPS								
Table Grape	8.2	11.4	14.6	17.9	21.1	24.3		45.6
Strawberry	6.3	8.4	10.5	12.6	14.7	16.9		21.1
Fine Green Beans	1.4	2.3	3.3	4.4	5.5	6.8		13.2
Total	15.9	22.1	28.4	34.8	41.6	48.0		79.9
Growth		39.0%	28.5%	22.5%	19.5%	15.4%		g=10.7%
Cut Flowers	32.3	57.6	82.6	107.7	132.7	139.7		153.8
Growth		78.3%	43.4%	30.4%	23.2%	5.3%		2.0%
GRAND TOTAL EX FLOWERS	480.9	499.7	518.8	538.1	556.0	571.4		658.0
GROWTH		3.9%	3.8%	3.7%	3.3%	2.8%		g=2.9%
Share of total mt	3.1%	4.4%	5.5%	6.5%	7.5%	8.4%		12.1%

Assumptions

The assumptions developed here use historical data cited elsewhere in this report, most notably under Marketing in the horticulture section of Chapter IV and Annexes Horticulture 1 and 4, the opinions of participants in the Egyptian horticultural export industry, and the Agricultural Assessment Team.

POTATO

1. Base volume in 2002 – 150,000 metric tons. Based on discussions with a leading potato exporter and with Dr. Hamdy Salem of the Egyptian Export Promotion Center. This assumption reflects the estimated level of 2002 export volume. Actual volume will spike upward significantly (25,000 tons or more) from time-to-time based on the EU supply-demand situation.
2. Annual growth rate in export volume - 2%, with random spikes upward taking advantage of abnormal world supply shortages. Realization of the 2% growth rate will require improved quality (for example, no brown rot in export production areas, packaging innovations, organic certification), and new forms of transaction (for example, direct sales to importing supermarkets). There are already examples of improved quality and new forms of transaction among Egyptian producers/exporters.

ORANGE

1. Base volume in 2002 – 50,000 metric tons. This assumption reflects volumes during the 1993-2000 period, excluding 1998, which was abnormally high. As with potato, actual volume will spike upward significantly from time-to-time.
2. Annual growth in export volume – 5,000 metric tons annually through 2005, then 2%. The 5,000 metric ton growth reflects near- term realization of expected sales to China. Dr. Hamdy Salem projects annual volume to China of 15,000 metric tons. The projection also reflects increased volume resulting from joint Egyptian Export Centre and private company promotions to markets in Africa, and the potential to increase annual sales to the former USSR market that declined significantly after its collapse in the early 1990s.

ALL OTHER TRADITIONAL PRODUCTS

1. Base volume 2002 – 230,000. This reflects volumes during the 1996-1999 period, excluding 1998 which was abnormally high.
2. Annual market growth rate in volume – 2%. Continued significant increases are likely to be experienced in medicinals and dried onions. The recommended USAID intervention in traditional crops will result in some crops that have experienced a decline in exports increasing their export market presence (for example tomato, garlic). Other products that have low volume

in export markets are expected to increase in sales (for example melons, artichoke).

TABLE GRAPE

Production capability: As developed by ATUT for 2002, 2007, and 2012 (February 12, 2002 projections) with our estimates for intervening years.

Window: Enlarged from mid-May-July to all of May-August, taking advantage of increased production in Upper Egypt and use of improved container shipping technology.

EU Market:

1. Market size: Base volume in 2002 is 80,000 mt, a 2.8% increase over Eurostat reported annual 1998-2000 imports during the year window period.
2. Annual market growth rate in volume: 2%. The market has been relatively flat in recent years.
3. Sales: As allowed by production capability with an upper limit of a 50% market share of window.

Gulf Market

1. Market size: Base year equals Faostat 2000 import volume for total year divided by 12. Using this calculation recent May-August volume has been 20,000 MT. Total reported imports have declined significantly over the past 8 years, so much so that while we use the data, we question its accuracy.
2. Annual market growth rate in volume: 1%. Reported market volume has been declining for a number of years but has recently flattened out.
3. Sales: Starting from a base of 1,500 mt in 2001 and increasing as allowed by ATUT production capability projections, market volume projections, and a 50% market share limitation. Product availability calculated from ATUT projections for 2002, 2007, and 2012 with our estimates for the intervening years.

Other Markets

2% of EU and Gulf sales (versus 1.4% in 2001) as allowed by product availability.

STRAWBERRY

Production capability: As developed by ATUT for 2002, 2007, and 2012 (February 12, 2002 projections) with our estimates for intervening years.

Window: Enlarged from November - March to October-April, taking advantage of increased production in Upper Egypt and use of improved shipping technology.

EU Market

1. Market size: Base year equals 20,000 MT. This is a 4.5% increase from the average of Eurostat reported imports for the 1999-2000 Egyptian window – 14,350 in 1998/99 and 23,921 for 1999/2000.
2. Annual market growth rate in volume: 5%. Total annual imports have been quite volatile over the past decade so the recent higher market volumes and growth rates may not be representative.
3. Sales: As allowed by production capability, total market size, and a maximum 50% market share of window imports.

Gulf Market

1. Market size: Impossible to determine from the Faostat data we located as it showed total annual imports as less than ATUT client and GOE Quarantine reported November-March shipments. ATUT clients shipped close to 3,000 MT in each of the last three years, with a modest increase in volume.
2. Annual market growth rate in volume: 2%. The reported increase in each of the past three years has been less than 1%. We suspect this was due more to supply limitations than market limitations. We project future growth at 2% annually.
3. Sales: Base year 2002 - 3000 tons, slightly higher than ATUT clients reported 2001 shipments. Increases as allowed by production capabilities.

Other Markets

5% of EU and Gulf sales (as in 2001)

FINE GREEN BEANS

Production capability: As developed by ATUT for 2002, 2007, and 2012 (February 12, 2002 projections) with our estimates for intervening years. ATUT production capability projections are for all categories of beans. We estimated fine green bean production as allowed by the market size and share assumptions stated below.

Window: January-December

EU Market

1. Market size: Base year – 40,000 metric tons. Eurostat data does not disaggregate total green bean imports into various categories. We used Kenya, the major producer of fine green beans for the EU market, as a proxy, assuming its green bean exports are all fine and supply 60% of the total market. This results in total market estimates of approximately 36,000 mt in 1999, and 39,000 mt in 2000.
2. Annual market growth rate in volume: 5% annually to 2007, then 2% to 2012.
3. Sales: Egypt assumed to secure a 2% market share in 2002, increasing 2% annually. Allowable maximum of 30%, as strong competition is expected from Kenya and Morocco. This share is not reached during the projection period.

Gulf Market

1. Market size: No data available. In 2001 Egypt exported approximately 2,300 metric tons of green beans (all categories, mostly, if not all, bobby) to Gulf states.
2. Growth rate: 2% for all Egypt's exports of all green beans to Gulf States, starting from a base of 2,500 metric tons in 2002.
3. Sales: We have assumed Egypt sales of fine green beans will reach a maximum of 25% of total green bean imports, increasing by 5% annually until the 25% volume limitation is reached.

Other markets

None assumed

CUT FLOWERS

Production capability. ATUT identified 5 flowers with strong export potential for its promotion, namely limonium, gypsophilia, molucella, solidago, and helianthus. We have assumed the production capability projected by ATUT for 2002, 2007, and 2012 (February 12, 2002 projections) with our estimates for intervening years.

Window: October- May

EU Market

1. Market size: We have developed estimates of EU imports using CBI reported import data for 1997-1999. It reports volume for three of the five aforementioned flowers. The pother two were not included in CBI's highest volume list and we assumed a level of imports 50% below the volume of flower number 25. These calculations resulted in 1999 imports of 572 million stems. (See Horticulture Annex 4.) We assumed imports are spread evenly throughout the year. Thus, volume during Egypt's 8-month window is assumed at 380 million stems in 2002.
2. Market growth rate: 4% annually to 2007; then 2% annually to 2012. Actual growth using the CBI data as described above was 7.6% in 1998 and 8.7% in 1999.
3. Sales: Starting from a base of 32.3 million stems in 2002 and increasing as allowed by ATUT production capability projections to a maximum 30% market share. This is slightly below Kenya's current share of sales in CBI's "Other Cut Flower"category that includes the aforementioned five flowers.

Gulf Market

Sales. We do not have Egyptian export data to Gulf markets in stem numbers, hence we have not included Gulf export sales in our projections. However, available GOE Quarantine data indicates 2001 exports to Gulf states approximated 60 metric tons in 2001. We believe this relatively low number was due more to production limitations than to market limitations. We

project Egyptian sales will increase 5% annually throughout the projection period.

Other Markets

None assumed. The Dutch are very competitive in world markets, even trans-shipping flowers they import from elsewhere.

ANNEX B

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ANNEX C

FISHERIES AND AQUACULTURE REFERENCES

FISHERIES AND ACQUACULTURE

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