Task Order No. 807
Contract No. PCE-I-00-96-00002-00

Ministry of Public Works and Water Resources
US Agency for International Development
Agricultural Policy Reform Program
Environmental Policy and Institutional Strengthening Indefinite Quantity Contract

Report

Annual Technical Progress Report
7 May – Dec 1997
Report No. 3

Prepared By
Water Policy Reform Team
International Resources Group
Winrock International

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Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (EPIQ)
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and Harvard Institute for International Development

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I. INTRODUCTION

Egypt's water resources, supplied almost exclusively from the Nile River, are under increasing stress due to expanding irrigation needs, population growth and the concomitant expansion in domestic water needs, and an increasing load of pollutants which is threatening the Egyptian environment and the health of its citizens. The Ministry of Public Works and Water Resources (MPWWR) is the primary Egyptian governmental agency charged with the management of water resources. Keenly aware of the need to improve the utilization efficiency and productivity of water resources in Egypt, the MPWWR and the US Agency for International Development (USAID) designed a "water resources results package" based upon years of earlier joint experience in water resources management projects.

The package has four major results: 1) improved irrigation policy assessment and planning process, 2) improved irrigation system management, 3) improved private sector participation in policy change, and 4) improved capacity to manage the policy process.

USAID and the MPWWR designed the water resources results package based on a "non-project" assistance approach aimed at policy analyses and reforms leading to improved water use efficiency and productivity. The MPWWR is responsible for various activities under the four results. USAID supports the Ministry's efforts through a cash transfer (tranche) mechanism based on performance of achieving identified and agreed upon policy reform benchmarks, and technically through a task order with an internationally recognized organization capable of providing technical analyses, supporting research and studies, etc., to assist policy and institutional reforms in the first three results.

Under the Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (EPIQ) signed by USAID and a consortium headed by the International Resources Group (IRG), USAID/Cairo issued Task Order (TO) 807 effective May 7, 1997. The TO supports the Egypt Mission's Agricultural Policy Reform Program (APRP), and is addressed particularly at increasing "...the global efficiency and productivity of Egypt's Nile Water System." Specific objectives are:

1. To increase Ministry of Public Works and Water Resources (MPWWR) knowledge and capabilities to analyze and formulate strategies, policies and plans related to integrated water supply augmentation, conservation and utilization, and to the protection of the Nile water quality.

2. To improve water allocation and distribution management policies for conservation of water while maintaining farm income.

3. To recover the capital cost of mesqa improvement, and to establish a policy for the recovery of operation and maintenance costs of the main system.

4. To increase users' involvement in system operation and management.

5. To introduce a decentralized planning and decision making process at the irrigation district level.

The water resources results package is part of the USAID/Egypt Mission's Agricultural Policy Reform Program (APRP), a broad-based policy reform program housed in the Ministry of Agriculture and Land Reclamation (MALR). APRP has the goal of developing and implementing policy reform recommendations in support of private enterprise in agriculture and agribusiness. Several Egyptian Government Ministries participate in APRP. Besides the MPWWR and the MALR, the Ministry of Trade and Supply, the Ministry of Public Enterprises and the Ministry of International Cooperation also participate.

The EPIQ Water Policy Reform Activity is one of five complementary activities of APRP in the MPWWR aimed at achieving the goals and objectives of the water resources results package. The EPIQ Water Policy Reform Unit and the MPWWR Water Policy Advisory Unit (WPAU) lead these activities. The MPWWR telemetry program and the Nile Forecast Center provide key data and information in support of policy regarding system operation and management. The Water Communication Unit focuses on strategies to promote policy reform and water conservation through public awareness and education. Each of these activities is housed in the MPWWR building in Imbaba.

The EPIQ Water Policy Reform Activity was one of the last APRP units to assemble under APRP. In addition to collaborating with other MPWWR units, the EPIQ Water Policy Activity closely coordinates with the APRP Project Management Unit; the Reform Design and Implementation Unit; the Monitoring, Evaluation and Verification Unit; and the Food Security Research Unit all housed on the 15th floor of the Companies Building of the MALR in Dokki.

A team of Egyptian and expatriate specialists, the EPIQ Water Policy Reform Team, has been assembled within the framework of the EPIQ task order to assist the MPWWR in achieving policy and institutional reforms that arise from technical analysis of pertinent water resource issues. Expatriate specialists have been identified and employed by Winrock International, sub-contractor to IRG on the EPIQ TO 807, as well as by IRG itself. Egyptian specialists are supplied by Nile Consultants, an Egyptian water, environment and agricultural development consulting firm, also through a sub-contract with IRG. The EPIQ Water Policy Team actively participates in weekly meetings of all APRP units to discuss on-going activities, problems and issues which may need joint action.
The MPWWR has established a project steering committee to oversee, supervise and coordinate project activities. The steering committee meets regularly and consists of senior MPWWR officials, a representative of USAID and the technical assistance team leader.

Organization of this Report

This report provides a brief overview, in chronological order, of project activities from 7 May 1997 (date of notice to proceed from the USAID Mission) through 31 December 1997. The project planning workshop, the composition of, and the mobilization of the long term technical assistance team are reviewed first. Project technical and management activities and accomplishments for the periods: 1 July through 30 September 1997 and 1 October through 31 December 1997 are subsequently reviewed. Project administrative support during the period is outlined and project financial summaries for each quarter are provided. Supporting project documentation is included as appendixes to this progress report.

II. PROJECT STARTUP

With the issuance of the Task Order (TO) 807 notice to proceed effective May 7, 1997 by USAID/Cairo, International Resources Group (IRG) and Winrock International began formal preparations for mobilizing the long term technical assistance (LTTA) team to Egypt. One if the first steps in this process was a Team Planning Meeting held in Washington DC, June 5-6, 1997. The agenda for this meeting is given in Appendix 1.

This team planning meeting provided the first opportunity for the long term TA team to convene, meet each other, meet key technical and administrative support personnel of IRG and Winrock, and briefly review the history and some of the technical activities behind the water resources result package. In addition, the team had the opportunity to meet and briefly discuss the water policy reform activity with key USAID personnel: Ken Baum, USAID Global Environment Office, EPIQ Project Officer and COTR, Curt Nissley, USAID/Washington, EPIQ Project Co-COTR and Craig Anderson, USAID/Cairo, water resources reform activity COTR.

Listed below are the attendees of the EPIQ Egypt Water Resources Results Package Team Planning Meeting.

Name	Position	Affiliation
John Priest	LTTA Team Leader	Winrock Intl.
Thomas Burola	LTTA Administrative Officer	IRG
Thomas Ley	LTTA Senior Irrigation Engineer	Winrock Intl.
Dennis Wichelns	LTTA Senior Water Economist	Winrock Intl.
Zhongping Zhu	LTTA Senior Water Resources Engineer	Winrock Intl.
Michael Rock	Senior Economist and Project Officer	Winrock Intl.
Douglas Clark	EPIQ Coordinator	IRG
Jack Keller	Irrigation Engineer	Keller-Bliesner Engineering
Ian Fitzsimmons	EPIQ Project Administrator	IRG
Sinikka DeHanas	Project Administrator	Winrock Intl.
Chris Kopp	Program Officer	Winrock Intl.
Ken Baum	EPIQ Project Officer	USAID G/ENV Washington
Curt Nissley	Project Officer	USAID G/ENV Washington
Craig Anderson	COTR	USAID/Cairo
Donald Spears	Facilitator	MSI

III. MOBILIZATION

The EPIQ Water Policy long term expatriate technical assistance team mobilized to Egypt during June 1997. Mr. Thomas Burola, Administrative Officer, and family, arrived in Cairo on June 12. Dr. Zhongping Zhu, Senior Water Resources Engineer, arrived in Cairo on June 13. Mr. John Priest, Chief of Party, and his wife arrived June 18. Dr. Thomas Ley, Senior Irrigation Engineer, and family, arrived on June 20. Dr. Dennis Wichelns, Senior Water Economist, arrived in Cairo on July 2. The expatriate LTTA team members were initially housed in the Cairo Marriott Hotel. Team members individually sought long term living accommodations in various locations of Cairo. Most members of the team had found apartments and entered into long term lease agreements by early August 1997.

Transportation was arranged by the Administrative Officer through a local short term contract for 3-4 vehicles and 3-4 drivers, depending upon needs. A vehicle was made available for the Chief of Party, the Administrative Officer, and the remaining technical team members. Communications were facilitated by procurement and provision of cell phones for the Chief of Party and the Administrative Officer.

During the last few days of June and the first week of July, the long term TA team essentially began technical operations and activities (described in the next section) from the Marriott Hotel. Beginning July 7, the team temporarily occupied available office space in the Nile Consultants offices located at 1/5 Street 216, Digla, Maadi. The team used these facilities as its headquarters until early October 1997, when it transferred into renovated office space on the 9th floor of the MPWWR office building in Imbaba.

Long term Egyptian experts joined the EPIQ Water Policy Team through the Nile Consultants subcontract. Initially, Dr. Bayoumi Attia and Dr. Abdel Fattah Metawie were designated to begin working with the Water Policy Team beginning in mid-July. These individuals were called to other posts within the Ministry upon the appointment of his excellency, Dr. Mahmoud Abu Zeid, as the new Minister of MPWWR. Subsequently Dr. Ahmed Fakhry Khattab and Dr. Ibrahim Elassiouti joined the EPIQ Water Policy Team, as co-team leader and Senior Water Resources Management Specialist, respectively, at the end of July 1997. Engineer Saleh Nour, consulting Hydrogeologist joined the EPIQ Water Policy Team on August 31, 1997.

Long term technical assistance for the reporting period is summarized in Appendix 2. Short term technical assistance for the reporting period is summarized in Appendix 3.

IV. TECHNICAL ACTIVITIES AND ACCOMPLISHMENTS (1 July - 30 September 1997)

APRP Tranche I Policy Benchmark Review

Mr. John Priest and Dr. Zhongping Zhu represented the EPIQ Water Policy Team at an APRP workshop in Ismailia, 22-23 June 1997, to review the verification of accomplishment/progress of APRP Tranche I benchmarks. Several water-related benchmarks were included in Tranche I, however, the EPIQ Water Policy Team did not actively participate in their development. Tranche I benchmarks not accomplished or partially accomplished were given until December 31 1997 for further work to be completed.

APRP Tranche 2 Policy Benchmark Development

The initial major contribution of the EPIQ team was the development of the APRP Tranche II benchmarks for the MPWWR (Tranche II covers the period July 1, 1997 - June 30 1998). Originally a list of eight benchmark topics were suggested for development. Three of these topics were eventually eliminated from the list as they were not considered to be true policy reform activities. Five benchmarks were developed and included in the Tranche II Memorandum of Understanding, which was signed on September 24, 1997.

The EPIQ Team reviewed a considerable amount of available literature from the Strategic Research Program and the Water Resources Strategic Research Program, other sources of information within the National Water Research Center, and other documents to learn as much as possible about the current nature of water resource issues in Egypt. Additionally information concerning the Irrigation Improvement Program and water user association development in Egypt was reviewed.

Background documents were prepared for each benchmark topic. These contained a review of the current situation, key policy issues which need to be addressed, a statement of the policy benchmark, suggested methods of verification, expected results of the work and supporting studies to be conducted. As these background documents were prepared, the EPIQ Team met with key individuals within the MPWWR to review the benchmarks and obtain further information concerning the policy issues and problems to be addressed.

The APRP Tranche II benchmarks and background documentation are included in this report as Appendix 4.

Project Implementation Plan

The major activity during the third quarter was the development of a Project Implementation Plan (work plan) by the EPIQ Water Policy Team. The Water Resources Results Package statement of work was the basis from which the team prepared the work plan of the water policy reform activity.
Many long internal team meetings were conducted during which the individual activities and tasks were discussed. All of the team members participated in an examination of technical and economic issues pertaining to water resources, in general, and specifically, deep and shallow groundwater resources, drainage water management, and irrigation improvements. Ideas regarding agricultural water demands and supply were developed. Issues involving the production of rice and sugarcane were examined, because the Ministry of Public Works and Water Resources is particularly interested in addressing farm-level

crop production issues, how and why farmers make particular cropping choices, and the impacts on irrigation water demand.

The development of the project implementation plan culminated in a workshop held at Port Said on September 25-27, 1997 in which the plan was presented, reviewed and discussed. All of the team members prepared materials for presentation at the workshop in Port Said. The goal was to present an overview of the water policy activity work plan, with particular emphasis on new ideas and approaches that reflect the policy focus of the project. This meeting was attended by key senior officials of the MPWWR, the project Steering Committee, the Water Policy Advisory Unit, representatives of USAID, and EPIQ Team Members.

At this workshop two very important concepts were introduced: 1) a water allocation program, in which farmers, water users associations, or federations of water user associations are provided with well-defined limits on the volume of water available to them each year, and would enable the Ministry to fundamentally change the current system of providing water from a crop water requirements basis to an aggregate water availability basis; and 2) greater user involvement at the district level, or a decentralized shift of system planning, operation and management responsibility and accountability to the directorate/district levels. These are critical new areas of policy and institutional focus that the EPIQ team presented, discussed and gained agreement for inclusion in the work plan. This workshop was just the initial step in the dialogue process with senior MPWWR officials in two areas which are felt to be fundamentally important for the long-term management of Egypt's scarce water resources. What is significant is that the issues are now on the table and open for further analysis and discussion.

The agenda for the workshop, a list of participants and the concluding remarks by Engineer Gamil Mahmoud, chairman of the project steering committee, are included in Appendix 5.

Based on the results of the workshop, the project implementation plan was revised and submitted to the APRP Project Planning Committee (PPC) for approval. The revised project implementation plan is included in this report as Appendix 6.

Other Activities

During the course of preparing the project implementation plan, the EPIQ Team participated in two field trips to provide orientation to irrigated agriculture in general and to the Irrigation Improvement Program (IIP) and water user associations in particular. The team was accompanied by Eng. Essam Barakat, director of the Irrigation Advisory Service on each trip. A one-day trip to the Qiman-El Arous IIP area near Beni Suef in the Nile Valley was conducted on 17 August 1997. The team was able to observe all of the components of the IIP program including improved branch and distributary canals, improved mesqas (raised and lined mesqas and buried pipeline mesqas), and improved tail escapes. In addition leaders of several of the water user associations (WUA) were available to answer questions about the program and their accomplishments with the WUA. It was evident the farmers were pleased with the program. They indicated that water distribution throughout the command area was improved with considerably less shortage felt by tail-end farmers, while their irrigation costs were also reduced.

A two day field trip to two IIP areas in the Nile Delta was conducted on August 19 and 20, 1997. The first area visited was the Qahwagi IIP pilot area near Kafr El Sheikh. The second area was the Balaqtar IIP area near Damanhur. In each case, continuous flow and utilization of automatic downstream flow control gates have been implemented along with the main canal improvements, mesqa improvements and formation of WUAs. In each case,

WUA leaders were available to discuss the results of the project and answer questions. Successful scheduling of irrigation turns along the improved mesqas, collection and disposition of fees for operation and maintenance of the single point lift pump, etc., and conflict resolution among water users were the major activities of these WUAs.

Personnel

Mr. John Priest resigned from his position as Team Leader/Chief of Party on August 9, 1997. Dr. Mohamed Allam, General Manager of Nile Consultants and water resources planning specialist, was appointed Acting Team Leader on August 10, 1997. He continued this temporary assignment until December 15, 1997.

V. TECHNICAL ACTIVITIES AND ACCOMPLISHMENTS (1 October - 31 December 1997)

Following the workshop, team members were requested to develop an implementation plan pertaining to the work plan. Based upon the background and experience of the individual team members, working groups were identified for each of the main activities of the project implementation plan. The table on the following page is based on from Table 3 of the Project Implementation Plan and summarizes these work groups. In each instance, the resident team staff member listed first is considered to be in the lead role for that particular activity. The table also illustrates where and how the Tranche II benchmarks fit into the work plan.

Based on an internal assessment of priority issues (including benchmark activities) and continuing discussion of policy reform methodology, the team identified high priority activities and tasks including: 1) drainage water reuse, 2) national strategy for irrigation improvement projects, 3) water management alternatives and strategies, 4) deep groundwater, and 5) WUAs outside of the Irrigation Improvement Program (user involvement). Work group activities and accomplishments in these topic areas are briefly summarized in the following sections. Further definition of EPIQ Team planning regarding the prioritization of work activities over the life of the project are found in Table 1 and 2 of the Project Implementation Plan (see Appendix 6).

Drainage Water Reuse

The drainage water reuse work group, led by Dr. Zhongping Zhu, has been working on a conceptualization of drainage water reuse issues. This has included a review of (a) existing studies on drainage water reuse; (b) existing practices of drainage water reuse (including "unofficial" reuse; and (c) future plans for reuse. The group has identified the following issues as critical.

(1) There is a growing dilemma in Egypt's drainage water reuse program. That is, an increasing number of drainage water reuse pumping stations are being closed because of pollution problems, as the government’s plans for increasing drainage water reuse expand. This situation will only get worse as new lands development proceeds.
(2) The group has developed a two-step approach to drainage water reuse. The first step involves assessing what must be done to maximize short run drainage water reuse. The second step has a longer time horizon and focuses on the design of policies and practices to reduce drainage water generation.

The group has collected and reviewed a broad range of previous studies and reports regarding the topic, including obtaining and translating the recent MPWWR Drainage Task Force Report, which gives a current in-depth analysis of the Ministry’s position regarding reuse of drainage water for irrigation. The group actively consulted with various agencies, institutes, consultants and other experts regarding the topic.

In broad terms, the group is focusing on a number of critical issues: 1) the potential maximum drainage water reuse based upon either minimum outflows to the

ACTIVITIES[1]		RESIDENT TEAM STAFF[2]	TRANCHE II BENCHMARK[3]
Result 1:	**Improved Irrigation Policy Assessment and Planning Process**		
1.1	**Agricultural Water Demands**	**Wichelns D., Elassiouti I., Zhu Z.**	
1.2	**Water Conservation and Management Alternatives**		
	A. Water Management Alternatives	**Wichelns D., Ley T. and Allam M.**	**II-C.4. Rice** **II-C.5. Sugarcane**
	B. National Strategy for Irrigation Improvement Projects	**Ley T., Khattab A., Wichelns D., Groenfeldt D. and Allam M.**	**II-C.7. National Strategy for Irrigation Improvement**
1.3	**Water Supply Augmentation**		
	A. Deep Groundwater	**Nour S., Elassiouti I. and Allam M.**	
	B. Shallow Groundwater	**Nour S., Khattab A., Ley T.**	
1.4	**Agricultural Drainage Water Reuse**	**Zhu, Z., Elassiouti I., and Khattab A.**	**II-C.8. Drainage Water Reuse**
1.5	**Agricultural Water Supply and Demand Scenarios**	**Wichelns D., Allam M. and Zhu Z.**	
Result 2:	**Improved Irrigation System Management**		
2.1	**Policy Testing and Evaluation**	**Khattab A., Ley T., Groenfeldt D., Wichelns D., and Zhu Z.**	
2.2	**Cost Sharing**	**Elassiouti I. And Wichelns D.**	
Result 3:	**Improved Private Sector Participation in Policy Change**		
3.1	**User involvement in Decision-Making**	**Groenfeldt D., Wichelns D., and Ley T.**	**II-C.6. WUAs in Non-IIP Areas**
3.2	**Localized Planning and Decision-Making**	**Zhu Z., Ley T., Khattab A. and Allam M.**	

[1] Activities from the EPIQ Water Policy Reform Project Implementation Plan covering the period July 1, 1997 - Sept 30, 1999.
[2] EPIQ resident team staff members (as of 30 Sep 1997) assignment to working groups. The individual listed first is the Activity Leader.
[3] APRP Tranche II benchmark activity for the period 1 Jul 1997 - 30 Jun 1998.

Mediterranean Sea for sustainable salinity balance or minimum outflows for sustainability of the ecosystems of the northern lakes for fisheries production, 2) drain water quality and the impacts (particularly of pathogens and heavy metals) of municipal and industrial wastes and other pollutants (pesticides) on agricultural productivity and the health of Egyptian farmers in the Delta, 3) alternative reuse approaches as opposed to the centrally planned and operated large mixing pump stations, 4) impacts of reclamation projects like El Salam Canal which have been planned to be fed (in a certain proportion) by agricultural drain water, 5) "unofficial" drain water reuse which is occurring all over the Delta, 6) institutional aspects of drainage water management, 7) impacts of new irrigation technologies on drainage water generation, 8) impacts of the aging drain system, inadequate maintenance, renovation needs, 9) drainage system privatization at some level and formation/involvement of drainage user associations or irrigation and drainage associations.

The group has conducted two field trips to the east and middle Delta areas to meet first hand with field officials responsible for drainage water reuse planning and operations. The first field trip was to Sharkia and East Dakhlia Governorates. Monitoring data and visual observations indicate the quality of drainage water in the area is getting worse due to sewage effluent and industrial discharges directly into the main drains. Large areas of rice are irrigated in this area primarily with drain water. Once the Salam canal begins taking its planned share of drain water these areas will suffer from lack of water. The second field trip was to Qalubia, Gharbia and West Dakhlia Governorates.

The drain water reuse work group has prepared a draft collection of written analytic material. The strategic topics addressed are summarized here:

- maximum reuse potential and minimum outflows
- municipal and industrial wastewaters in the Delta
- drainage water quality in the Delta
- impacts of IIP and other new irrigation technologies on drain water generation
- centralized and intermediate drainage water reuse
- impacts of Salam Canal and Toshka projects on drain water in the Delta
- institutional aspects of drainage water reuse
- long term economic aspects and policy development regarding drainage water

National Strategy for Irrigation Improvements

This work group, also called the IIP work group, is led by Dr. Thomas Ley. The group has collected and reviewed over 50 background documents and reports regarding the USAID-funded IIP program. Field trips have been made to 4 IIP pilot areas in the Delta and Nile Valley. In each case local IIP and IAS staff have been interviewed about the program, its accomplishments, problems and issues. Farmers and WUA leaders at each site were also interviewed regarding the same topics. Project sites visited include some of the best performing sites and some of the most problematic sites. Field visits have also been made to the World Bank supported IIP sites, where discussions were conducted with various experts working with the World Bank IIP program. Field trips to areas suffering irrigation water shortages and distribution problems, such as parts of the Nile Valley just upstream of Cairo and some of the old new lands were also made.

The assessment of IIP and development of a national strategy for irrigation improvements is being conducted within a broader scope which is inclusive of several elements of the EPIQ water policy reform work plan. Improving the productivity and utilization of Egypt's water resources, with a focus on the agriculture sector, means improving the

management and use of water at all levels of the Nile Irrigation and Drainage System. Improving water management is dependent upon:

a) the development and communication/implementation of appropriate water policy parameters to motivate users to use water efficiently. This is largely the focus of Activity 1.2A of the EPIQ water policy work plan and led by Dr. Dennis Wichelns. Appropriate parameters may include water pricing or water allocation programs which communicate to users the true economic value of water such that efficient use is an important factor in input decisions relative to crop production.

b) enhancing measurement and control of water as it moves through the irrigation system encompasses the development of strategies regarding irrigation improvements (Activity 1.2B) as well as greater user involvement (Activity 3.1) and devolution of irrigation operation and management to the local level (Activity 3.2). The IIP includes physical/infrastructural enhancements which improve the control of water, the measurement of water, and minimize operational wastes to drains (and the subsequent consumptive losses due to pollution). Additionally, IIP includes the institutional development/involvement of users in system planning, operation and management at the local level (WUAs at the mesqa level), and technical support to WUAs with water management issues and problems at the mesqa level and on-farm level.

Neither of these areas of work is sufficient in isolation of the other to bring about the desired changes, but should be viewed as a package. While much of the IIP paradigm fits within the above package, there are many questions regarding the appropriate role of the Ministry in carrying out the program and upon whom the cost burdens should fall.

Major issues the IIP work group is addressing include:

• the feasibility of leaving mesqa improvements entirely to the private sector and government support or institutional/legal requirements to foster this. For instance, mesqa improvements are not likely to happen in the absence of some form of farmer organization. The organizational costs of forming WUAs (or similar organization) are too great with too little return for an individual or perhaps even a small group of individuals to bear.

• widespread WUA formation to “jump start” the local irrigation improvement process, and move towards privatization of parts of the irrigation system.

• public investment to foster the development and sustainability of WUAs through an organization such as the Irrigation Advisory Service. The need to strengthen the IAS as an institution and in terms of its range of technical capabilties is being assessed.

• improved water delivery service is needed if water user organizations at the local level are going to be viable. Physical infrastructure development and modernization in main system branch and distributary canals which allows the implementation of downstream flow control and continuous availability of water in these watercourses may partially provide the appropriate incentive, thereby justifying government investment in main system improvements.

• increased user involvement in planning, operation and management of the irrigation and drainage system from the branch canal to the farm. The development of semi-autonomous and quasi-private, if not completely autonomous and privatized, irrigation

districts may be a long term goal. User organizations would manage/distribute their annual/seasonal water allocation to individual mesqas. They would also be entirely responsible for the operation, maintenance and periodic upgrading of water delivery and control structures within their districts. Irrigation districts would work with a Ministry district engineer (or hire him as well as other operation and maintenance support staff) to be the liaison between them and the Irrigation Department. The Ministry's Irrigation Department would continue to operate the main system and would jointly develop the annual/seasonal water allocation to each district with the input of the district's water board. In a contractual arrangement, the district would become entirely responsible for planning and managing the distribution of the annual/seasonal allocation during the year/season, while the Ministry would be contractually bound to operate and maintain the Nile Irrigation System to deliver the contracted volume(s) of water to the branch canals.

Management and Economic Factors Affecting Crop Choices (emphasis on rice and sugarcane agriculture)

The work group, led by Dr. Dennis Wichelns, Water Resource Economist, has reviewed a large number of analytical studies of Egyptian agriculture. During the period, Dr. Wichelns continued to work in a lead role with all team members in developing a legitimate policy reform methodology and framework for the Water Policy Reform Activity. In addition, the Economist reviewed reports describing the macro-economic policies that influence farmer decisions regarding cropping patterns and water use. An understanding of this information is essential before developing policy recommendations regarding water resources. The Economist met with representatives of USAID and with technical experts from other components of the APRP project, to develop an understanding of pertinent agricultural policies and the reform effort.

Dr. Wichelns developed an analytical model which assesses the impact of existing policies toward rice and cotton (the main crop which competes with rice in the summer) on the demand for water for irrigation. The major finding of this analytical model is that distortions in the agricultural prices for rice and cotton has shifted farm level returns per feddan towards rice and away from cotton. If these distortions were removed, net returns per feddan would shift dramatically in favor of cotton over rice. This has major implications for water use. The next step in the analytical modeling is to extend the analytical work to include the impacts of the distortions on other markets (such as inputs and credit markets), assess the impact on water use of rice needs for home consumption by farmers, take account of the differences in the risk associated with different cropping patterns on farmer crop choices and use all of this to develop rough estimates of the aggregate quantities of water that would be saved by completely liberalizing agricultural input and output markets.

The Economist began assembling empirical information to evaluate farm-level decisions regarding cropping patterns and water use. He examined estimated crop budgets and the impacts of import and export policies on the expected net returns of major cropping patterns. He also began to examine the role of water in crop production, with particular emphasis on the financial and economic returns.

Dr. Wichelns also began evaluating the potential farm-level impacts of changes in the rent control law that became fully functional on October 1, 1997. It is not possible to conduct valid policy analysis without a good understanding of the potential impacts of a change in policy that may lead to much higher rents for farmland, and that may result in the loss of property rights for tenants. In addition, it is possible that some aggregation of small farms into larger farming operations may take place if landlords fail to renew leases to a large

number of long-term tenants.

Deep Groundwater

The deep groundwater work group led by Eng. Saleh Nour, has collected and reviewed a large volume of technical papers and reports regarding the hydrogeology of the deep groundwater aquifers in the Western Desert and the Sinai. Based on this information, the group has prepared a primary vision of the strategic issues for deep groundwater utilization in these areas.

The work group visited several sites in the New Valley and Western Desert from 9-12 November, where deep groundwater is being used or considered for use. Data were collected regarding the current status of deep groundwater use in agriculture and other sectors, as well as current practices to control and manage deep groundwater use in these areas.

The work group is developing a report on the hydrogeological characteristics of the deep groundwater aquifers in these areas, the potential for sustainable use of these fossil aquifers, the priority areas for development, and the strategic issues that will need to be taken into account to develop a national strategy for deep groundwater use.

WUAs in non-IIP Areas

Work supporting the development of a policy benchmark allowing the formation of water user associations in areas that have not been participants in the Irrigation Improvement Program will be led by the long-term expatriate sociologist team member. Mobilization of this specialist has been delayed until March 1998. Short term technical assistance has been identified and approved to augment the work to assure that the work is completed on schedule.

In the course of field trips and visits to areas in the Delta and the old new lands, the IIP and drainage water reuse work groups learned of several efforts by irrigation department officials, in which informal attempts to organize farmers to help them solve their problems had been conducted. Further study of these efforts is planned as a means for assessing the feasibility of forming WUAs in the absence of a program like the IIP.

Tranche I Benchmark Support

During the quarter several members of the EPIQ Water Policy Team were involved in supporting the MPWWR to achieve the Tranche I benchmarks which were extended. Tranche I benchmarks requiring further work were: 1) III.B.2 Develop an implementation plan for cost sharing, and 2) III.D.2 Develop an implementation plan for allocating and recovering O&M costs. It was agreed that these were very closely related activities which could be combined. Additionally, the topic of cost sharing is a major activity in the EPIQ Water Policy Reform Project Implementation Plan (Activity 2.2).

Based on these factors, Dr. Mohamed Allam, Acting Team Leader, developed an initial action plan for implementation which more feasibly describes a series of coordinated activities leading to the implementation of a national cost sharing plan over a reasonable period of time. Drs. Ibrahim Elassiouti and Thomas Ley provided further technical

support in the preparation of the action plan for submittal at the end of December to the MVE Unit of APRP. A copy of the action plan document is included in Appendix 7.

Other Activities

Dr. Allam and Dr. Wichelns met several times with a consulting team, hired by the Monitoring, Verification and Evaluation Unit of APRP, to develop a methodology for evaluating the impacts of the APRP project at some time in the future. These discussions were mutually beneficial, as we shared our informed perceptions regarding water resource issues in Egypt and we considered alternative perspectives and methods for conducting a water policy reform project.

The EPIQ Water Policy Team has been actively searching for and obtaining relevant technical documents and reports pertaining to water resources in Egypt, and water policy development and reform in Egypt and the world. To this point a number of useful documents have been collected and the very modest beginnings of a technical water policy library initiated. A current listing of the contents of the library is given in Appendix 8.

Personnel

Dr. David Groenfeldt, the designated expatriate Sociologist for the EPIQ Water Policy Team, visited the team October 19-22, 1997. It was learned in early December that Dr. Groenfeldt's spouse was diagnosed with cancer requiring extensive treatment in the US. Dr. Groenfeldt thereby elected to not join the long term team. Dr. Jeffery Fredericks, a candidate for the Team Leader/Chief of Party position visited the project November 1-4, 1997. Dr. Fredericks was subsequently approved for this position in early December.

Dr. Dennis Wichelns, Senior Water Economist, resigned from the EPIQ Water Policy Team and departed Egypt on December 3, 1997. Dr. Mohamed Allam, Acting Team Leader, resigned from this position on December 15, 1997. Dr. Thomas Ley was named Acting Team Leader starting December 16, 1997. He continued this temporary assignment until the arrival of Dr. Jeff Fredericks in late January 1998.

VI. ADMINISTRATIVE SUPPORT

Administrative support to the EPIQ Water Policy Team is provided through an administrative staff headed by Mr. Thomas Burola, administrative officer. The staff consists of Mr. Karim Abdel Razek, administrative assistant, Mde. Jacqueline Rizk, administrative clerk, Ms. Foaz El Mona Fouad, executive secretary for chief of party, and Ms. Noha Ahmed El Sayed, secretary for technical staff. Ms. Noha resigned from the project in mid-November and was replaced by Ms. Amira Serry in early December.

During the period July 1 to October 8, 1997, while offices at MPWWR were being prepared, the EPIQ depended heavily upon the office staff and facilities of Nile Consultants in Maadi. Without this support the work accomplished during the 3rd quarter would not have been possible.

Major activities of the administrative staff early in the reporting period included:

1) arranging transportation, a local short term contract for 3-4 vehicles and 3-4 drivers, depending upon needs,
2) facilitating communications by procurement and provision of cell phones for the Chief of Party and the Administrative Officer,
3) customs clearance and delivery of the expatriate team members' air and sea shipments, procurement of 3 vehicles (Ford Taurus and 2 Cherokees)
4) procurement of 3 computers for the technical staff,
5) support of team field trips (transportation, housing, etc.),
6) procurement of office supplies.

The administrative office provided full planning and implementation support for the EPIQ work plan workshop held in Port Said. All financial arrangements and transportation arrangements to and from Port Said for most participants were handled by the administrative team.

The administrative officer and his assistant spent many long hours planning and implementing the renovation of the EPIQ Team offices on the 9th floor of the MPWWR office building in Imbaba. The renovation was accomplished well within budget limits. Approximately 1600 square meters were reconditioned and painted.

- Eight offices and associated support facilities were improved and upgraded.
- Four new external telephone lines were installed (315-4400, 315-4411, 315,4343, 315-4440).
- An internal computer-monitored telephone system was installed.
- Each office was equipped with split air conditioning units.
- Desks, chairs, filing cabinets, book shelves, and work tables were located in each office.
- Electronic office equipment procured and installed included additional computers, printers, a fax machine, a photocopy machine, a LAN system for the administrative staff computers, and uninterruptible power supplies.
- Bathrooms were equipped with hand dryers.
- A new hot water tank and water filter system were installed in the tea room.
- One office was set up as team conference room with two large tables and chairs. A-V equipment and other conference/meeting support facilities were procured.
- Basic stationery and office supplies were procured and distributed.

The EPIQ Water Policy Team moved from its temporary office location at Nile Consultants in Maadi to the MPWWR 9th floor on October 8-9, 1997. A multi-user e-mail

account was set up with a local internet service provider to provide the technical staff and the administrative office with e-mail and internet access.

The administrative office continued logistical support of the TA team throughout the 4th quarter with transportation and housing arrangements for all field trips, continuing attention to office arrangements and facilities, and continuing arrangement of local transportation needs. Considerable time and effort were expended in clearing the three vehicles through Egyptian customs, arranging for registration, and acquiring local insurance coverage.

VII. FINANCIAL SUMMARY

Financial summary for 3rd quarter (1 July 1997 - 30 September 1997)

Category	Budget Amount	Total through Last Period	Expenditures This Period	Cumulative Amount	Remaining Amount	Percent Expended
Direct Labor	2,509,512.00	0.00	102,362.00	102,362.00	2,407,150.00	4.08
Labor Multiplier	2,760,463.00		112,599.00	112,599.00	2,647,864.00	4.08
Subtotal Labor Costs	5,269,975.00	0.00	214,960.00	214,960.00	5,055,015.00	4.08
Materials and Other Direct Costs	2,729,079.00	0.00	128,323.00	128,323.00	2,600,756.00	4.70
Total TO Ceiling Budget	7,999,054.00	0.00	343,283.00	343,283.00	7,655,771.00	4.29

Financial summary for 4th quarter (1 October 1997 - 31 December 1997)

Category	Budget Amount	Total through Last Period	Expenditures This Period	Cumulative Amount	Remaining Amount	Percent Expended
Direct Labor	2,509,512.00	102,362.00	55,531.00	157,893.00	2,351,619.00	6.29
Labor Multiplier	2,760,463.00	112,599.00	61,085.00	173,684.00	2,586,779.00	6.29
Subtotal Labor Costs	5,269,975.00	214,960.00	116,616.00	331,576.00	4,938,399.00	6.29
Materials and Other Direct Costs	2,729,079.00	128,323.00	203,254.00	331,577.00	2,397,502.00	12.15
Total TO Ceiling Budget	7,999,054.00	343,283.00	319,870.00	663,153.00	7,335,901.00	8.29

VIII. EPIQ WATER POLICY TEAM REPORTS AND PUBLICATIONS

Report/Publication Title	Author(s)	No.	Date
APRP Tranche II Water Policy Benchmarks And Background Documentation	EPIQ Water Policy Team	1	August 1997
Project Implementation Plan (Work Plan) for the Water Resources Results Package	EPIQ Water Policy Team	2	October 1997

Appendix 1: Agenda of Project Startup Team Planning Meeting, 5-6 June 1997 Washington DC

Appendix 2: Summary of Long Term TA

Summary of Long Term Technical Assistance (Project startup-Dec 31 1997).

Expatriate LTTA

Name	Position	Dates	PM for Reporting Period	Cumulative PM
John Priest	Chief of Party/Team Leader	June 18 1997-Aug 9 1997	1.67	1.67
Thomas Burola	Administrative Officer	June 12 1997-	6.60	6.60
Thomas Ley	Senior Irrigation Engineer Acting Team Leader	June 20 1997- Dec 16 1997-Dec 31 1997	6.33	6.33
Dennis Wichelns	Senior Water Economist	July 1 1997-Dec 3 1997	5.10	5.10
Zhongping Zhu	Senior Water Resources Engineer	June 13 1997-	6.60	6.60

Egyptian LTTA

Name	Position	Dates	PM for Reporting Period	Cumulative PM
Mohamed Allam	Acting Team Leader	Aug 10 1997-Dec 15 1997	4.16	4.16
Ahmed Fakhry Khattab	Co-Team Leader	Aug 1 1997-	5	5
Ibrahim Elassiouti	Senior Water Resources Mgmt. Specialist	Aug 1 1997-	5	5
Saleh Nour	Hydrogeologist	Aug 31 1997-	4	4

Appendix 3: Summary of Short Term TA

Summary of Short Term Technical Assistance (Project startup-Dec 31 1997).

Expatriate STTA

Name	Position	Dates	PD for Reporting Period	Cumulative PD
Michael Rock	Project Administrator/Winrock	Aug 2 1997-Aug 12 1997	11	11
		Sep 23 1997-Sep 30 1997	8	19
		Nov 29 1997-Dec 4 1997	5	24
Douglas Clark	EPIQ Coordinator/IRG	Sep 23 1997-Sep 30 1997	8	8
Jeffery Fredericks	Chief of Party Candidate	Nov 1 1997-Nov 4 1997	4	4

Egyptian STTA

Name	Position	Dates	PD for Reporting Period	Cumulative PD
Abdel Wahab Amer	Workshop Facilitator	Sep 15 1997-Sep 30 1997	15	15

Appendix 4: APRP Tranche II Water Policy Benchmarks and Background Documentation

Water Policy Benchmarks and Background Documentation for APRP Tranche II

I. Benchmark Statements

Drainage Water Reuse

The GOE will develop and approve new policies, regulations, and criteria to promote drainage water reuse with appropriate incentives and technical support.

National Strategy Regarding Irrigation Improvement

The GOE will develop a national strategy for improving water use efficiency and agricultural productivity through irrigation improvement projects. This strategy will include priorities for implementing the desired improvements.

Water User Associations

The GOE will develop a policy to allow the formation of water user associations in areas that have not participated in the Irrigation Improvement Program, and begin to promote such associations.

Water Use on Rice

The GOE (MPWWR and MALR jointly) will establish a strategy for the optimal water use for rice production

Water Use on Sugarcane

The GOE (MPWWR and MALR jointly) will establish a strategy for the optimal water use for sugarcane production.

II. Background Documentation

Drainage Water Reuse

A. Background

Reuse of water from drains for agriculture is practiced extensively across the Nile Delta. Each year, officially sanctioned reuse of drainage water approximates 4 billion cubic meters (unofficial reuse of drainage water over and above this amount by farmers occurs but has not been quantified). Annually, about 12 billion cubic meters of drainage water flows to the Mediterranean Sea through the northern lakes, transporting more than 30 million tons of salt from the Nile system.

Drainage water is an important part of the irrigation supply in the Nile Delta. However, when the national demand for Nile water begins to exceed the fixed annual supply from the Aswan High Dam, pressures will build for increased reuse of drainage water. A new policy package will be developed to guide the increased reuse of water from drains.

B. Policy Issues to be Addressed in Tranche II

To increase reuse of drain water in the Nile Delta, several important policy issues need to be addressed:

- The environmental effects of extensive drainage water reuse. Drainage reuse in the lower part of the Delta constitutes a threat to soil conditions for high agricultural crop production and to the health of farmers. The maintenance of drain water quality at an environmentally acceptable level will be the key for more drainage water reuse in the Delta.

- Treatment and/or separation of municipal and industrial (M&I) wastewater, particularly industrial wastewater. Treatment of M&I wastewater will serve to preserve the environmental integrity of drainage water, sustain crop production and soil conditions, and reduce the amount of drainage water used to transport and dispose pollutants.

- Intermediate drainage water reuse. At present, most official reuses are conducted by mixing drainage water with canal water at pump stations on main drains. These pump stations play a major role in drainage water transportation and distribution, but have reached a limit, under current operating criteria, for more reuse development. The centralized mixing processes also unnecessarily spread poor quality water, upstream to downstream, when pollutants are discharged along a main drain. More effective drainage reuse in the Delta may be achieved by pumping water from second-level and third-level drains, i.e., intermediate reuse, to facilitate localized demands. The completed Beheira conservation strategy studies of the Water Resources Strategic Research Activity and the on-going work of the Drainage Research Institute (programs supported by the African Development Bank and the Netherlands Government) provide a reference base for the planning of intermediate reuse.

- Possibilities for modifying the current MPWWR drainage water reuse policies, regulations, guidelines, and law enforcement, particularly with respect to safe drain water reuse and distribution of pumping along lower order drains by private individuals.

Other problems and issues related to reduction of drain water volume are the effects of IIP programs, the introduction of zero-discharge on-farm irrigation techniques, etc.. These

programs will undoubtedly affect drainage flow patterns in the Delta and need to be addressed in an integrated manner along with other water conservation policies.

C. Benchmark for Tranche II

The GOE will develop and approve new policies, regulations, and criteria to promote drainage water reuse with appropriate incentives and technical support.

D. Verification Indicators

The GOE will issue new policies, regulations, and criteria on drainage water reuse.

E. Expected Results

Based upon the issuance of a drain water reuse policy package, including reuse criteria, regulations, and associated institutional modifications, more quantity and better quality of drainage water will be available for reuse in the Nile Delta.

F. Studies to be Conducted

Studies will be carried out to address issues of :

- evaluation of current drainage reuse practice;
- assessment of different mechanisms for promoting drainage reuse; and
- environmental, institutional and legal aspects of drainage water reuse.

National Strategy Regarding Irrigation Improvement

A. Background

Further development of Nile River water resources within Egypt must concentrate on conservation and augmentation to meet the water needs of irrigation expansion and the rapidly growing population. Irrigation water is diverted and used in perhaps several cycles from the Aswan Dam to the northern Nile Delta before the remaining flows are discharged to the Mediterranean Sea. These multiple reuse cycles are the basis for high basin level efficiency. It has been suggested that water savings can be realized only where irrigation return flows are lost to salt sinks or by exploiting drainage flows.

This approach accepts the current level of operation and management of the irrigation delivery and on-farm water management systems in Egypt. The fact that there are drainage flows available for exploitation implies there are excessive operational losses in canals and large return flows from irrigation applications. There is nothing wrong with drainage water exploitation. However, this addresses only symptoms of the real problem: 1) inadequate local delivery system resources and infrastructure to measure, control, and manage water distribution all the way to the mesqa level, and 2) inadequate water distribution and management by farmers once they receive water in the mesqas.

Basin scale analyses do not inherently deal with problems of water management and distribution at subregional and local levels and ignore the spatial and temporal value of irrigation water at these levels. Egypt's local irrigation districts and many (if not all) irrigation directorates distribute water in canals and distributaries by maintaining flow levels at specific points in the various watercourses. The volume of water delivered or the discharge in these watercourses is unknown because canal and mesqa cross-sectional parameters have changed over time. Currently, water is not quite well managed/delivered based on local or directorate demand estimates. Depending on the season, operational losses may be quite high, or serious maldistribution occurs (head-end and tail-end effects, etc.).

Low on-farm irrigation efficiencies result in excessive irrigation return flows (surface runoff and deep percolation losses). While it is true that these return flows do eventually reenter the Nile system over much of its length and contribute to downstream water supply, they are degraded quality waters which have lost the original intended value (in time and space) of their diversion.

Local irrigation delivery and on-farm water management improvement projects can result in reduced diversions, thereby resulting in water available for immediate local reallocation and distribution (as opposed to the time delay and spatial departure of return flows reentering the system). Losses to non-beneficial evapotranspiration are reduced. Agricultural productivity increases. Water quality is preserved for downstream uses.

Irrigation improvement projects (IIP) have been implemented on about 100,000 feddans under the Irrigation Management Systems (IMS) Project. Adequate baseline data were not collected and detailed evaluations were not carried out to fully document the impacts of IIP and identify the most feasible alternatives to include in the package of water conservation measures. In addition, continuous flow (as opposed to rotational deliveries) in branch and other distributary canals was implemented, but unfortunately, not fully evaluated in IIP command areas.

Other issues regarding IIP include: concerns that the implementation is too slow, arbitrary methods for prioritizing and selecting areas for implementation, public vs. private sector involvement in construction/rehabilitation, should mesqa renovation be included or

left completely to farmers, and what is the appropriate level of water user association development and involvement.

B. Policy Issues to be Addressed in Tranche II

A national strategy for irrigation improvements should integrate physical (structural), managerial, operational and institutional components in a policy package to address improvements in both the irrigation delivery (from main canal to branch canal levels) subsystem and on-farm water management subsystem. Other components to consider include: farm-level water allocations; local water user participation in planning, management and decision-making in water delivery operations; and cost recovery for sustainability (see Table 1).

The package needs to be flexible to allow adaptation to the significant site differences in Egypt's irrigated agriculture (i.e., not all components of the package may be needed in all areas). The framing and focus of benchmark components considers the following issues in coordination with other proposed Tranche II policy benchmarks:

- physical structure (canals, gates, regulators, turnouts, etc.) improvement and maintenance to improve water distribution, control, and management; to allow water measurement; and to minimize operational losses in the irrigation delivery system;
- equitable distribution and delivery of specific water allocations to the farm gate with enforcement of the delivery of allocations along the entire system, canal to the farm gate;

Table 1. Matrix of irrigation improvements.

Component	Water Delivery	On-Farm Water Management	Local Participation	Cost Recovery
Physical	x	x		x
Management	x	x	x	
Operation and Maintenance	x		x	x
Institutional	x		x	

- development of resources (trained manpower, vehicles, flow measurement equipment, computers, etc.) to fully establish capabilities at the irrigation directorate and irrigation district levels to calculate daily water demands, measure flows, and manage water distribution with deliveries more closely following demand;
- farmer organization into water user associations (WUAs) responsible for mesqa rehabilitation, maintenance, and cost recovery, as well as enhancement of local participation in water delivery planning, management and decision-making;
- on-farm water management improvement programs including technical assistance for physical on-farm irrigation system improvements and irrigation decision making education and support;
- implementation and evaluation of continuous flow;

- identification of areas where improvements are not needed or are not economically feasible.

Because IIP-type projects have been shown to improve the equity of water distribution, those farmers previously short of water receive a more firm supply and may consequently change their cropping choices. There is a concern that this will lead to an increase of rice production area. Farmers must realize the relative value and scarcity of water through an appropriate set of costs for water delivery service and constraints on the volume of water allotted and actually delivered. A water allocation/water delivery policy should be integrated into the national strategy for irrigation improvement.

Drainage and drainage water reuse issues and policies must also be carefully coordinated with policies for national irrigation improvement. Drainage water volumes should be expected to be reduced under the integrated policies for irrigation improvement of this benchmark. Consequently, quality of available drainage water will be reduced. Drainage infrastructure should be carefully analyzed and improvements/additions made to enhance effectiveness of agricultural leaching.

C. Benchmark for Tranche II

The GOE will develop a national strategy for improving water-use efficiency and productivity through irrigation improvement projects. This strategy will include priorities for implementing desired improvements.

D. Verification Indicators

The adoption and publication of a national strategy for irrigation improvement projects.

E. Expected Results

The strategy should consider improvements in physical structures, institutional enhancements, a water allocation policy, a cost recovery program, and farm-level involvement in local and regional decision-making. The strategy should also assign priorities to policies and areas for implementing the desired improvements.

A integrated package of irrigation improvement practices at the directorate, district and farm levels is expected to result in enhanced water distribution which yields: 1) improved crop production, 2) greater profitability for farmers, and 3) more sustainable agriculture. More water will become available for efficient, equitable local distribution rather than being lost from the local area as non-beneficial ET and irrigation return flow.

Systematic extension and implementation of this package will result in reduced diversions and more water left in the mainstem for allocation to other uses, including irrigation expansion, dedication to aquaculture in the lakes of the northern Delta, or others.

The degraded water quality conditions that currently occur throughout the delivery and drainage systems when excessive irrigation return flows mingle with polluted drain flows will be reduced. This will result in river and canal flows of equal or better water quality than currently exist.

F. Studies to be Conducted

Conduct an evaluation of the current status of irrigation improvement projects in Egypt, including:

- continuous flow;
- downstream control;
- mesqas renovation and rehabilitation;
- WUAs;
- single lifting point;
- IAS; and
- cost sharing.

Water User Associations

A. Background

Water user associations (WUAs) provide a local forum and means for cooperatively administering and financing sustainable efficient management, operation, and maintenance of local (mesqa) and regional irrigation and drainage systems. Associations can provide farmers with a greater voice in local decision-making and a forum for implementing cost recovery programs.

About 1,000 water user associations have been established in Egypt, in conjunction with the Irrigation Improvement Program (IIP). That program involves the improvement of mesqas by raising the canals and lining them with concrete, or replacing earthen ditches with buried pipelines. In addition, single-point pumping stations have been installed at the head end of the improved mesqas.

The Ministry of Public Works and Water Resources requires that farmers in IIP areas form water user associations, to facilitate repayment of system improvement expenditures and to operate and maintain the improved mesqas and single-point pumping stations. Several studies have reviewed the experience gained in forming and managing water user associations in IIP areas.

Within Egypt, water user associations have not yet been formed in non-IIP areas. Therefore, no local information is available regarding the potential benefits of establishing water user associations in non-IIP areas within Egypt. The farm-level economic incentives for forming water user associations in non-IIP areas need to be examined before these associations are promoted in those areas. Without clear economic incentives, it may be difficult to form, operate, and sustain successful water user associations.

B. Policy Issues to be Addressed in Tranche II

Successful water user associations can increase the role of farmers in operating, maintaining, managing, and financing local water delivery systems. It may be possible to achieve these goals by establishing associations in areas that have not participated in the Irrigation Improvement Program. However, the Government of Egypt does not yet have a policy allowing the formation of water user associations in those areas.

Due to limits on resources earlier available, information should be gathered in areas where successful associations are still operating and in areas where associations were formed during implementation of the Irrigation Improvement Program, but are no longer in operation. Analysis of the success and failure of water user associations in Egypt will be helpful in describing the potential role of associations in non-IIP areas.

C. Benchmark for Tranche II

The GOE will develop a policy to allow the formation of water user associations in areas that have not participated in the Irrigation Improvement Program, and begin to promote such associations.

D. Verification Indicators

The GOE will develop a policy to allow the formation of water user associations in areas that have not participated in the Irrigation Improvement Program, and begin to promote such associations.

E. Expected Results

Farmers will be allowed to form water user associations in non-IIP areas.

F. Studies to be Conducted

Study the feasibility of forming WUAs in areas which have not participated in IIP.

Water Use on Rice
Water Use on Sugarcane

A. Background

Historically, the allocation and distribution of water in Egypt's Nile River irrigation system have been made by canal commands. Allocations were adjusted to the area served, nationally mandated cropping patterns, and constraints inherent in design capacities of intake structures and control structures along canals. The gross areas allocated by government for specific crops have been modified over the years following completion of Aswan High Dam and in recognition of a net increase of irrigated area of about one million feddans.

Allocations of crop areas have been issued and applied with varying levels of success nationally, within canal commands and at the mesqa level. Policies were adopted for punishing those who deviate from government mandated cropping patterns. However, farm level penalties have not been enforced uniformly and national policy regarding rice and sugarcane areas has not been successful in limiting the area planted to these crops. The continuance of broad government mandates of cropping patterns are contrary to previous and current economic and agricultural sector reform efforts aimed at the development of a free market economy in Egyptian agriculture.

The focus on rice and sugarcane in this benchmark statement results from the perception that these crops use much more water than other crops and therefore their area should be restricted to free up water for other crops or uses. Individual farmers must account for a range of incentives and disincentives at work at the farm level when deciding which crops to grow. These include physical or delivery system constraints, regulatory and management factors, and subsistence and marketplace factors. A focus on allocating or mandating cropped area is inconsistent with current economic reform policy activity in Egyptian agriculture.

Rice

Egypt produces more rice than is consumed allowing a portion of the crop to be exported annually. It is an attractive crop for farmers because of the relatively higher returns per feddan, the lack of water delivery service cost recovery, and the lack of adequate controls on the volume of water farmers may obtain.

A de facto allocation of water per unit area is implied in the design capacity of main canals and intake works and is often quoted based on an assumption that rice will be grown on a maximum of 60% of the area served. This de facto allocation of water fails at some point within the delivery system, resulting in inefficient allocation of water among farmers at the distributary canal and mesqa levels. Farmers producing rice at the head ends of distributaries and mesqas often divert larger volumes of water per unit area than the average the system was designed to deliver. Consequently, with large areas planted to rice in the initial reaches of a command area, downstream water users suffer shortages and the financial burdens of developing supplemental water supplies.

Additional factors affecting design allocations of water include the effects of improper maintenance on canal and mesqa cross sections, unauthorized mesqa outlets and unauthorized pumping from canals or mesqas. Main canals are operated by delivering measured discharges and volumes of water. However, the remainder of the system is operated by maintaining water levels at key points in the system. The volume of water delivered or the discharge in many watercourses is unknown because canal and mesqa cross-sectional parameters have changed.

Rice is a reclamation crop in the northern Delta. Rice is the crop of choice in areas composed of heavy clay soils having extremely low porosity. In other areas, rice in the crop rotation every two to three years serves to leach salts from the soil back to the saline shallow water table thereby allowing other crops to be grown. Upflux of water and salts during the production of these other crops, using current production methods, permits re-salinization the crop root zone.

One study has suggested that leaching under paddy rice in the north and overdraft of the water table aquifer in the southern Delta region reduces the piezometric pressure gradient of the water table aquifer from south to north and encourage seawater intrusion (WRSR-14). Thus, monitoring and control of water pumpage to the south coupled with adequate volumes of good quality leaching water and drainage all must be addressed in a coordinated manner to maintain sustainable crop production in this area.

The MPWWR has attempted to place an upper limit on the annual area of rice production. The focus on limiting the area of cultivation may result because the current condition of canals and control structures is inadequate for efficient regulation of water allocations. From 1987-93 the Ministry's targets ranged from 0.90 million feddans to 1.08 million feddans. The actual area in production was often in excess of these limits by more than 200,000 feddans during these years. In 1995-96 an area of about 1 million feddans was allocated by growing zones. The allowable rice area in each zone decreases progressively from a maximum of 50% of croppable area in zone 1 in the northern Delta to 10% of cropped area in zone 5 in the southern Delta. Penalties to farmers violating the allocation were set at approximately LE 500/feddan, the estimated economic value of the excess water diverted for rice compared to other crops (LE 0.10/ m^3 x 5000 m^3).

Sugarcane

Sugarcane has a growing season of nearly one year resulting in high total crop ET. Estimated consumptive use of sugarcane is approximately 5000 m^3 per feddan per year more than alternative annual crop rotations which might be produced in middle and upper Egypt (although land lies fallow for 1-2 months during the intervals between crops with these alternative annual rotations).

Irrigation diversions for sugarcane have been estimated to average as high as 17,000-18,000 m^3 per feddan, reflecting inadequate water management in mesqa water distribution and on-farm application systems. Small individual farm holdings in intensively cropped sugarcane areas prevent efficient water delivery and distribution to the farm and efficient on-farm distribution and application. In addition, small plantations of sugarcane experience higher consumptive use due to edge effects.

Water quantity and quality savings could be realized by concentrating sugarcane on large plantations in those canal areas with many small plots of sugarcane. Large plantations are amenable to laser-leveling and improved surface irrigation methods. Sugarcane also is adaptable to drip irrigation, an efficient irrigation method compared to surface flooding.

It is estimated that approximately 90,000 feddans of sugarbeets will be produced in Egypt in 1997-98. Sugarbeets have different agroclimatic requirements compared to sugarcane and are cultivated mostly in the lower Nile Valley and Nile Delta. Thus, they are not a direct substitute crop for sugarcane in upper Egypt, although sugarbeets are being successfully cultivated as far south as El Minya in middle Egypt. Sugarbeet processing plants have been established in several governorates and in one instance (El Minya) sugarcane processing machinery has been adjusted to allow processing of sugarbeets.

B. Policy Issues to be Addressed in Tranche II

Based on the above review, the following issues should be considered:

1. Introduction, and adoption of less water-intensive varieties/crops such as shorter season rice varieties having reduced crop water requirements, upland rice varieties and production practices and sugarbeets;
2. Potential for water conservation in the cultivation of sugarcane rests with modifications of irrigation practices and reduction of total water requirements. Water lost to non-beneficial evapotranspiration (ET) will be freed up for other uses;
3. Since a portion of the rice crop is exported, monetary incentives within the production and marketing system are important factors in determining the area dedicated to rice cultivation;
4. Need to frame and adopt water allocation policies which account for companion water, agricultural, and market policies;
5. Empowerment of farmers, WUAs and groupings of WUAs to cooperatively administer water allocations within distributary canal and mesqa service areas;
6. Mandated crop area allocation targets are inappropriate and contrary to policies relaxing constraints on cropping choices by farmer.

C. Benchmarks for Tranche II

The GOE (MPWWR and MALR jointly) will establish a strategy for the optimal water use for rice production

The GOE (MPWWR and MALR jointly) will establish a strategy for the optimal water use for sugarcane production.

D. Verification Indicators

Adoption and publication by the GOE of a strategy regarding water use on rice

Adoption and publication by the GOE of a strategy regarding water use on sugarcane.

E. Expected Results

Strategies should consider policy analyses and development for the potential use of farm-level water allocations to encourage farmers to use less water when irrigating rice and sugarcane, the potential role of new rice varieties, and potential market impacts.

An effective, but limiting, water allocation system will address equitable water delivery throughout canal commands and to the farm level. Along with companion policies to be developed in the agricultural, marketing and cost recovery spheres, farmers will face an appropriate set of incentives to use water efficiently.

F. Studies to be Conducted

- A study of water resources and market issues regarding rice and sugarcane from the perspective of farmers, field irrigation engineers, and Ministry staff and officials.

- A study that examines the potential role and feasibility of a water allocation program, and the ability to control water flows and volumes, in promoting more efficient use of water in agriculture and enhancing

productivity. The study will incorporate results of the study of the current water supply and delivery system.

Appendix 5: Agenda and Attendees of EPIQ Water Resources Result Package Work Plan Workshop, 25-27 September 1997 Port Said, Egypt

Agenda
Workshop on
Water Resources Results Package Project
Port Said, September 25-27, 1997

Thursday Sept. 25

Opening Session

20.00 - 21:00	Formal Presentation	
Speakers:	Mr. Michael Rock	EPIQ / IRG
	Mr. Douglas Clark	EPIQ / IRG
	Mr. Gamil Mahmoud	MPWWR
	Mr. Tom Olson	USAID
	H. E. Dr.. M. Abu-Zeid	Minister of Public Works and Water Resources

Friday Sept. 26

Session I	**Work Plan Presentation**	
8:30 - 9:45		
Speakers:	Abdel Wahab Amer	Workshop Agenda
	Douglas Clark	Policy Versus Infrastructure Development Project
	Mohamed Allam	The Work Plan
		Discussion
9:45 - 10:15	***Coffee Break***	
Session II	**Concepts and Themes**	
10:15 - 11:45		
Speakers:	Dennis Wichelns	Agricultural Water Demand
	Zhongping Zhu	Decentralization
		Discussion
11:45 - 13:30	***Coffee Break***	
Session III	**Concepts and Themes (Cont.)**	

13:30 - 15:00

	Dennis Wichelns	Water Allotment
	Tom Ley	Policy Testing Areas
		Discussion

15:00 - 15:30 ***Coffee Break***

Session IV **Concepts and Themes (Cont.)**

15:30 - 17:00

	Michael Rock	Policy Components
	Ahmed Fakhry Khattab	Collaboration
		Discussion

Saturday Sept. 27

Session V **Concluding Remarks**

9:00 - 10:30

Mohamed Allam
Douglas Clark
Craig Anderson
Tom Olson
Gamil Mahmoud

List of Participants

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Workshop Concluding Comments by Eng. Gamil Mahmoud

Thanks to you all for attendance and positive participation in this workshop. Thanks to the EPIQ Staff for their excellent presentations. Thanks to MPWWR Staff for their constructive discussions which have made the workshop alive. Thanks to Mr. Mahmoud Nour and Mr. Max Goldensohn for accepting our invitation and for their constructive comments. Thanks to USAID for their support to the project and to the workshop and we are looking forward for more cooperation in the future.

The workshop has achieved the designed goals and objectives, namely:

- Dissemination of the results package among the senior officials of the Ministry.
- Introduction of EPIQ team to the senior officials
- Clarification of the project nature and objectives
- Outlining directions and providing guidance to the EPIQ team.

The discussion shows that EPIQ team has succeeded in preparing an excellent work plan which responds to the Ministry needs as outlined in the statement of work. Given the Policy nature of the project and the need for policies which achieve the ministry interests and contribute to a better management and allocation of available limited water resources, a very close working relationship with the ministry is essential.

The steering committee will examine various alternatives and mechanism to ensure this working relationship, and recommendations will be developed in this regard. The steering committee will investigate also the feasibility of utilizing some of the cash transfer to compensate the incurred costs.

Based on the early review of the work plan and discussions made in the workshop, specific comments on the work plan are as follows:

- Water allotment is probably difficult to implement under the Egyptian irrigation / agricultural conditions. It is not also adequate to concentrate the effort in this early stage on one alternative for improved water management, and disregard other options. It is better to be more general and flexible in the work plan, stating that various management options will be examined.

- The Egyptian resources system is a centralized one by nature. One major source (Lake Nasser) and a distribution system. The lag time is large from Lake Nasser to the Delta. Decentralization at the lower fringes of the system may be required for better operation and management. Such decentralization schemes should not be in conflict with system reliability and sustainability which can only be insured through a centralized operations and management.

- More coordination between EPIQ team and APRP contractors and activities are essential for reflecting and coordinating the liberalization policies in other related sectors to the proposed policies and strategies for the ministry.

Finally, I would like to thank you all and looking forward to seeing you soon in another workshop for presenting the developed policies.

Appendix 6: Project Implementation Plan

Appendix 7: An Action Plan for Irrigation Water Cost Sharing

(support of APRP Tranche 1 Benchmark)

An Action Plan for Irrigation Water Cost Sharing

Phase 1—Studies and Analysis of Cost Sharing

1. Allocation of costs among agricultural and non-agricultural water users (completed).

2. Formulation of alternative plans for introduction of service charges for the various water users (completed).

Several studies have been conducted in recent years with the goal of describing the appropriate distribution of system costs among the water-use sectors.

ISPAN and IIMI have produced reports that describe the annual costs of operation and maintenance of the Nile water delivery system, methods for allocating those costs among water users, and recommendations for implementing a water delivery service cost recovery program.

3. Revisit of previous studies.

Previous cost sharing studies to recover the annual costs of operation and maintenance will be reviewed. Cost estimates will be updated, as appropriate, to reflect current conditions and any changes in system operations that may have occurred since the original reports were prepared. Previous recommendations for implementing a cost sharing program will also be reviewed.

Estimates of water user's ability and willingness to pay for water delivery services will be reviewed and updated, as appropriate.

Constraints on the design and implementation of a cost sharing program including technical, economic, administrative, political and social issues will be summarized.

Phase 2—Preparatory Activities

1. Field survey of farmers attitudes to service charges.

Irrigation agriculture is the major user of Nile River water. A field survey of farmer's knowledge of water delivery service costs, and attitudes towards cost sharing, will provide important information regarding farmer's willingness to share costs. Additionally important baseline information will be gained for use in development of public information and education programs to increase awareness of the need for a main system cost sharing program.

2. Politically and socially acceptable options for cost sharing mechanisms for the different water users.

Religious and cultural considerations bring forth significant objections to cost-sharing by farmers. Another social obstacle is the problem of achieving sustained group action among farmers along tertiary watercourses, brought about by conflicting interests among head-end and tail-end farmers, and by differences in social and economic status. The major economic constraint is ability of farmers to pay for water. This is especially true for small holders or tenant farmers of limited wealth. Any new charge will be challenged as

a threat to their economic well-being. These issues should be analyzed in order to design, evaluate and implement an appropriate cost recovery program.

3. Selection of potential areas for pilot implementation.

Policy test areas in which alternative cost sharing mechanisms and/or strategies can be implemented and evaluated will be identified. Criteria to consider in selecting these areas will be developed in consultation with Ministry officials. Valuable information can be gained through these test areas regarding implementation difficulties, etc. Strategies for implementation may then be revised as necessary.

4. Public awareness campaign(s).

Program(s) to disseminate information to the public and increase awareness of the need for a main system cost sharing program will be conducted. Issues specifically raised by farmers concerning cost sharing shall be considered in the design and delivery of public awareness campaigns.

Phase 3—Implementation and Evaluation

1. Formulation of alternative charging mechanisms.

Based on the review and update of previous work, surveys of farmers and consideration of socially and politically acceptable options for cost sharing mechanisms, alternative cost sharing schemes will be formulated.

Two broad categories of charging instruments may be considered. One category, which may be more applicable to irrigated agriculture, is a flat land charge. Flat land charges are relatively easy and inexpensive to administer, but often do not result in the optimal economic use of water in irrigation.

The other category is a charge based on volume of water use and is applicable to irrigation as well as other water use sectors. This approach requires the resources and the political will to measure water use. While it encourages economically efficient water use, and is fair in the sense that each user pays according to water used, the cost of measurement and adverse social attitudes toward water pricing represent significant drawbacks.

2. Implementation of politically and socially acceptable alternative cost sharing mechanism(s) in pilot areas.

Acceptable alternative cost sharing mechanisms will be tested in the previously identified policy testing areas. Given that there might be more than one mechanism which the Ministry is interested in evaluating, implementation tests may occur in several areas, each having a possibly different approach under study.

Local irrigation officials, representatives from other water use sectors, water user associations (or committees) and individual water users will be involved in the design, planning and implementation tests.

3. Field testing of charging mechanism(s).

A plan for collecting information and data for evaluating the cost sharing mechanisms shall be designed and implemented within each implementation test area. This evaluation plan will be conducted during this activity. In addition, any unforeseen implementation problems and difficulties, and other relevant information will be recorded and documented.

4. Evaluation and recommendations.

Test area implementation evaluation data and information will be analyzed and summarized in a report. Recommendations regarding the cost sharing mechanism tested will be formulated with suggestions for improvements.

5. Identify institutional, budgeting and infrastructure requirements for collection and utilization of service charges.

Legal and political actions are needed to draw up specific legal provisions authorizing cost recovery, fund collection methods, and the fate and utilization of collected funds. Other steps include setting the rate structure(s) for cost recovery in the various water sectors and the terms upon which rate(s) may be paid.

Parliamentary approval of a national main system cost sharing will need to be obtained. Steps necessary to achieve this, including a time frame, need to be identified.

Management initiatives may be necessary to assure that water supply officials fulfill their obligation for providing better water delivery.

6. Development of a national plan.

A national workshop for senior MPWWR officials and professionals of other concerned ministries will be conducted to present and discuss the results of pilot area studies; the institutional and legal requirements and the proposed cost sharing mechanism(s). The potential political, social and institutional implications of alternative cost sharing scenarios will be addressed.

Following this the Ministry will organize a roundtable meeting for senior officials of concerned ministries and sectors to discuss, review, revise, and approve the findings of the national workshop; and develop a national action plan for implementing a cost sharing program.

Appendix 8: Current Contents of EPIQ Team Library