

# **PARTICIPATORY IRRIGATION WATER MANAGEMENT IN EGYPT: REVIEW AND ANALYSIS**

**M.N. ALLAM**

Department of Irrigation and Drainage Engineering  
Faculty of Engineering, Cairo University, Egypt

**SUMMARY** – This paper presents a review and analysis of different trials and projects in Egypt for introducing as well as strengthening farmers' participation in irrigation management. The impacts of irrigation improvement projects are improvement of conveyance efficiency, reduction of irrigation time, equity of water allocation between the head and tail of the Mesqa, land saving due to construction of improved Mesqa, increase in crop yield, decrease of irrigation application cost, etc.. Different forms and scales of implementation of participatory irrigation management are discussed including branch canal water user associations, water boards, deep groundwater user associations, drainage users associations, etc.. The paper underlines the necessity for the application of different participatory irrigation management models to reflect the essential differences between: the old land, new land and mega projects. These models could be different in the level of participation, stakeholders, and financing sources and mechanisms.

**Key words:** water management, irrigation improvement projects, water user associations, Egypt.

## **INTRODUCTION**

Water plays an essential role for providing the basis of population stability and civilization. The Nile River in Egypt has supported the longest civilization over the history, which lasted for more than seven thousands years. Egyptians, throughout the history, were careful to utilize the Nile water. During the last century, they installed an invaluable water structure; High Aswan Dam (HAD), which is providing controllable water releases pattern over the year and serves about 99% of the Egyptians who are living on small lots along the river. Egypt's share of Nile water is 55.5 billion cubic meters annually, according to the 1959 agreement between Egypt and Sudan. After the construction of the HAD, Egypt started a new era for development and the cultivated area has been expanded to reach 8.0 million feddan (about 3.4 hectares) and is cultivated about twice a year. The government of Egypt continues to invest heavily in expanding the cultivated area, to add another 3.4 million feddan by year 2017, to secure food for the rapid increase in population.

Released water downstream Aswan Dam is distributed among regions and districts through canals and pumps, along the Nile reaches, to meet different water requirements such as agriculture, industry, municipal, etc. The canal hierarchy includes principle canals (Rayah), main canals, branch canal and distributaries canals. This canal system is called public canals where the government is responsible for its operation and maintenance. Water flows in the branch and distribution canals on rotation bases according to types of crops grown on the canal. The public canal system delivers water to private channels called "Mesqas" serving an area ranging from 50 to 200 feddan. Mesqas feed farm ditches, which are called "Merwas" serving up to 20 feddan. Farmers are responsible for the operation and maintenance of Mesqas and Merwas. The private ditches are usually however, subject to deterioration due to the poor maintenance conditions. Therefore, Egypt started in the middle of 1970s recognizing the importance of improvement of farmers' performance through organized operation and maintenance mechanisms. Since then, considerable efforts have been carried to come up with suitable policies to be adopted for farmers' participation in irrigation management.

This paper presents a review and analysis of different trials and project in Egypt for introducing as well as strengthening farmers' participation in irrigation management.

## **WATER USE AND MANAGEMENT PROJECT (EWUP, 1977-84)**

The Ministry of Water Resource and Irrigation (MWRI) started in 1977 EWUP- sponsored by USAID- to examine the feasibility of introducing advanced irrigation technologies to what was called the old lands in

Egypt, which include most of the cultivated areas in the Nile Delta and in the Nile Valley. The objective was to reduce the considerable water losses that were recorded from canal tails and Mesqas.

Three pilot areas have been selected in different climatic regions in Egypt. One pilot area was selected in Kafr Elsheikh where the climate is moderate representing the Delta region, the soil type has 60% clay and the water table is about 50 cm from the ground surface. The other pilot area was selected in Giza governorate to represent the sand and light clayey soils. The third pilot area was selected in Menia governorate to represent the Middle Egypt climate in addition to the soil type having a 40 – 67 % of clay. The water table in this area was found far from the ground surface. The study in these three pilot areas involved professionals from different fields such as irrigation engineers, agronomists, agro-economists, and sociologists in order to cope with the integrated approach that was utilized to improve the irrigation methods at the farm level with farmers' participation in operation and maintenance of the on-farm irrigation systems. An increase in crop production was expected as a result of field irrigation improvement and involvement of water users in operation and maintenance.

The results of the EWUP concerning farmers' participation may be summarized as follows:

- Farmers must play a role in ensuring more efficient operations, improved maintenance and protection of physical works;
- Farmers should become involved in the improvement works of the main system and in water management practices;
- The need for a special well-trained cadre of professionals for irrigation advisory services (IAS) for generating new farmer responsibilities related to water delivery, water use and organization of farmers and to train farmers in these skills;
- Continuous farmer involvement is essential for improved operations, water scheduling, Mesqa improvements and renovations of branch canals;
- Three renovations were suggested to the irrigation system. These included introducing of continuous flow in the branch canal instead of the rotational flow, physical rebuilding of existing Mesqas and replacement of individual pumping by collective pumping.

The program showed promising results for improving the agricultural production and conserving water in old lands. Consequently, by the end of 1984, the government set out the National Irrigation Improvement Program aiming at implementing this program on a nationwide scale. In 1985, the People Assembly approved the policy of implementing a National Irrigation Improvement Program.

## **IRRIGATION IMPROVEMENT PROJECT**

During the period 1985-1988, the Regional Irrigation Improvement Project, as a component of the USAID sponsored Irrigation Management Systems Project (IMS), implemented the recommendations of the previous EWUP. The project selected Serri Canal as a pilot area with 120,000 feddan (50400 ha) in Menya Governorate. During the three years, the project identified the irrigation problems in details for two areas on the canal; Beni Mazar and Herz Elnomania. The project completed also a detailed design for improvement of the Serri canal with a total length of 115 km. Moreover, a Water Users Association (WUA) was initiated in Herz Elnomania and a plan for establishing a national irrigation advisory service (IAS) was completed.

In 1988, Sir M. MacDonald & Partners LTD completed feasibility analysis for another eight command areas. The study focused mainly on rehabilitation of the main water delivery system, but it recommended some improvements to the Mesqa system. In December 1988, the ministry of water resources and irrigation (MWRI) started implementation of the irrigation improvement in these command areas.

The irrigation improvement project required replacing the traditional low-level Mesqas from which water has to be lifted by the framers. IIP includes that, basically, farmers have the choice between two alternative types of improved Mesqa designs to replace the old low-lying Mesqas: (a) raised and lined Mesqas which are open or (b) buried low-pressure pipelines. The raised Mesqas are provided with gravity turnouts while low underground Mesqas have alfa alfa valves to feed individual farm Marwas.

In order to become fully operational and to achieve the objectives of equal water distribution along the Mesqa and increased farm productivity, the IIP technical improvement package requires a relatively high level of social organisation between farmers who need to manage communal pumping stations, take turns irrigating and set their own policies to oversee water delivery. The development of private Water User Associations (WUAs) is therefore a social pre-requisite for technical innovations to become effective. Further, farmer's perceptions of ownership and irrigation requirements are crucial to ensure sustainability of the

project. During the course of the project it is intended to form approximately 3,100 Water User Associations for the management and operation of improved irrigation systems. Moreover, 67 federations shall be formed by the associations to monitor the delivery of water from secondary (branch) canals into Mesqas under conditions of continuous flow.

Eleven pilot areas for IIP have been selected to implement the IIP package over the period 1989 – 1996. The total IIP gross area is 393,669 feddan (hectare is approximately 2.4 feddan) scattered in different regions in the Nile system. The implemented activities of the irrigation improvement project may be summarized as follows (WPRP, 1998):

- Conducting feasibility studies for all command areas;
- Improvements were made to the main delivery system and Mesqa system in 129,000 feddan;
- Improvement of Mesqas in 67,000 feddan;
- A number of 1,100 WUAs have been formed and got into fully operation;
- Training of 9,000 WUAs leaders.

### **The impacts of the Irrigation Improvement Project (IIP)**

The impacts of the irrigation improvement project (IIP) may be summarized as follows:

- The conveyance efficiency in the branch canal and Mesqa has improved from about 70% to reach about 98%;
- Reduction of irrigation time ranged from 50 to 60% that of before IIP
- Equity of water allocation between the head and tail of the Mesqa. Before IIP, most of tail end farmers suffered water shortage;
- Land saving due to construction of improved Mesqa as compared to areas occupied by old Mesqas. There is about 2% of the total command area has been saved and made available for agriculture;
- Increase in crop yield due to the better condition of water availability. Increase in crop yield ranges from 5% to 30% according to crop type;
- Cost of one irrigation application has decreased from LE 15.84 to LE 7.59 per feddan, i.e. 51 % reduction for winter crops, while this reduction was 57% for summer crops;
- The IIP innovated system had positive impacts on the public health particularly for the tail-end users. This system has contributed to the availability of fresh water at canal end. Therefore, tail-enders is no longer pumping polluted drainage water and consequently, farmer exposure to pathogens is reduced. Buried pipeline Mesqas do not provide the favourable living conditions for snail hosts;
- A significant accomplishment was the development and passage of national legislation providing the legal basis for WUAs and for the mesqa improvement cost recovery. Law No. 213 was passed in 1994 as an amendment to the irrigation and drainage Law No. 12 of 1984. Bylaws were developed and approved, and ministerial decree No. 14900 was issued in February 1995 for the implementation of the legalization and registration of WUAs and for improvement of the capital cost recovery of the Mesqa;
- Irrigation Advisory Service (IAS) is a newly initiated governmental agency. The primary mission of the IAS is to facilitate and assist in the formation of WUAs. It also assists in providing technical assistance to water users for Mesqa improvements, operation, maintenance, and irrigation scheduling among farmers.

### **BRANCH CANAL WATER USER ASSOCIATION (BCWUA)**

MWRI has recognized that the participatory approach in irrigation management should be extended and scaled up to a higher level. The initial thoughts were to establish a federation of WUAs sharing one branch canal. Through the USAID sponsored Water Policy Reform Project (WPRP)-a component of the Agriculture Policy Reform Project (1997-2002)- the Government of Egypt and USAID agreed to implement participatory irrigation management at the branch canal level. The agreement was: "The GOE will decree a policy and initiate an action program for the formation of water user associations at the distributaries and branch canal levels."

Therefore, the proposed federation of WUAs was then called Branch Canal Water Users Association (BCWUAs). This benchmark aimed to formulate a common work plan and strategy for BCWUAs. The purpose of BCWUAs is to represent a collective association of cultivators on a branch canal, and to liaise with the Irrigation Department of MWRI in all matters related to operation, maintenance and management of

the branch canal. MWRI had successfully implemented the agreement and the results may be summarized as follows:

- Preparation of the documentation of BCWUAs processes in social organizations and issuing the related ministerial decrees.
- Forming four BCWUAs for Qemri, Bahr el Dahram and Balaqtar branch canals (Lower Egypt) and El Reity canal (Upper Egypt)
- Developing a list of the Executive Councils for each BCWUA
- Developing Cost-sharing plans at two of the locations, i.e. Qemri and Bahr el Darham branch canals.

There are many social benefits of farmers' participation that cannot be easily quantified or measured in economic terms. It is always important to acknowledge, that whatever the social benefits, participation also imposes some costs to farmers in the form of time and other resources spent in these activities. In the initial stages, farmers must become more involved in branch canal management, with minimal opportunity costs to them, i.e. they should be reimbursed for participation in branch canal O&M which will allow them to build up a small capital reserve for the BCWUA. This system should continue over several years until the farmers have sufficient economic resources and incentives to assume more managerial, fiscal and record-keeping responsibilities. It is believed that opportunity costs for such participation can be greatly minimized.

## **WATER BOARDS**

Water boards, as farmers' participation in water management at secondary level is a new concept in Egypt. Focus in Fayoum is on testing different forms and degrees of joint management, and different organisational models have been developed. Within the rather strict legislation two different models are presently being tested in ten secondary canals: one consisting of farmers only; and another including both farmers and officials. Activities are directed at planning and monitoring of construction, rehabilitation and maintenance works in the irrigation system and in the installation of the sub-surface drainage system. The executive board of the WB consists of 5 to 9 members; Treasurer, Secretary, member for maintenance, member for drainage, member for water distribution, member for residential water management issues, member of complaint management, and member of industrial water management (WBP, 2001). Therefore, the role of water users will be scaled up to take care of not only irrigation but also other water requirements such as municipal and industry. Their role is also planned to take care of pollution protection.

### **Fayoum Water Management Project (FWMP)**

The Fayoum Water Management Project -sponsored by the Government of Netherlands- started in 1993 and has been extended over three phases, which will be ending by April 2004. Over time, the project support has shifted from technical interventions and infrastructural improvements towards institutional development. The institutional development encourages farmer's participation in specific governmental water management tasks. Since 1995, 32 pilot Water Boards (WBs) were initiated in Fayoum. Activities of these Water Boards include both irrigation and drainage. At present, the project is testing the formation of a federation of water boards in order to improve water distribution for a larger command area.

In order to establish water boards, the project followed some steps that include:

- Awareness raising and introducing the idea of water boards through mesqa meetings at district and village;
- Assessing the social structure in the area;
- Identify key persons in the mesqa level;
- Identification and election of mesqa representatives to become committee members;
- Form the committee members an executive board is elected depending on the size of the area;
- More detailed extension and training on water boards to the committee members;
- Identify the key female persons in the residential areas to establish a platform discussing water quality;
- Election of two or three women according to the size of the platform, those women may become members in the committee and after this will possibly be elected on the executive board.

The FWMP outcomes may be summarized as follows:

- Establishment of 32 WBs in Fayoum over the period 1995-2003;
- FWM is presently setting up a pilot with establishing three Federations of Water Boards, consisting of a representation of WBs.
- Preparation of memorandum of understanding (MoU) between the ministry and WBs to facilitate implementation of WBs activities;

- Water Boards became involved in the following activities:
  - Joint planning and monitoring of construction, rehabilitation and maintenance works executed by FID and EPADP;
  - Execution of channel maintenance works by the WB; and
  - Participation in planning and design of sub-surface drainage systems.

A major activity of WBs is weed control. By contract, using the **length men system**, WBs maintain the canals on a monthly basis. Not only is this method very efficient, it is also an excellent tool for the development of WBs as it is a recurring activity requiring planning, organisation, and financial accountability.

The development of WBs has had positive effects on the water distribution within the secondary canal system. This is most notable from changes in cropping patterns. There is a marked decrease in the areas under fallow, especially during the summer seasons. Other major effects, though more difficult to quantify, are improved relations between engineers and farmers and diminishing conflicts between farmers in the area.

The experience from Fayoum indicates that there are clear benefits to be gained from active involvement of farmers in water management at the level of secondary canals. However, the existing legal constraints risk making present endeavours less sustainable. Although some organisational forms are permitted present legislation is too restricted to allow for effective, motivated and sustainable WBs in the longer term. In 1997, the Minister of PWWR issued a decree confirming and supporting the efforts in Fayoum. Authority was delegated to the Under-Secretary of State/Head of Central Department to establish WBs in Fayoum, and new WBs have been established and implemented for the joint planning, monitoring and execution of works.

Sustainability and reliability of the water boards remain a major concern. Revision of the Irrigation Law needs to consider aspects of water boards.

### **Water Board Project (WBP)**

The WBP - sponsored by the Government of Netherlands - started in 1999 and has as objective "to develop a vital national policy and a legal framework for participatory water management improvement at secondary level". The WBP established 10 WBs at secondary canal level, mainly in the Nile Delta region (Egyptian-Dutch Advisory Panel Project, APP, 2003).

A process approach has been adopted to achieve the project objectives and outputs, and the following activities have been successfully implemented (WBP, 2001):

- Development of sustainable 10 Water Boards in pilot areas at secondary levels;
- Development of a training approach for ministry staff and Water Board committee members on participatory water management;
- Development of monitoring and coordination system for nation-wide establishment of water boards;
- Definition of the role and functions of the ministry with respect to the functioning of water boards after their establishment;
- Formulation of legislative amendments;
- Initiation of support by national and regional leadership.

The following are perceived impacts of the project:

- Equity in water distribution;
- More efficient use of water;
- Integrated water management at branch canal (irrigation, drainage, and pollution issues);
- Farmers can participate in maintenance priorities;
- Improved maintenance;
- Reduced pollution of canal/drain water.

The project has the initiative to propose the amendments and modification of the Irrigation Law to consider establishment and operation of WBs.

### **DEEP GROUNDWATER USERS ASSOCIATION**

Under the USAID sponsored Water Policy Reform Project (WPRP), a benchmark was to study and adopt policies for reducing water loss and land degradation due to improper operation and management of free-

flowing groundwater in the reclaimed areas of the Western Desert. One of the study activities was to establish water users (unions) associations to be responsible for:

- Scheduling and distribution of well water;
- Matching cropping pattern and water requirements;
- Referring water delivery problems to appropriate service providers;
- Conflict resolution among water users;
- Participating with local authorities in solving common irrigation problems.

The work plan was developed setting out a strategy for implementing the groundwater user development program. The main features of this organizational strategy stress consultation with farmers and dialogue between farmers and MWRI officers.

- In consultation with groundwater using farmers, MWRI officials in Frafra, and local leaders, identify main problems and priorities regarding irrigation, drainage, and agricultural production.
- Identify initial set of well-water command areas on which to establish the first WUUs.
- Prepare list of WUU roles and responsibilities.
- Multiple meetings with all farmers on the selected wells to assess the land served by the wells and the condition of the mesqas.
- Conduct a series of meetings among the farmers on each well to orient them to WUU formation concepts and responsibilities, and to arrive at a consensus regarding WUU objectives.
- In collaboration with farmers and MWRI officials, draft WUU charter documents.
- First meeting of WUU General Assembly is held, at which time the Executive Council is elected from among the general membership.
- The WUU Executive Council selects its board of officers, *i.e.*, Chairman, Treasurer, and Secretary, from among its members.
- Orientation Training Sessions for irrigation engineers and technicians and WUU Executive Council on respective responsibilities and roles of each set of stakeholders.

Three new Water User Unions are formed in the West Qasr El-Farafra area. The study recommended that the program of formation of water user organizations started in West Qasr El-Farafra should be continued throughout the reclaimed areas of the Western Desert oases. These organizations can play a significant role in ensuring success of the policies for control of free-flowing well discharge to prevent water wastage. Their anticipated role in providing seasonal information on cropping patterns planned by farmers is an essential part of implementation of the recommended policies.

#### **DRAINAGE USERS ASSOCIATIONS (DUA)**

Formation of DUA started since 1992 by the Egyptian Public Authority for Drainage Projects (EPADP). The role of the DAU was identified and based on the three-implementation stages of tile drainage projects as follows:

- To assist drainage engineers conducting the field surveys and investigations required for design of tile drainage system;
- To monitor the construction of tile drains; and
- To maintain the system.

According to EPADP, there are more than 1600 associations of drainage users comprising 18,000 feddan (7560 hectares) and 7,000 farmers. It should be noticed, however, that the formed DUAs are not generally spread in areas with drainage installations. In Damanhour they were not functional any more while in Fayoum farmers, although invited after the implementation of sub-surface drains, did not form any DUA. Apparently, under present conditions farmers do not have an interest to organise themselves on drainage matters only.

#### **IRRIGATION MANAGEMENT TRANSFER (IMT)**

Under IMT models in other countries, private sector entities assume managerial control, but not ownership over the physical infrastructure and its operations. These management entities normally operate over relatively large areas, and can be in the form of water user associations, irrigation districts, water management districts, private irrigation authorities, cooperatives, or shareholder enterprises. They are usually financially autonomous, within parameters established by enabling statutes or decrees, and are able to hire or contract for technical operational and management services. Management transfer can be partial, incremental or total. Although irrigation management transfer (IMT) is now a major feature of irrigation delivery in many other countries, this approach is still to be attempted in Egypt.

Under WPRP, a plan for partial transfer through branch canal O&M cost sharing was negotiated with two BCWUAs and the GOE. Objective of this initiative are:

- GOE formally determines the prerequisites for introducing the hand over of management responsibilities to stakeholders and/or the private sector.
- GOE defines the strategies and steps required to implement partial, incremental and total management transfer in all categories of land, including old lands; and
- MWRI issues a policy document on transfer of irrigation management responsibilities to the private sector.

A Ministerial Decree designating the pilot areas was issued by the MWRI Minister, to be later followed by under secretarial-level decrees for detailed implementation of IMT package. These pilot areas were selected according to criteria to cover different water management aspects in Egypt. The selected areas are:

- New Lands: New Shebab in Sharkaiya (high water delivery cost);
- Old Lands: El Nazl area of El Bahr El Sagheer in Mansoura (partially improved tertiary command area); Beni Abeid of Serry Canal, El Minya (improved system under USAID-funded IIP);
- Old New Lands: South Tahrir in Beheira (opportunity for integrated water resources, surface and ground water)

Four Branch Canal Water User Associations (BCWUAs) have been formed and a Memorandum of Understanding (MOU) has been signed between the MWRI and the BCWUAs, but transfer is presently waiting for system rehabilitation.

## LIMITATIONS AND CONSTRAINS

Reviewing the situation of participatory approach in the irrigation system in Egypt could reveal some facts that need to be clearly addressed. It could be worth listing here the on-going activities and trials of participatory approach and associated constraints:

- a. *Formation of Water User Associations (WUAs) at the Mesqa level for operation and maintenance (O&M) of improved Mesqas (IIP/USAID/World Bank).* According to Law 213 of 1994, users are required to pay for O&M as well as improvement costs. This program is presently underway, and a new program (Integrated Irrigation Management Project, IIMP) covering an additional 500,000 feddan has been approved and will start in early 2004. The new program has a wider technical and institutional scope, as it includes among other activities land drainage improvement, water quality management and formation of water user organizations at the branch canal level (the command area of a branch canal is approximately 8,000-10,000 feddan).
- b. *Formation of branch canal water user associations (BCWUAs) in four pilot areas in Salhia, Dakahlia, Behaira and Qena to participate in the management of these canals (WPRP/USAID).* These four associations are basically to act as spokespersons for the farmers and to provide MWRI with suggestions regarding water issues in the area. They are not responsible for the O&M of the system.
- c. *Formation of three WUAs for management of deep groundwater wells in the Western Desert (WPRP/USAID).* The government is establishing more WUAs for the management of similar wells, however, there is no legal basis supporting these organizations.
- d. *Pilot study to transfer operation, maintenance and management of branch canals to the BCWUAs and/or the private sector (WPRP/USAID).* Four BCWUAs have been formed and a Memorandum of Understanding (MOU) has been signed between the MWRI and the BCWUAs, but transfer is presently waiting for system rehabilitation.
- e. *Introduction of Drainage Committees for maintenance of the collectors and to participate in the planning of field drainage systems (INTESP/Netherlands).* The Drainage Committees are regarded as a transitional step prior to establishing Water Boards in the study areas.
- f. *Formation of ten pilots Water Boards at the secondary (branch) canal level in the Governorates of Sharkia, Kafr El-Sheikh, Qena and Alexandria (WBP/Netherlands).* The Water Boards are formed from the farmers using these canals to operate and maintain the canals. The Boards are not fully functional yet, as a legal basis for their formation and management exists and no financing mechanism is available for their operation. Farmers' participation in providing O&M costs is not explicitly addressed. The project in collaboration with MWRI is in the process of establishing two more Water Boards, and expansion of the concept to the district level is in the planning stage.
- g. *Formation of thirty-two Water Boards at the secondary canal level in Fayoum (FWMP/Netherlands).* The boards are partially functioning particularly for weed control and small rehabilitation works as they are financed from the project. A federation of twenty-two of these water boards is established at

a feeding canal level. There is no governmental representation in either the Boards or in the federation, and there is still no legal basis for Water Boards and their operation.

Although there are intensive efforts that have successfully introduced the concept of water users participation at different levels of the irrigation network starting with the *Mesqa* and up to the branch canal, still, the level of water users participation remains limited. The average size of a branch canal command area is about 8,000-10,000 feddan. Most of the user organizations still are not functioning, as intended as they do not have a legal standing, and no clear strategy exists regarding their long-term financing. The revision to Law 12 will provide the required legal basis. Due to the nature of this law, MWRI is proceeding cautiously. The proposed revision is under review by the Irrigation Committee of the Peoples Assembly at present and MWRI officials provide clarifications and briefings to the committee periodically. MWRI also continues to meet with stakeholders to explain the revision and to build a consensus.

There also continues to be some confusion over the differences in approach and composition of BCWUAs and Water Boards, with some advocating that the titles and concepts simply be unified. Another alternative is to use the different titles for different levels of the system, for example: WUA (for *Mesqa* level), BCWUA, FCWUA (feeding canal WUA), and Water Board at the District level. The Board at this level may include representatives of government institutions and other stakeholders besides farmers. Some of the user organization concepts currently being tested also include water quality. Financing arrangements under consideration include: transfer of part of the MWRI budget; and allowing user organizations to collect land, or other taxes. Only limited consideration has been given thus far to the organization of non-irrigation water users such as municipalities, boat operators, industries and fishing communities. Duplication exists among different donor-supported activities such as WPRP, WBP and FWMP and coordination of efforts could save time and money. This coordination may be managed through the already existing steering committee in MWRI, which is responsible for coordinating the donors programs and activities.

## CONCLUSIONS

Apparently there are some overlaps and duplication among some of these programs of stakeholders' participation and water user organizations. Also, the introduced policies and concepts have not been effectively coordinated or linked to each other. This probably is due to the nature of these programs, as most of them are focusing only on few issues and are designed in a way that they cannot easily be linked to each other.

Though there has been considerable experimentation with and acceptance of approaches to improve water users' participation in water policies and programs, no clear consensus has yet emerged on how best to operationalize these concepts. Also, most of the discussion about user organizations has been those in the agriculture sector, with fishers, cruise ships, urban users, industries and others not yet fully considered. As higher levels such as district or directorate levels are included, a much wider range of users will need to be involved.

The major comments and recommendations that can be addressed are as follows:

- Different participatory irrigation management models are needed to reflect the essential differences between: the old land, new land and mega projects. These models could be different in the level of participation, stakeholders, and financing sources and mechanisms.
- Formation of water user organizations for drainage is not feasible, and farmers' participation should be through one of the already piloted and tested associations (WB and BCWUA).
- Participatory Irrigation Management (PIM) organizations should not be governmental but private, and should be self financing and responsible for the O&M of their systems.
- Water allocations and water trade concepts are questionable for the Egyptian conditions and need further study. The most critical question is that: are farmers able to allocate water among themselves and deal with water stress? Are they able to adjust their cropping pattern to cope with the water shortage?
- PIM is accepted by GOE and therefore is a national policy, but still more time is needed to arrive at the adequate models which suits the local conditions. The recommended models may be tested in two governorates, one in the old valley and the other in the new valley.

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