

EGYPT: THE ROLE OF WATER USERS' ASSOCIATIONS IN REFORMING IRRIGATION CASE # 110

The case describes the institutional and management changes involved in introducing participatory irrigation management in Egypt, in the context of wider policy changes. The government of Egypt is now committed to a long-term irrigation improvement program, which will continue for the next 15 years.

ABSTRACT

Description

Egypt's water resources are severely constrained, at less than 1000m³ per person. This calls for increasing the water use efficiency by improving irrigation management practice, as the agriculture sector is the main user of water resources. Much of the irrigation infrastructure is elderly and in need of rehabilitation. The irrigation improvement program (IIP) is one of the large-scale projects to help Egypt in the 21st century in order to sustain its ambitious development plan. The program involves a combination of technical changes and infrastructure investment, together with institutional and organisational changes in the way irrigation water is managed. Of key importance, Water Users' Associations playing a major role in decision-making and the operation and maintenance of the pumps and mesqas by themselves, with minimal assistance from the Irrigation Advisory Service (IAS) staff. The fundamental change introduced by the irrigation improvement is to replace individual farmer pumping at multiple points along the mesqa (irrigation ditches) by collective single point pumping.

In addition to the above primary aims, there are many other aspects to the project, including intensive training for water users, the IAS, and all levels of personnel involved to the top of the ministry; special studies and seminars, workshops to help the execution of such a program.

Lessons learned

- The new programme has been built of the experience of earlier irrigation programmes; there is a body of knowledge that has been tested and piloted which provides underlying strength to the new reforms.
- In order to increase the efficiency as well as the performance of the system, users' participation in the management is a must since their decisions and ideas have a great impact on the operators and the modernization process of the systems would assure the sustainability of the system.
- Increased crop production and achievement of real water savings in the system is dependent on the awareness and understanding of both users, and operators and managers of the system.
- Increasing the capacity of users, operators and managers require intensive training. Now in Egypt the new generation has accepted the concept of users' participation in the management and the MWRI has legalized the formation of water users' association.

Importance for IWRM

The case shows clearly the importance of building appropriate institutional structures in parallel to the introduction of technical changes, and sets the irrigation reforms in a broader policy context – eg general agricultural and economic liberalisation. It also illustrates the importance of testing and piloting programmes over several years as a basis for strong institutional structures.

Main tools used

- A2.3 Reform of existing legislation
- B2.1 Participatory capacity and empowerment
- C3.1 Improved efficiency of use
- C4.2 training of professionals

MAIN TEXT

1 Issues and problems

Water as limited resource

Egypt has vast land resources, but only a fixed fresh water share from the Nile. The population is estimated at about 67 million in 2002, and the average per capita share of water in Egypt is about 800 m³ per year, and is expected to fall to less than 600 m³ per capita by the year 2025. This is well below the 1000 m³ per capita which is considered as “water poverty limit”. Consequently, water could be a severe constraint to Egypt’s economic development and food self-sufficiency. This has stimulated programmes to improve efficiency in the irrigation sector which uses over 80% of the available resource.

Water and policy context

Irrigated agriculture systems are different from other systems such as rainfed agriculture in humid areas and supplementary irrigation systems in semi-arid areas. Irrigated agriculture systems are artificially designed in terms of both irrigation and drainage networks and their operating rules, which are based on designed assumptions for easing the operating rules.

Most central irrigation systems do need certain routine operations but they don’t include users’ opinions in modifying irrigation schedules and maintenance plans. Naturally, rainfed agriculture is based on what nature could provide rain, and farmers’ participation in making changes are limited to growing crops; but in irrigated agriculture systems users as well as operators play a role.

In Egypt, where one of the largest gravity irrigation systems of the world has existed for many centuries, users have played a major role in the management at various periods of history. Right now the idea of users’ participation is becoming reality once again. The experience of implementation of the current Irrigation Improvement Project (IIP) in many governorates of Egypt, illustrates that users’ participation is essential for both sustainability and higher system performance.

The wider context

The irrigated agriculture system in Egypt has been always in a dynamic state for either internal or external reasons. Changing policies such as the transfer from administered economy to privatization, the dynamic change of the cropping pattern, out flow or immigration from rural areas to urban areas and to foreign countries, return of immigrants after the Gulf war, new international agreement such as the Global Agreement of trade (GAT), new irrigation improvement Projects (IIP) in some areas, new technologies such as introducing new crop varieties, fertilizer application, short season varieties, high yield varieties: all these have a direct impact on irrigation practice, but may also be subject to change.

The present phase of IIP comes at a time when the Government is moving away from its former development strategy, based upon centralized ownership and planning, towards a decentralized, market-based and outward-oriented economy. Significant progress has been made in liberalizing the agricultural sector since the mid- 1980 s, including the removal of a range of quotas, price controls and input subsidies, and the privatization of various agricultural production projects and state-owned new lands.

Agricultural reforms

The most significant measure from the point of view of irrigation water demand is probably the removal of crop area allocations. In the past, principal cropping patterns and areas were fixed and enforced by the Ministry of Agriculture and Land Reclamation (MALR), but with

liberalization, farmers are responding to market forces in their cropping plans. In the absence of any water charges reflecting the true economic value of this limited resource, there has been a tendency for farmers to opt for rice during the summer season, increasing the overall water demand. For the 1998 season, formal restrictions on the area of rice cropping were introduced.

In parallel with these developments, the Government has launched ambitious programmes for the horizontal expansion of irrigation, especially in North Sinai through the El Salaam canal and in the Western Desert through the Toshka project which will draw water by pumping directly from Lake Nasser. The water demands of these projects, coupled with increasing urban and industrial demands due to population growth and economic expansion and the associated increase in pollution loads, mean that the irrigation system in the old Lands of the Nile Valley and Delta will operate in an environment of increasingly scarce freshwater resources.

Irrigation reforms - background

The origins of the present phase of irrigation improvement in Egypt can be traced back to the 1977 Egyptian Water Use and Management Project (EWUP), a USAID supported multi-disciplinary applied research and extension program. It was implemented in three small pilot areas, located near Kafr el Sheikh in the northern Delta, near Cairo, and near Minya in Upper Egypt. In 1984, EWUP was merged into the Regional Irrigation Improvement Project (RIIP) which was initiated as a full-scale pilot project based in the Serri canal command in Minya governorate. Drawing on the result of EWUP, the aim of the project was to develop and demonstrate a practical procedure to remodel irrigation systems in these pilot areas, with the aim of rapidly applying the same approach to improving irrigation systems in other areas of the country.

A plan was developed defining the concept and the national organizations of the irrigation Advisory Service. Start-up efforts were made to establish the IAS at regional level in four Governorates, as well as to initiate a Water User's Associations in the Herz-Numanyia UCA.

Coincidentally with the start of RIIP, in 1984 in the national assembly approved the idea of a National Irrigation Improvement and Rehabilitation Program (NHP), with the intent of improving agricultural production by improving the irrigation network and in recognition of the need to optimize the utilization of the nation's limited water resources.

The focus of the earlier programmes was on physical rehabilitation of the irrigation networks, but by the late 1980s, the USAID assisted IIP included strengthening the capacity of the Ministry of Public Works and Water Resources (WMPWWR) to implement improvement projects, the Development of the Irrigation Advisory Service (IAS) and the organisation of Water Users Associations, as well as the establishment of policies and procedures for a cost recovery program associated with irrigation improvements.

By the mid 1990s, at project completion, delivery system improvements had been completed for more than 125,000 feddan, and 1,050 mesqas serving about 67,000 feddan had been improved. The irrigation Advisory Service was established in the Cairo office of IIP and in all the regional directorate offices. More than 1,100 mesqa commands had been organized into water users associations, and just over 800 WUAs on completed improved mesqas were considered to be fully operational. The largest number of these in Minya governorate where there were 432 WUAs formed, of which 375 fully operational.

2 Actions taken

The current project

The present Irrigation Improvement Project (IIP) concerns the improvement of existing irrigation system over a total area of 248,000 feddan (around 100,000 hectares) in the northern part of the Nile Delta. The project area is divided into three sub-projects: Mahmoudia (131,000 feddan) in the Beheira Governorates, and Manafia (42,000 feddan) and El Wasta (75,000 feddan) which are adjacent to each other in Kafr El Sheikh Governorates.

The project is being implemented by the irrigation improvement sector of the Ministry of Water Resources and Irrigation (MWRI) of the Government of Egypt, with co-financing by the International Development Association (IDA) and Kreditanstalt für Wiederaufbau (KfW). As noted above, the project has been built on the experiences of previously applied research, pilot and implemented projects and the lessons learned.

Recognising the role of farmers

It has been recognized that the beneficiary farmers can only attain long-term sustainability of irrigation through the sharing of both capital and O & M costs. Although farmers have traditionally cooperated to organize, and pay for, operation and maintains at mesqa level, they did not have their own formal organizations for doing this (although the District engineers, to make arrangements on the farmers' behalf). Existing agricultural cooperatives are not oriented towards water distribution, being largely established and controlled by Government as a vehicle for subsidized input distribution and state purchase of agricultural production and membership was mandatory. Therefore, in recognition that new institutions were required, the government has, through law 213 of 1994, amended Irrigation Law 12 of 1984 to enable the MWRI to:

- Organize farmer groups to operate and maintain mesqa facilities;
- Maintain mesqas and tertiary drains at the farmers' expense, should they fail to do so themselves;
- Implement mesqa improvements and recover the full capital cost of these improvements (without interest); and
- Establish a special revolving fund within the Ministry of Finance for future mesqa improvement

Components of the IIP project

The overall objectives of the project are:

- (a) To increase agricultural production and farm incomes by improving the irrigation infrastructure, facilitating a more equitable distribution of water and improving on-farm water management;
- (b) To improve the long-term sustainability of irrigation, through the assumption of responsibility for operation and maintenance at the tertiary level by farmers, and establishing cost sharing arrangements for tertiary level investment costs; and
- (c) To strengthen the institutional planning and implementation capacity of MWRI in the irrigation sector. The main project components are summarised in Table 1 below and particular aspects of the project discussed further.

Table 1 The IIP Programme

| Main components of the IIP programme |
|--|
| <p>Improvement of the delivery system through:</p> <ul style="list-style-type: none"> – The installation of new regulating structures on secondary (branch) canals, together with the introduction of continuous flow in place of the existing rotation system; – The rehabilitation of canals, including the provision of channel protection and replacement of deteriorated structures; – The provision of telemetry system to allow centralized remote control of regulators on main canals; and – The installation of drainage reuse pumping stations at selected series to allow for pumping controlled quantities of drainage water into canal to meet the water deficit. <p>Improvement of the tertiary system through:</p> <ul style="list-style-type: none"> – The installation of a “single-lift” pumping station at the head of each tertiary (mesqa), to replace the multiple pumps and (sakias) used at present to lift water at the head of each farm channel (marwa); and – In conjunction with the above the construction of “high-level” mesqas in the form of raised lined channels or low-pressure buried pipelines with turnouts or alfalfa valves |

Main components of the IIP programme

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Establishment of the irrigation Advisory Service (IAS) in the project area to:

- To provide technical support for the establishment of Water Users' Associations (WUAs) at mesqa level and federations of WUAs at branch canal level;
- To train WUA members in operation and maintenance of improved mesqas; and
- To foster links between WUAs and other local organizations.

Institutional support to IIP for project implementation, including:

- Training of HP staff;
- The provision of consultancy services; and
- The provision of facilities and equipment.

Environmental assessment: involving the formulation of a program to evaluate the environmental impacts of the project on soil and water quality, using information collected through relevant organizations, and identification of environmental issues related to the implementation of IIP.

An on-farm irrigation management demonstration program: aimed at promoting measures to improve farmer's irrigation practices and water use efficiency, including land levelling and selective soil amendments.

A communications program: aimed at farmers in the project area to promote messages in support of IIP activities, focusing on project benefits, water conservation, cost sharing arrangements and environmental issues as well as on training of farmers in operation and maintenance mesqa level.

Balancing supply and demand for water in irrigation systems

The new orientation of the Egyptian economy toward privatization is becoming a new fact within the irrigated agriculture system. Farmers now have the freedom to grow whatever crops, which they might think that it is of higher economic returns to them. This new fact implies dynamic cropping pattern, which in turn affect the way the irrigation system is being managed.

In order to have more and more of the control over the system users participation in the management is critical because they now decide on what to grow when to grow, and how to grow; when to irrigate, how much apply and when to stop irrigation? If the answers to these questions are in the hands of the managers and the operators of the system, there are several possible scenarios.

- | | |
|------------|---|
| Scenario 1 | Demand can be matched by the supply |
| Scenario 2 | Demand is the greater than both the available and or the capacity of the system |
| Scenario 3 | Demand is less than the supply so there is a room for real water savings. |

The first scenario normally happens when there is a good idea about the answers of the questions, which has been mentioned above. Scenario Number 2 arises when the users think and try to maximize their benefits regardless of the constraints on the system in the terms of capacity, availability of resources as well as misunderstanding of the real constraints on the scarcity of the water in the system. The third arises when users' choose to plant crops with lower water requirements and the operator does not have the tools to decrease the flow especially at the tail ends of the system.

In any given year all three scenario cases could happen. Under these circumstances, user participation is very important. The Egyptian system is characterized by having a large number of users with a small land holding. It is impossible to deal with each single individual user, the idea of forming WUAs is of great value where dealing with associations as a first iteration in

managing the system is an excellent idea. The second step of federating a distributor canal, which has many associations, is another step or iteration in managing the irrigated agriculture system.

Water users' associations (WUA)

The idea of water users association is broadly accepted now in many of the areas where the Irrigation Improvement Project (IIP) is to be implemented. The idea needs understanding and support from both sides of the equation of the supply and the demand whether they are decision-makers, planners, managers and operators in the supply side and users in the demand side.

Developing mechanisms for reaching agreements should occur through dialogue. The experience of forming WUAs has helped to create a new generation of engineers, technicians, and users, who have become experts in building the trust between both parties. The on-going challenge is to ensure the continuation of mutual understanding on all levels of the irrigation system, so that areas where meeting the demands of users for reaching the potential production as well as defining areas where real water saving could become reality with less cost can be located.

Investment in people as well as infrastructure

Changes in the software of the system where the rules and roles of operation can be modified are harder than changes in the hardware of the system such as adding structures. But the impact of changing the rules and roles is greater where it involves investments in the people by increasing their awareness of their system, their capacity to run the system within its constraints and limitations.

Acceptance as well as appreciation of the users is greatly dependent on the performance of the management in meeting the demands of the users with the least costs involved in operating the system as well as keeping in right shape through maintenance.

A seven-phase process has been developed in the IIP areas for building sustainable Water Users Associations. The seven phases for building sustainable water user associations are presented at regular intervals in almost all documents and reports pertaining to IIP. Most descriptions of the seven-phase process (7PP) state the targeted goals and the way these goals have to be achieved (how it is done), and the steps are summarised in Table 1. The ultimate goal of the process is to increase total farm income by saving labour, time spent on irrigation, to ensure good water control for increased production possibilities, and more equitable distribution of water.

Monitoring and evaluation should of course be a continuous effort and be part of each phase. Apart from special evaluations on the project's impact, which could be done in a separate phase, there should be continuous regular monitoring of WUAs and mesqa progress to feed back into the learning process.

Table 2 Seven stages in building participation at Mesqa level

| Phase and timing | Goal | Focus/comments |
|--|---|---|
| <u>Phase One:</u> Entry Information and understanding Time requirements: 1-2 months | To gain the acceptance of unit command area leaders including farmers and those leaders in the public and private sectors; to introduce the IIP to mesqa water users through communication, meeting and individual contacts; and to collect essential information with active participation of mesqa leaders. | This first phase should put sustainable emphasizes on the <i>building of trust</i> and relationships of friendship. Such a process can be initiated more effectively if a qualified group organizer stays permanently with the community and the WUA(s) |
| <u>Phase Two:</u> Initial Organization and Study Time requirement: 2 | To establish strong base for building a private (WUAs) by assisting water users on a mesqa to select/elect their | Emphasis in this phase is very much on the <i>communication and dissemination</i> of information about |

| Phase and timing | Goal | Focus/comments |
|--|--|---|
| weeks to 1 month per mesqa / WUA | leaders. Determine initial roles and responsibility, meet on a regular basis to solve problems and consultation with IIP engineers. | IIP, WUA and its consequences for the present mesqa layout and organization. Introduce cost sharing principles. |
| <u>Phase Three:</u> Planning and Design for Mesqa Improvement Time requirements: 2 weeks after ending phase 2 | To involve the WUA(s) council members in active decision-making regarding making the planning, designing and acceptance of the final mesqa design. | The focus is on the <i>design approval</i> . Other outputs may include: a WUA Workshop for improvement, a rapid appraisal of the mesqa, discussions based on data collection results. |
| <u>Phase Four:</u> Implementation and hand-over of Mesqa Improvement Time requirements: 2- 3 months/mesqa | Active involvement in decision making and planning and involvement of farmers in design. The role of the WUAs planned by Council. | WUA council involved in design and construction, the contractor's work plan is to be analyzed and reviewed. Heavy organizational inputs are necessary for all issues and training. |
| <u>Phase Five:</u> Regular WUA Operations (O&M phase) Time requirements: Regular training is given within a week of completion of phase4. | The final goal is to establish a <i>sustainable self reliant WUA</i> which is fully owned. Controlled and operated by the farmers for their benefits to be achieved by improved production possibilities. | This is a continuous phase, which must be regularly monitored, evaluated and improved to maintain optimum operation under changing conditions |
| <u>Phase Six:</u> Branch Canal water User Associations (BWUA s) | Goal: To increase the effectiveness of main system operations and communication between water users and water suppliers by assisting the irrigation authorities in maintaining and participating the canal system. Grouping of the WUA to branch level should start after the completion of phase 5. | To also provide water users voice and improved communication with water supplies. The BWUA federation can enter into private business activities and can purchase properties and equipment and take loans from credit institutions. |
| <u>Phase Seven:</u> Continuous Monitoring And Evaluation | To ensure effective process documentation of all six phases and periodic internal and external evaluation of this total WUA program. | Results, documentation and other studies are used as <i>feedback to improve the process for building sustainable WUAs</i> . |

3 Outcomes

Overview of effectiveness

In recent years irrigated agriculture system has experienced many changes such as the Privatization Policy, Free Cropping Pattern, and the Irrigated Improvement Project. Even though these changes are recent, it is already clear that user's participation has helped in increasing the performance of system through upgrading the capacity of the users, operators and managers of the system.

The process of involving users in the management can lead not only to real water savings but also to increased crop production. Early involvement of users in the modernization of the irrigation system does assure a high quality control of the implemented project, so the sustainability of the system is maintained.

The irrigated agriculture systems are characterized by high degree of interdependency between its upstream and downstream also, there is high level of interchanging impact between parties involved in the supply – demand equation whether they are managers, operators and or users.

The Ministry of Water Resources and Irrigation (MWRI) is launching new program in the media to increase the awareness of the Public in dealing with water, also a new law was issued in order to legalize the participation of the users in the management of the system.

Imbalance between hard and soft ware aspects

The USAID- assisted IIP serves as a useful demonstration for future phases of IIP. Models have been established for both the engineering technology and the institutional structures involved. However, the concepts cannot be regarded as fully proven. Some adjustments have been made in the preparation for the present project, but sufficient time has not yet elapsed to ascertain the sustainability of the models over the years.

Under both the IIP, and the previous RIIP, considerable effort that was put into developing concepts and procedures for mesqa improvement and organization of WUAs and establishing the IAS. This meant that delivery system improvements received relatively less attention. So far, it has only been possible to establish full continuous flow in fairly limited parts of the IIP areas, so that many of the mesqas, which have been improved, cannot in reality function as intended, and inevitably the credibility of the new operating system suffers. The tendency is to revert to the previous arrangements, with farmers drawing water when and where they can, including using their individual private pumps. However, it is better to ensure the institutional structures are in place before the hardware, rather than the other way round, as the IWR< approach requires changes in the way people think and use resources.

The problem of providing continuous flow is related to the difficulty of achieving proper coordination of delivery system and mesqa improvement. This difficulty is compounded by the fact that main system operation is the responsibility of the irrigation Sector of the Irrigation Department, which has no direct reporting relationship with IIP, and has not been involved in development of the new operational concepts.

Slow progress and poor quality of construction also caused many difficulties with farmers. Under the present project, efforts are being made to ensure that civil works contracts are awarded only to contractors with suitable experience and capacity.

Supply of pumps

Farmers were initially expected to supply the pumps serving the mesqa from their own resources. However, farmers did not provide the pumps for the new mesqa as expected, and only in 1995 was it agreed to provide these pumps through the project. Under the present project, purpose--designed pumps are to be included as part of the mesqa improvements, ensuring that adequate pumping facilities are available from the outset. The purchase of these pumps directly by the project also provides the opportunity for proper arrangements to be made for warranty and after-sales service under the supply contract.

The November 1993 evaluation of USAID-IIP (Devers Inc) suggested that the mesqas considered by the project as having reached the operational phase were "so only in rudimentary way" the WUA leadership was "still basically a non-management force expert in a very few mesqas" There is still a continuing need for the IAS to act as facilitators in enabling farmers to organize themselves and to work more effectively both internally and with other organizations. The present project also includes an --on farm irrigation demonstration program to ensure coordination between farmers, the IAS and the agricultural extension services.

4 Lessons learned

Conditions for effective WUAs

One of the most important activities in building sustainable WUAs is system of process documentation for learning from experience how to improve the process. There are a number of conditions which help develop effective WUAs. Clear policy guidelines and continuous strong

support from the MWRI and senior officials in implementation of the new legislation and developing the appropriate organizational mechanisms for the IAS Irrigation Improvement Projects is essential. Other conditions include strong IAS leadership, and regular meetings, contacts and special training of WUA leaders.

The time involved should be recognised: communication and training support focused on creating understanding and building linkages with stakeholders should begin in new project areas several weeks before, Phase I activities and communication support should continue throughout the seven phases. Building strong linkages and working relationships with district engineers, staff of the MOA, local banks, cooperatives, schools and influential local legal begins with phase I, "entry" and must continue through all phases into the future. The investment in time and effort means that it is essential that the benefits of the new technology and the WUA organization must continue exceed the costs involved if strong and sustainable WUAs are to be achieved.

Replicability

Based on the experience gained during the course of the IIP, the following are some important lessons for expanding the program in Egypt and/or countries of similar conditions:

- The IIP project results do confirm the value of continuing with the project.
- The Egyptian farmers have a long historical experience that should be developed and integrated with the scientific experience.
- Strong water user associations can share in developing a public awareness program about the improvement concept, purpose and objectives.
- Human resources development by continuous training is one of the most important achievements of the project; it is indeed for the successful continuation of the project.
- The new advanced equipment and software programs are essential to upgrade the staff capabilities and the project sustainability.
- A good communication program and facilities, the good use of the mass media and conducting well-designed campaigns are important to support the project implementation and to reach its objectives.
- The continuous flow is important to assure the success of the project.
- Improving the mesqa systems contributes to better environmental quality and minimises pollution.
- Good qualified contractors and good quality control system are essential.
- Continuous monitoring and evaluation before and after with and without the project are important to evaluate the project benefits and to improve its performance.

Conclusions

In order to increase the efficiency as well as the performance of the system, users' participation in the management is a must since their decisions and ideas have a great impact on the operators and the modernization process of the systems would assure the sustainability of the system.

Cases of increased crop production and changes of real water savings in the system are dependent on the awareness and understanding of both users, operators and managers of the system.

Increasing the capacity of users, operators and managers require intensive training. Now in Egypt the new generation has accepted the concept of users' participation in the management and the MWRI has legalized the formation of water users' association.

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