

PROJECT TECHNICAL REPORT NO. 65



EXPERIENCE WITH WATER USERS' ASSOCIATIONS

By:

Mohamed Sallam, Mohamed Naguib, Abdallah Saber,
Abdel Fattah El Masry, Ahmed El Attar, Essam Ezz El Din,
Farouk Abdel Al-Omar, Farouk Hassanein, Hoda Hussein Dweeb,
and Sohair Kamal Yousef

As compiled by:

James J. Layton

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EGYPT WATER USE AND MANAGEMENT PROJECT

22 El Galaa St., Bulak, Cairo, Egypt

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**Colorado State University
Engineering Research Center
Ft. Collins, Colorado 80521
USA**

**Consortium for International
Development
5151 E. Broadway, Ste., 1500
Tucson, Arizona 85711 USA**

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ABSTRACT

A Water Users Association (WUA) is a group of farmers all served by a common source of water, who join together to allocate, distribute, and manage water. Such organizations can be most helpful to Egypt in that they provide a mechanism whereby the irrigation water at the local level can be effectively managed. The purpose of this paper is to demonstrate that there is a socio-political network which manages the physical component of an irrigation system, and that there are specific procedures established which need to be followed in order to organize such a network to provide the type of irrigation management desired by the government of Egypt.

The major purposes of a water users association are to mobilize local resources for the purpose of managing an irrigation system, to administer that system, to provide a communication link between the government and the farmers, and to serve as a means by which farmers can make appropriate decisions concerning the problems of irrigation. These associations generally fill the management gap in a country where the regular governmental entity controls the irrigation water down to the tertiary canal level and leaves the rest of the system to the management capabilities of the farmer. What is argued in this paper is that there should be an organization of farmers established at this local level in order to work with the government for the total management of the water.

In establishing water users associations there are some guiding principles which serve as parameters for the work. First, the organizations must be established around some specific goal or set of goals. Next, there must be an acknowledgement that local participation is essential to this process. An acceptable pattern of organization must be constructed and there must also be a means by which that organization can be integrated into the irrigation bureaucracy.

Based on these principles, the work in establishing the water users association proceeds along the following periods: The introductory period, the planning period, the organizational period, the operation period, and the continuation period.

ABSTRACT (Continued)

What type of organization needs to be established is somewhat situationally-determined, but there are some general aspects of an organization which need to be considered for all types of associations. For each organization there needs to be a differentiation between the general body of irrigators and the managing unit of this general body. Additional aspects of how such an organization operates also needs to be developed. They include task assignments, organizational maintenance procedures, the communication network, the decision making procedures, the coordination processes, the control procedures, the adaptation procedures, and the conflict processes in the organization.

The work with the farmers at the EWUP field sites has been conducted along the procedures described above. By following such procedures the project has demonstrated that the farmers can work together with the government on improved irrigation management. The work with the farmers is still at an early stage of development; but with proper commitment and care, effective water users associations can be developed.

مستخلص

رأه رابطة مستخدمي المياه (WUA) هي مجموعة من المزارعين يخدمهم مصدر مشترك للمياه، وتشارك هذه المجموعة في تقسيم وتوزيع وإدارة المياه. ويمكن لهذه المنظمات أن تكون ذات فائدة كبيرة لمجتمعات أقرها توفر طريقة متكاملة على المستوى المحلي يمكنه من تحسين إدارة المياه الري وإداره مؤثره وفعال. والغرض من هذا التقرير هو إظهار شبكة العمل الإجتماعي السياسي الخاصة بإدارة النواحي الطبيعية لنظام الري، وكذلك توضيح الخطوات المحددة التي يجب أن تتبع لكي تنظم هذه الشبكة نوع إدارة وتطوير الري الذي تتطلبه الحكومة المصرية.

ومن أهم أهداف رابطة مستخدمي المياه هي: تنظيم وإعداد المصادر المحلية لإدارة وتطوير طريقة الري، توجيه هذه الطريقة، توفير وسيلة لإتصال متبادل بين الحكومة والمزارعين، وأخيراً العمل كوسيلة لمخ المزارعين مع إتحاد القارات المناسب والخاصة بمسائل الري.

وبصفة عامة تملك هذه الروابط فجوة الإدارة الموجودة في أي بلد حيث تتحكم الحكومة في مياه الري هي الطبقة الثالثة من الرتبة وتترك الباقي لإدماكينات إدارة الفلاح. وهذا المقال يناقش ضرورة وجود منظمة للمزارعين على المستوى المحلي لكي تعمل مع الحكومة من أجل تحسين الإدارة الكاملة للمياه.

وعند تكوين روابط مستخدمي المياه هناك بعضه المبادئ والأساسية المرشدة والتي تخدم العمل عند تطبيقها، وهذه العوامل هي: أولاً: يجب أن تكون المنظمات قائمة على هدف محدد أو مجموعة من الأهداف. ثانياً: يجب أن تتوفر الموافقة على أنه التمثيل المحلي للري لهذا المشروع. كما يجب بناء نموذج مرفق للمنظمة ويجب أيضاً توفير الطرق التي يمكنها لهذه المنظمة أن تندمج مع بيروقراطية الري.

وينادى على هذه المبادئ ، تقوم العمل على تأسيس رابطة مستخدمي المياه خلال الفترات التالية : فترة التقديم ، فترة التخطيط ، فترة التنظيم ، فترة العمل والتنفيذ ، فترة الاستقرار .

وبهذا يكون قد تم تقريباً تحديد نوع المنظمة الذي يجب أنه يؤسس ، ولكنه هناك بعضه الاعتبارات العامة لدى منظمة يجب أنه تؤخذ في الاعتبار بالنسبة لأنواع الروابط المعقدة ؛ لكل منظمة يحتاج الأمر إلى تفرقة بين الهيكل العام للوحدة المديرية لهذا الهيكل العام ، وكذلك يحتاج الأمر إلى تطوير الإجراءات اللدنية للكتيبة بإدارة العمل بالمنظمة والتي تحتوي على : متطلبات العمل اللدنية ، مراحل الصيانة التنظيمية ، سبجات الإتصال ، مراحل اتخاذ القرار ، عمليات الترتيب المتبادل ، طرقة التحكم المطلوب ، مراحل التكيف والملائمة ، وكذلك عمليات المعارضة داخل المنظمة .

هذا وقد تم ممارسة العمل مع المزارعين في مواقع حقول مشروع ال E W A P على أساس اتباع الخطوات الموضحة سابقاً . ومن خلال اتباع تلك الخطوات أذرع المشروع أنه يمكن للمزارعين العمل مع الحكومة من خلال إدارة الري متطورة . وهذا ولديزال المزارعين في المرحلة الأولى من التطوير ، ولكنه بالعناية الموجهة والشفافية السليمة يمكن لروابط مستخدمي المياه أن تقوم وتتقدم بكل مؤثر وفعال .

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EXPERIENCE WITH WATER USERS' ASSOCIATION

By

The Sociology Discipline, as compiled by
James J. Layton

INTRODUCTION

A Water Users Association (WUA) is a group of farmers all served by a common source of water, who join together to allocate, distribute, and manage the water which serves that group of farmers. Such organizations, can be most helpful to Egypt because they provide a mechanism whereby the irrigation water at the local level can be more effectively managed. The purpose of this report is to describe what a WUA is and how such an organization can be developed in Egypt.

To pursue such a task, the report will first focus on the context within which a WUA functions. This context centers around two attributes: (1) the type of control which is associated with an irrigation system, and (2) the levels of operation which encompass that system. An understanding of the context of the irrigation system in Egypt can demonstrate where a WUA can be effectively utilized to improve the present management performance associated with that system.

The report then focuses on the development of the WUA. A definition and purpose of a WUA will be presented and then how the organization was constructed will be examined. Developing the WUA in Egypt was based on a specific procedure of work and performed with regard to certain organizational parameters. The strategies pursued were designed to enhance farmer involvement in the various programs of irrigation system improvement and cultivate that involvement so that a specific organizational type of behavior would emerge.

The format of the report will weave the findings and experience of EWUP with the theoretical constructs of organizing farmers which have been developed from experience around the world. This report is designed to not only present findings, but also to provide a set of guidelines for the development of future WUA's in Egypt.

THE IRRIGATION SYSTEM AS A CONTEXT

The complex physical network of canals, distributaries, ditches, drains, regulators, etc. which constitute an irrigation system is managed by a specific socio-political system. In addition to physical and biological factors, human and institutional issues also affect the way in which water can be managed and controlled. (Takase, 1976:11) In fact, throughout the world there has been a growing realization that the weaknesses with many irrigation systems are imbedded in the "human" process of management. (Sargadoy, 1982; Thornton, 1975; Wade and Chambers, 1980) Two major foci of attention with regard to this point have centered on (1) the notion of control of irrigation water, and (2) the definition of an irrigation system in terms of level of operation.

The notion of control has been elaborated by Wade and Chambers (1980). They state that the effectiveness of water control in the delivery of irrigation water is a function of two variables.

1. Control Capacity: a function primarily of the physical structures; i.e. gates, regulators, measuring devices, lining, facilities, etc.
2. Control Utilization: depends on many complex interaction factors: environmental, communication system, training of technical staff, the irrigation bureaucracy through which maintenance and operation occurs, and the liaison between the canal staff and the irrigators. This report will generally define control utilization as the management of an irrigation system.

The relationship between these two aspects of an irrigation system is now being addressed around the world. Wade and Chambers elaborate these two variables by stating; "It is misleading to assume that higher levels of control capacity will 'automatically' give rise to improve utilization of that capacity by the canal staff, resulting in more effective water control to the outlets". (Wade and Chambers, 1980: A 108) Takase and Wickham puts the point more directly: "There is a tendency in most countries of the region to equate better water management with more structural facilities, especially terminal facilities.

Insufficient attention appears to be given, however, to the role that management of existing facilities can play in improving system performance". (Takase and Wickham, 1976:15) Why is there this discrepancy? Takase and Wickham puts forth the idea that there is an aura of glamour surrounding engineering and structural changes while dealing with the human element is a much more difficult problem and therefore is the more neglected aspect of irrigation system improvement.

Bottrall reiterates this concern about the relation between the physical structures composing an irrigation system (control capacity) and the management of that system (control utilization). "Recent years have witnessed a marked increase in concern at both national and international levels about the poor performance of irrigation schemes in many developing countries: rapid population growth is intensifying mankind's demands on an increasingly scarce resource which is essential to its livelihood; there are high energy costs associated with extending its exploitation; yet efficiency of water use on many existing systems continues to be very low. At the same time, there has been a growing realization that much of the poor performance stems from fundamental weaknesses in the human processes of planning and management, which no amount of investment in technological hardware is going to overcome on its own." (Bottrall, 1981:73)

To summarize, the first point of focus in looking at the context of an irrigation system centers around the relationship between the physical structures of that system and how those structures are managed. Observers of irrigation systems around the world suggest that both aspects of control must be utilized if any irrigation scheme is going to be effective. These observers further note that there are different administrative priorities attached to the two aspects of control. Control utilization, management, has played a secondary role in the operation of most irrigation systems. Even though management has not received that much administrative support, it is from this area that most of the problems of a system are encountered.

The second issue involved in looking at the context of irrigation systems is the level of operation within that system. In order to obtain a maximum degree of effective water control, both the on-farm aspect of the irrigation system and the "main system" aspect of the irrigation network needs to be effectively taken into consideration. While much of the concern has been to improve the on-farm condition, there must be a corresponding improvement of the delivery system or little will be accomplished.

"Control of water in the main system is difficult to achieve, that it has not be pursued very vigorously in most irrigation systems, and that on-farm improvements will probably not result in much better irrigation performance until the main system operates more predictably. Although the effects of poor management are seen at the farm level in water wastage and stress periods, the causes are largely in the main system." (Takase and Wickham, 1976:15)

Most major irrigation systems are usually planned and operated by the irrigation agency down to the level of the outlet delivering water to blocks of farmers. Below this level is the farmers' responsibility. The parties to this partnership have quite different objectives in carrying out their responsibilities. The crucial point in management is how well can the irrigation agency deliver water to the farmers' level and integrate their efforts with the farmers. For effective irrigation management to occur, both the "main system level" and the "farm level" must be properly managed and the efforts at both levels must be integrated with each other.

Both of these issues can be associated with each other as depicted in Figure 1. The control capacity includes all types of physical structures used for controlling irrigation. These structures are constructed at all levels of the system: the main level and the on-farm level. Not only are there specific structures at each level, but there are also different management circumstances which encompass each level, i.e. control utilization. For the main system operation, an irrigation bureaucracy is established to operate and maintain the various structures, direct the flow to the farm level, and remove the excess water from the field. At the distributary canal and actual on-farm level, the farmers establish a working order of rules and procedures which allow them to operate that portion of the system.

Each cell in the figure focuses on a particular aspect of irrigation management, but that emphasis does not negate the relationships among the different cells. The physical structures obviously are related in that they are used in concert with each other to adequately direct the amount of water to a specific place at a particular time. The management of these structures determine how such direction occurs. Procedures set up by the irrigation bureaucracy over the larger system affects how the farmer will manage the amount he obtains. In return, the administration of the larger system must at least reflect the irrigation practices of the farmers as they produce their respective crops. Thus, the mutual reciprocity among the different cells

Type of Control

		<u>Control Capacity</u>	<u>Control Utilization</u>
Levels of Operation	Main System Level	Main System	Bureaucratic
	Network	Structure	Management
	Farm Level	Farm	Farmer
	Network	Structures	Management

Figure 1. Parameters of Irrigation Management.

reflect the interdependence of these major aspects of an irrigation system. If such a system is to be operated effectively, as suggested above, then all four cells must be included in any management package.

In examining the irrigation system of Egypt, one can apply the scheme as presented in Figure 1. The River Nile is the main source of irrigation water, but the water itself is delivered to farms through an extensive system of channels. The system has a combined length of 30,300 km. (EWUP, 1984:18)

To control the proportional distribution of water to the canals (control capacity), seven main barrages have been built in the Nile. These main structures are at Aswan, Esna, Nagga Hamadi, Asyut, Delta, Zifta and Edfina. From the Nile different channels have been constructed and are classified as follows:

- Principal canals receive water directly from the River Nile for conveyance to main canals. No direct irrigation from these canals is permitted.
- Main canals receive water from principal canals for conveyance to branch canals. Some main canals may take water directly from the River Nile. No direct irrigation is permitted.
- Branch canals receive water from the main canals for conveyance to distributary canals. Direct irrigation is permitted along the lower reaches of those canals.
- Distributary canals receive water from branch canals for distribution to mesqas. Direct irrigation along all distributary canal banks is permitted through legal farm outlets according to established rotations.
- Private ditches (on-farm level) called mesqas receive water from distributary canals for distribution to marwas or directly to basins and/or furrows on private farms.

Additional structures in the delivery system include: intake regulators (5623), head regulators (2287), weirs (162), tail escapes (1761), spillways (153), bridges (9955), and crossing works (567). These structures are made of various materials and are operating to different degrees of effectiveness. Most of the farm outlets in the Project sites are pipe outlets with generally no gates or control features. Channels in the Project sites were unlined and subject to the normal maintenance problems: weeds, soil seepage, and unstable cross-sections.

The operation of this system (control utilization) is divided between two major means of authority: the government bureaucracy and the farmers. The bureaucratic administration of the irrigation system extends down to the mesqa level of operation. This authority was granted to the government through Law No. 74, 1971. (Abdel Abdallah, 1975) Parts of this law has been updated, but the essential features of the law still remain. What this law does is define the difference between the public and private domains of the system and delineates the rights and responsibilities of private individuals using both domains. The law also specifies specific responsibilities with regard to water distribution and drainage practices, the use of pumps, and navigation. Penalties ascribed to each responsibility are also explained by the law.

The administration of this law is performed by the Ministry of Irrigation. Through this organization, rules and procedures are established for the operation and maintenance of the control capacity of the irrigation system. Such rules include the proper allocation of water to each area, selected rotation periods for irrigation, throughout the country, and the determination that lifting is the satisfactory mode of irrigation. The interface between the MOI and the farmers occurs at the district level with the district engineer and his support staff. That interface is superficial in that the district engineer is required to serve as much as 50,000 feddans.

Because this interface between the district engineer and the farmers is so tenuous, the actual on-farm management of the system many times deviates from what is legally mandated. Here are a few instances where such deviations occur. Section 10 of the law stipulates that landlords who have land which is benefited by private watercourses and drains must clear the hyacinth, and other plants and weeds which impede the flow of water from the channel. Also, it is the landlord's responsibility to maintain the banks of the channels in many areas of the country. A significant number of private and public watercourses in Egypt are not cleaned regularly. (EWUP 1984)

Section 9 states that landlords shall have the right to drive water from the watercourse to his field at a rate equivalent to his area owned. In fact, there are legally mandated sizes of inlets from the distributary canal to the mesqa and from the mesqas to the fields. Measurements by EWUP in one area have shown that about 72% of the turnouts are larger than the legal size. (EWUP 1980) There is a question about the adequacy of the legal size turnouts; but irregardless of this argument, field observations show that the farmers have

consistently changed the size of the turnouts to fit their need for water. While the law has set penalties for such action, little if any enforcement of this section is now being performed by the MOI.

Section 35 charges the MOI to direct how the rotation periods are to be established in delivering water throughout the system. Again, field observations in some areas has demonstrated that farmers do irrigate during the "off" periods. While a nation-wide study has not been conducted to document the extent of this problem the fact that it is occurring should indicate that there are problems in managing the rotation periods.

Finally, Section 37 stipulates that the cultivation of rice in areas other than those defined by the MOI shall be prohibited unless authorized by the MOI and authorized in accordance with the conditions it assigns. However, in reality, there are areas in the rice growing portion of the country where the percentage area of a mesqa which is cultivated for rice is too large for the mesqa to properly supply the needed amount of water during periods of that season. The resulting shortage has been of great concern to the farmers who have been affected.

The above-mentioned points are not presented only to criticize the MOI, but they are discussed to emphasize a couple of points. First, while only a few points have been mentioned here, and there is no accurate estimate of how much of the law is being modified or ignored; the fact is that there is a discrepancy between what the irrigation law stipulates and what is actually occurring. Again, this paper is not a forum to discuss the merits of the law, but the examples are being presented to show that there are management breakdowns in the irrigation system.

This leads to a second point of why such breakdowns are occurring. Again, maybe the law in some parts needs to be changed, but that point cannot be discussed here. One position of this report is that even if the law was adequate, the management of the system would still be lacking because the MOI does not have sufficient personnel nor resources to completely manage the whole system on its own. The bureaucratic management scheme can only penetrate the system, so far and unless it receives cooperation from the farmers in managing the lower levels of the system, the irrigation system in Egypt will never be effectively managed.

The Egypt Water Use and Management Project's work with the farmers has demonstrated that the farmers are now engaging in some forms of cooperative efforts and that there is a potential to organize the farmers in a

manner which would help make the irrigation system function more effectively. This is what a water users' association is designed to do. The rest of the report will present our experience in developing a water users' association, but it must never be forgotten that one never organizes people unless there is a reason for the organization attempt. In Egypt, there is a need to involve the farmers as a group to help the government manage the irrigation system in the country, and a way to most effectively obtain that involvement is to develop water users' associations.

PURPOSE AND GENERAL DESCRIPTION OF WATER USERS' ASSOCIATIONS

Establishing WUA's allows farmers to perform activities which are more difficult, or impossible, for them to do individually. These associations perform functions which allow the farmers the capability of managing their portion of the irrigation system more effectively by providing the following services:

1. administering the irrigation system under their authority;
2. providing a mechanism whereby the government interacts meaningfully with the farmers; and
3. providing a means whereby the farmers can make decisions concerning problems of irrigation. (Sargadoy, 1982; Radosevich, 1976).

In terms of administering the irrigation system, a WUA can mobilize local resources to reduce the costs of managing the system for the government. A WUA can provide the procedures and mechanisms whereby the canals and other tertiary channels are cleaned, maintained, and operated on a schedule. In addition, such associations can act as arbiters to local conflicts in the area.

Since there is a need for the government to interact with the farmers, the WUA can act as the conduit for such interaction. Through the association, various extension programs can operate. Such organizations can also serve as a means to channel the needs and desires of farmers to those government agencies best equipped to meet them. They can provide such services by acting as a communication channel between the government and the farmers. Once the WUA's are established and are working well, they may be able to administer what government aid is given to the farmers.

Sargadoy (1982) has presented a comprehensive description of a WUA, whereby he summarizes their general attributes based on the following examples: irrigation districts of the U. S. A., the Comunidades de Regantes (Spain), the Subak Irrigation Association (Indonesia), the Irrigation Association of Afghanistan, the Associations de Canalistas (Chile), among others. His description, which is now to be presented, generally coincides with many other authors who are researching this topic. What will be presented is excerpts from Sargadoy's description of WUA's.

The most distinctive characteristic of WUA's is that they are organizations of the people, for the benefit of the people. However, even though government participation is excluded by their very nature, most of these associations would never have existed without the promotion and encouragement of governments.

1. The Structure: From the organizational point of view a WUA is made up of the following executive bodies:

- a. The General Assembly: Is composed of all the farmers of the association. It is the highest authority. Its main function is to select their representatives (Board of Directors) and to approve or disapprove the management plans.
- b. The Board of Directors: Is the highest executive body. Its main function is to supervise and direct the execution of the work approved by the assembly and to prepare management plans annually.
- c. The Manager's Office: Is directly responsible for the execution of the mandate given by the Board of Directors and for day-to-day work.
- d. The Execution Units: Are responsible for specific functions, such as operation, maintenance and administration.
- e. The Irrigation Juries: Some of these associations-especially the traditional ones - have their own juries to punish faults against the rules and regulations. The jury is generally selected from distinguished members of the Board.

2. Coordination with the Supporting Agricultural Services: The very existence of a water management organization implies that a segregated organizational structure has been selected and that therefore the other necessary services are provided by other institutions. All too frequently

this assumption is arrived at too quickly since the mere presence of extension, credit and other services in the project area does not mean that they are available to farmers in sufficient quantity to satisfy their specific needs. This is particularly important in the case of irrigation extension services which are a prerequisite to proper use of water and other agricultural inputs.

To ensure coordination with the agricultural services and to engage them actively in the affairs of the irrigation scheme, it is good practice to include representatives of such institutions on the Board of Directors of the association as special members. Alternatively, representatives of the WUA's should be invited to the decision-making meetings of the concern institutions at regional or, where justified, at national level. In any case, it is important to assure the possibility of a dialogue between the institutions providing the services and the representatives of the farmers receiving them.

3. Main Characteristic: The main features of these associations are:
 - a. Water Users' Associations secure farmers' participation in decision-making for the irrigation schemes. The democratic process of selecting farmers' representatives guarantees such participation. In a world where the people's desire for participation in public affairs is expanding quickly, securing such participation is more relevant.
 - b. In this connection it may be opportune to raise the issue of the non-political nature of these associations. Their development has sometimes been handicapped because of the belief that these associations may become political and so be a powerful instrument of political leaders. Although in theory such a risk exists, practice has demonstrated that it rarely happens.
 - c. Water Users' Associations appear to be more effective administratively than Public Irrigation Schemes. Farmers are personally interested in their own organization and this sometimes permits them to do the same job cheaper and faster. Thus, WUA's reduce the need for a heavy public bureaucracy to run the irrigation schemes. The civil servants utilized in the development of an irrigation scheme when the first is completed, instead of remaining as permanent employees of the developed scheme.

- d. The recovery of water fees is more effectively carried out through a WUA, than through Public Irrigation Schemes. Experience shows that payment of water fees is higher among farmers of a WUA than in those run by government officials.
- e. Rules and regulations are respected better since the punishment of faults in WUA is effective and quick. Most of the WUA's have their own irrigation juries or regulators that are highly respected by members, so making any punishment effective.
- f. The relations between those distributing the water (water masters and water guards) and the farmers receiving it are much more friendly and cooperative than when the same job is undertaken by personnel of the administration. In the latter case, the water masters and ditchriders are seen as representatives of the government and not as part of the farmers' group.
- g. The WUA provides an excellent communication channel between the administration and the farmers. When they do not exist, communication tends to be one-sided from the top to the bottom.
- h. The Board of Directors and often the appointed Manager himself, are farmers of the irrigation scheme and continuation in their jobs will depend largely on their performance. This is indeed an important incentive to carry out their jobs in the best possible way.

In spite of the fact that WUA's are a highly desirable way of managing an irrigation scheme, they also have some limitations:

- a. The water distribution system utilized frequently leads to considerable operational water losses. Most of the WUAs operate on the basis of a 'semi-demand' system, i.e., the farmer requests water and within a period of 3 to 7 days his request is granted. Although this system is perhaps the most desirable one from a social point of view, it is less efficient than the rotational system. This can be easily understood when one considers that to grant the request of a few farmers sometimes the whole canal irrigation network has to keep in operation, with the corresponding water losses.

- b. There is little capability for undertaking responsibilities outside the operation and maintenance field. Most of the people running a WUA are from the farmers' community and are unlikely to have technical and managerial skills, thus tending to limit their sphere of competence to problems that they themselves can easily handle. So the involvement of WUA's in farmers' training activities or water research investigations, monitoring of water quality problems, marketing and agricultural processing activities, etc. becomes problematic. However, it is possible for the WUA to become more involved in activities other than those purely related to operation and maintenance problems by having qualified personnel. The irrigation and water districts of the U.S.A. prove that under proper technical guidance and with sufficient financial resources, WUA's can be very dynamic organizations with a wide sphere of competence.
- c. Long periods of considerable effort are required to get a WUA established and working properly, even in countries like Spain where such institutions have centuries of tradition. The farmers' irrigation experience, educational level, the tradition of such associations in the region, the absence or presence of farmers' leaders are all factors that may influence the time required for the proper functioning of such organizations. In favorable conditions the WUA can be operational a few years (5 or less) after completion of the irrigation works, while in less favorable conditions a long period of 15-20 years may be required.

4. Size of the Association: The question of the optimum size of the Association is important in determining its potential capability to undertake the related functions efficiently. Indeed, up to a certain size of irrigation scheme (about 5,000 ha), the size of the Association is predetermined by the physical size of the scheme. In larger schemes, the possibility of subdividing them into irrigation sections, each having its own WUA, or having a large association for the whole scheme, is frequently debated.

Large WUA's have the advantages of greater economic potential and negotiating power. However, the larger the WUA the more difficult communication becomes between the individual farmers and the executive body. In countries where the means of communication (mainly telephone) is effective and widespread in the rural areas, the formation of large WUA's may be desirable (this is the case in the Irrigation and Water District of the U. S. A.), otherwise a federation of smaller associations may be preferable.

On the other hand, small WUA's facilitate communications; but the administrative costs are greater and therefore place more of a burden on the farmers.

From these discussions it appears that the optimum size for an irrigation association is neither too large nor too small: a size corresponding to 10,000 ha (2,000-4,000 farmers) is perhaps a desirable target. This should be matched with the criterion that each WUA should operate within the command area of hydraulically independent canals, as far as possible.

From this general description of a WUA, by Sargadoy and others, one can see the major attributes of these associations. With this in mind, we will now proceed to describe the establishment of such associations in Egypt. This analysis will intertwine the conceptual guides for organizing farmers with the experience of EWUP in this endeavor.

ESTABLISHING WATER USERS' ASSOCIATIONS

Establishing an effective WUA demands that two major conditions be met. The first condition is that a proper procedure for organization must be established and implemented. Second, the component parts of the organization must be developed in such a way that a viable entity can evolve within the environment of that organization. What will be reported here is first the components of the organization and then how EWUP has worked with the different components. Next, a description of the procedure used in organizing farmers into WUAs will be described. Finally, both the procedures and the component parts will be combined as the EWUP experience in Egypt is presented.

COMPONENTS OF THE ORGANIZATION

There are two major components of an organization which must be developed. The first component is called the structural component which entails the general framework for the organization. While the literature talks of at least three bodies; a general body, a managing body, and a judicial body; the work in Egypt focused on setting up a general body and a managing body. The next component includes the various processes performed by an organization in order to maintain its organizational integrity. There are eight processes involved: task, decision-making, communication, coordination, control, conflict, maintenance, and adaptation.

Structural Component

As previously stated, the structural component consists of three major bodies, the general body, the managing body, and judicial body. The general body consists of the total membership of the association. In a well developed association they perform the following tasks:

1. decides what the association will do;
2. determines how much authority should be delegated to the managing body;
3. ratify rules and regulations;
4. decides what action will be taken regarding participation of the association government programs;
5. approves the budget and assessments;
6. determines the extent of construction and rehabilitation of the association government programs;
7. sets the water delivery guidelines;
8. decides what sanctions will be imposed on violators of association rules and regulations.

As the WUA's in Egypt are developing, this general body of farmers performs a much more general role. That role essentially is to select the local leadership and to help decide what the WUA will do. Time needs to be given for the new associations to allow its members the opportunity to understand the fundamental aspects of the organization. Once the organization is functioning, then the members can see what their responsibilities are and then the further differentiation of their roles will emerge.

The managing body of the association is the executive group of the association which performs the tasks approved by the general body. The number of leaders on this body is determined by the size of the association. They may serve with or without pay. The directors are chosen by the general body and they should have a specified term of office. Rules for re-election should be indicated in the by-laws. The directors should represent the various interests that make up the association. This group of people perform the following tasks:

1. manages the association;
2. convenes meetings;
3. holds elections;
4. adopts the by-laws;
5. keeps records of the association;
6. collects assessments;
7. oversees the operation and maintenance of the system;
8. resolves disputes; and
9. represents the water users needs, views, and interest to the government.

The managing body of the associations established thus far in Egypt consists of the established leadership of the mesqa as recognized by the farmers on that respective mesqa. This leadership group consists of a council of men representing the whole mesqa with one of those council member evolving to become the spokesman for the group. In this early development of the associations the leaders serve as a communication conduit between the government and the farmers, and works to solve various problems on the mesqa. The leadership is organized on a fairly informal basis; meaning that the leaders are acknowledged as such by the farmers and the government, but they have not as yet defined themselves as leaders with specific responsibilities in a formal manner. Their authority evolves from what authority they previously had supplemented with the backstopping efforts of EWUP. Their meetings together are not regular as yet and they still are in a transition as to what their responsibilities entail. Much work still must be done in institutionalizing their role in the operation of the mesqa.

The judicial body is a group of association members, selected by the general body, who settles disputes. Whether or not an association has such a body depends on the level of development attained by the association and the environment surrounding the association. There has been no establishment of a judicial body among the mesqas in Egypt at this point in time.

The thrust of the organizing effort thus far has been on the mesqa level with the irrigators forming the general body and the mesqa leaders forming a council which can be identified as the managing body. Initial efforts have been made to develop a canal wide organization with a canal committee consisting of all the mesqa leaders. However, at this point in time the canal wide organization is still in its infancy and the thrust of the work remains at the mesqa level for a variety of reasons. The mesqa organization can be diagrammed as shown in Figure 2.

Figure 3 shows how the combination of mesqa organizations can evolve into a canal-wide organization and eventually into a federation of canal organizations. Ideally, the government would establish linkages with the water users' associations at different levels of authority. The district engineer would interact with the WUA's at the canal level while the authorities at the governorate level would work with the leaders of the federation of WUAs in the governorate. This is a long term proposal, but it does present a picture of what can evolve with careful involvement of the farmers in the management of the nation's irrigation system.

Process Component

The process component consists of all the processes performed by the organization which are necessary to develop in order to maintain the viability of that organization. Haas and Drabek (1973) presents eight specific processes which must be recognized and addressed before any organization can become functional.

The first process in the task process which simply identifies all activities performed by the organization. EWUP's work thus far with the WUA's concentrated on two major activities which were viewed as being central to the purpose of the organization: scheduling of irrigation turns and maintenance of the mesqas. The farmers did help out at times in the reconstruction of some of the mesqas but this was not included as a central task.

Next, one must be aware of the decision-making aspect of an organization. This includes the ways in which decisions are made concerning organizational performance. EWUP focused its initial efforts on the existing authority structure within the mesqas and a consensus among the mesqa leaders was the decision making approach pursued by EWUP.

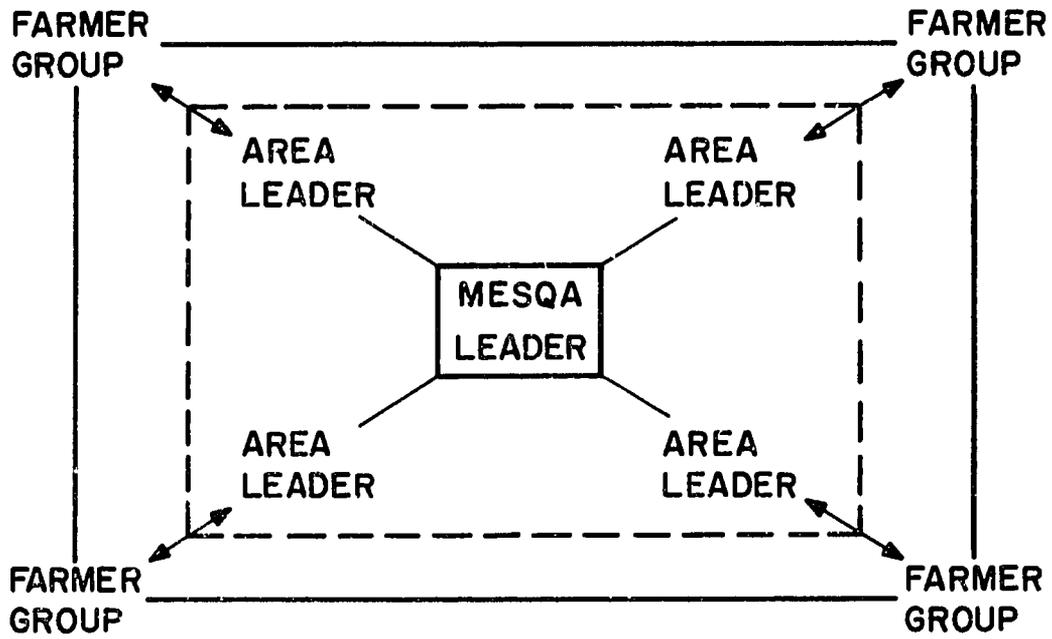


Figure 2 Mesqa Level Water User Association

MINISTRY OF IRRIGATION

MINISTRY OF AGRICULTURE

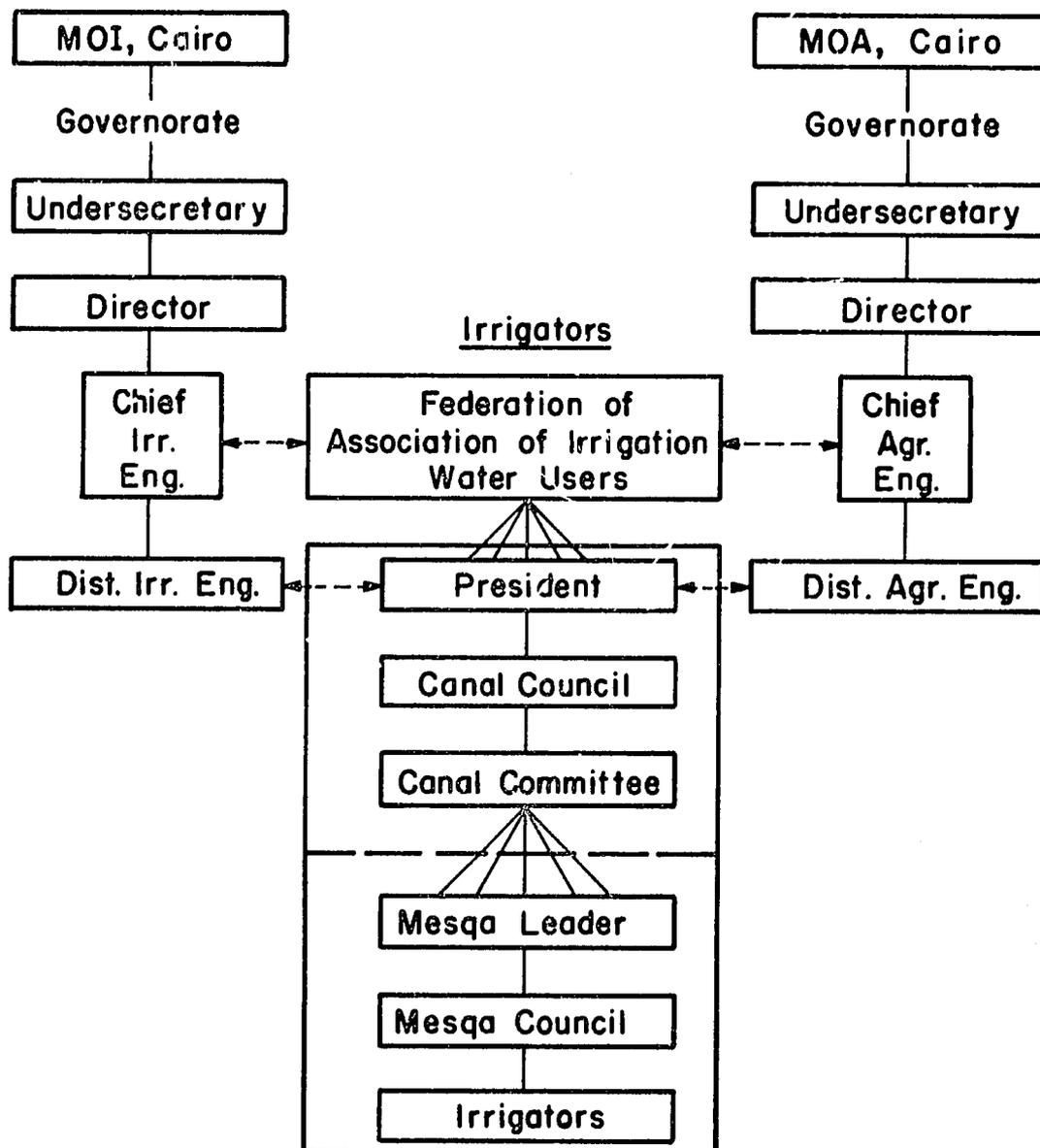


Figure 3 A Proposed Design For Water Users' Associations In Egypt

The means by which information is transmitted throughout the organization, and between the organization and its environment constitutes the communication process. EWUP's major task was to develop among the farmers a systematic scheme whereby on any particular matter EWUP would contact the leaders of the organization and the leaders in turn would contact all the farmers. In addition, EWUP desired to set up a feedback system whereby the farmers would go to the leaders for information, advice, or complaints; and the leaders in turn would come to EWUP with the concerns of the farmers.

Fourth, the coordination process involves a set of behavior through which the complex nature of interrelated events are maintained. In organizing the WUA's, EWUP desired to establish a set of roles to be performed by the leaders and the farmers in general. There were specific responsibilities delineated on a very simple level separating the two structural components of the mesqa WUA. Also, a delineation of the roles between EWUP and WUA was developed.

Another important aspect of an organization is its control process. This process is the interaction sequences characterized by a participant or group announcing an intention that leads to attempts to influence other participants or groups to behave in a way which fulfills the original intention. The initial form of control exercised by EWUP was within its own authority as a government agency. However, that authority on the mesqa level is severely limited in scope and so EWUP has worked with the WUA's to exercise control by using the existing legitimacy of the leaders of each mesqa plus exploiting the principle of peer pressure.

Related to the control process is the conflict process. This process is defined as the patterned sets of behavior that designates internal and external disagreements and efforts at resolution. Throughout the whole process of organizing the farmers to work with the government numerous conflicting situations emerged. Some of these situations were localized circumstances which required only on-the-spot resolutions. However, there are other situations which are now inherent in the relationships within the WUA's, and between the WUA and the government which must be addressed before a further development of the WUA's can evolve.

The maintenance process consists of behavior patterns resulting in the recruitment of members in the organization and teaching the members the way of organizational life. At this point in time, EWUP has been involved in teaching all the farmers how to work together as a WUA at the mesqa level. Initial steps have been taken to help the farmers see how they can be organized at the canal level.

Finally, the eighth process is the adaptation process. This entails the environmental factors which influence the behavior of the organization. The major focus of EWUP has been to initiate a linkage among the different mesqa WUA's and between the farmers and the government. These efforts are only beginning.

When establishing the WUA's, EWUP organized the farmers into the two structural components of the general body and the managing body. Beyond this, each different process component was addressed and developed as the organizations evolved concurrent with the physical work performed by EWUP. The next section will describe the procedure for systematically organizing the farmers, and then a detailed explanation of EWUP's experiences in developing the above process components will be presented.

PROCEDURES IN ESTABLISHING A WATER USERS' ASSOCIATION

With the constraints of the working environment, EWUP proceeded to organize the farmers into WUA's following a specific, well-acknowledged procedure. This procedure is a basic compilation of a number of community development programs which follow a similar agenda of activity. The procedure is set up as a series of periods which are progressive in nature and allow for the continual development of an organization. These periods are defined as the introductory period, the planning period, the organizational period, the operational period and the continuation period.

The introductory period consists of the initial contact by the change agent with the farmers, the initial involvement of the farmers with the change agent, and the legitimation of the organization effort. What is necessary to accomplish, and what EWUP did, is to confer with present formal authority figures in the area and obtain access to various groups. An initial sociological assessment is performed to provide some baseline data in existing irrigation practices and to delineate a leadership network of the area. Also there will be a need to legitimize the effort with the farmers by explaining what will be proposed. An understanding of the area and its capabilities is crucial in order to establish a viable WUA.

Next comes the planning period where the general assessment and problem identification studies are performed. From these studies, goals and objectives of the work are formulated. The Egypt Water Use and Management Project performed these studies, but there needs to be a much greater involvement by the farmers in order to make this period more effective.

After the initial planning period is completed, the initial organizational structure and procedures for the WUA are formulated. This is the organization period. The Egypt Water Use and Management Project took the initiative and set up the structure of the WUA based on what was viewed as most effective within the farmers' existing network of relationships. Leaders were informed and trained as to their responsibilities and the farmers in general were informed as to what their role was to be. This was done by negotiating what would be acceptable to the farmers. The work in organizing the farmers commenced with the work of improving the mesqas.

As the physical work with the mesqas continued and the development of the irrigation network proceeded, the operation period of establishing the WUA evolves. This is the period where the initial structure and set of procedures are tested and modified in order to ensure the viability of the organization. The Egypt Water Use and Management Project has spent much of this time in problem solving activities attempting to define and implement the crucial interaction patterns which will coordinate with the necessary responsibilities of managing the physical system. The organization should be consolidated at this time.

The real test for the success of the organization comes in the last phase - the continuation period. This period constitutes the withdrawal process of the change agent from the day-to-day consultation relationship with the organization and provides the means whereby the association becomes fully self-sufficient. Evaluation studies are performed and conditions are established whereby the members of the organization take upon themselves all of the workings of the WUA. While the withdrawal of the direct administration of the organization by the change agent begins during the operation period, it is at this period where the effort to sustain the organization, becomes the total responsibility of the farmers. All the environmental linkages should have been established. The farmers should understand what they are to do, and the farmers should be willing to take over the administration and operation of the WUA. The Egypt Water Use and Management Project has not reached this period as yet.

After this period, the organization should be able to sustain itself. This requires the proper support from the government. Later on as the WUA becomes more established, its goals and structure may be amplified; but it should now be able to perform the initial purpose for which it was established.

Each of these periods are obviously interrelated. This classification scheme is designed to provide some guidance for the change agent in working to develop the organization. In reality, these periods can overlap with each other and different periods can be existing at the same time in different areas of the WUA. Based on the circumstances involved with setting up the organization, the different periods will require different time periods to operate and different resources to be allocated to those periods. Yet, based on experience, the above scheme describes what one must do in order to effectively develop any type of WUA. Now, what will be reported is how these procedures were experienced in Egypt as EWUP worked with it's WUA.

ESTABLISHING A WATER USERS' ASSOCIATION IN EGYPT

The Egypt Water Use and Management Project's work in establishing water users' associations has been proceeding for about three years and has followed the theoretical guidelines previously discussed. Figure 4 presents how the different theoretical components fit together. To begin with, the work of developing a WUA is a joint venture including both the representatives from the MOI and the farmers who are going to be organized. What will be emphasized throughout this section of the report is that unless both parties actively and correctly pursue their respective responsibilities, the WUA developed will not be sustained; if it is organized in the first place. The basic procedure followed in establishing the association in Egypt is that both the government as represented by EWUP, and the farmers pursued specific activities for each of the different periods previously identified. In each period after the introductory period, the activities were planned and executed to address and develop the different organizational processes needed to make the association a viable entity. At this point in time, the work has not been completed in all of the periods of this organizational process, but a statement as to what is planned in the unfinished periods will be presented. What is now to follow is a description of how the procedure for developing a WUA has been carried out.

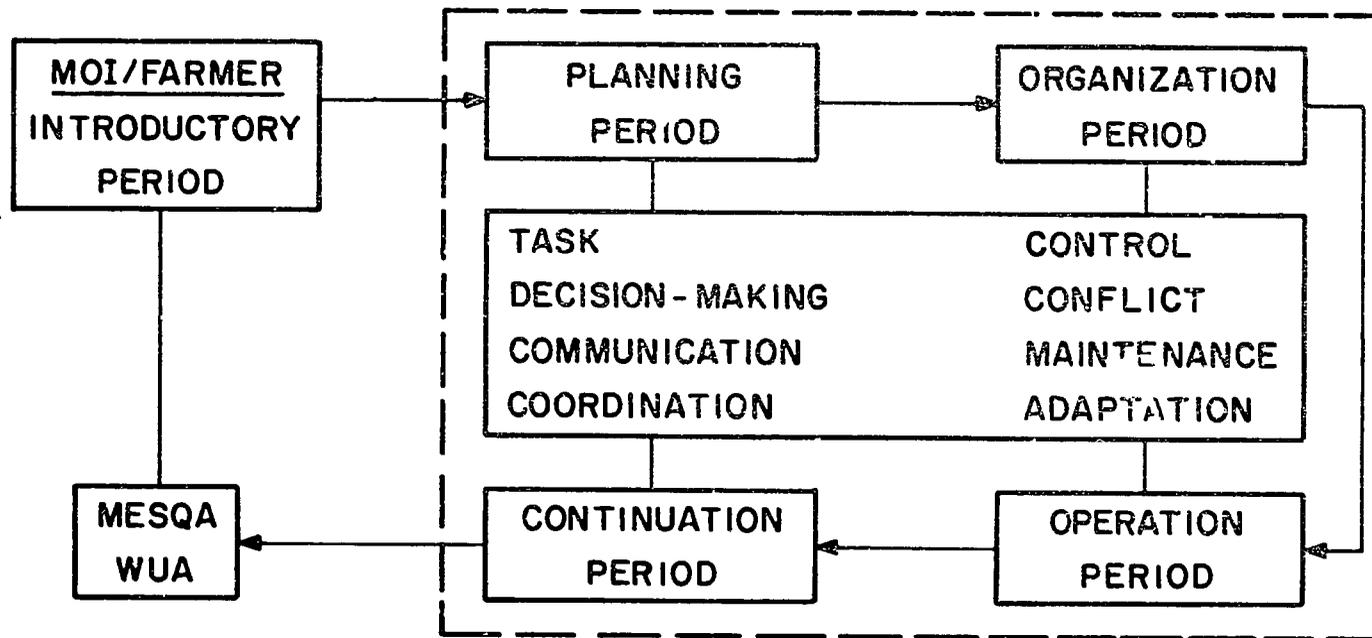


Figure 4 The Process of Developing Water Users' Associations

Introductory Period

As previously stated, the introductory period consists of the initial contact by the change agent with the farmers. From this contact, two general consequences need to be developed. First the MOI officials, the change agent, and the farmers need to develop a trust between each other. The second consequence is that the idea of the organization must then be legitimized by the farmers. As these two consequences of the introductory period become fulfilled, then ideally one can proceed to the formal planning period.

Developing Trust:

One of the most crucial aspects of any organizational effort is that a trust must exist between the officials working to establish the organization, and the farmers who are to be organized. Unless such a trust exists, the organization effort will quickly dissipate when the organization and operation periods evolve; for these are the times which will strain the relationship between the officials and the farmers to the greatest extent. During this period of time the officials must gain entry to the community, extract the relevant information about the community for initial planning purposes, and establish a working rapport with the members of the community. The first two tasks help to build the foundation, but it is the third task which needs to be successfully accomplished in order for that trust to develop.

A central issue surrounding the notion of working with farmers is when should the entry begin with relation to the overall work plan for the project. Work in the Philippines puts forward the idea that "community organizers", who are generally some type of applied social scientist or extension person, be placed in a village where a proposed project is to be introduced nine months prior to any formal development of a physical system. (Korten, 1982) This period is similar in purpose to our introductory period and stresses the point that there must be some time spent by the officials to become involved with the village of contact in order to prepare for the formal planning phase of the project. The reason for this is that they found after many irrigation projects were completed by the government, and turned over to the farmers; the management of those projects by the farmers was practically nil. Results from those findings showed that farmers not only needed to be involved in the projects in order for the projects to meet their objectives, but also they needed to be involved at the beginning of the planning effort. In order for the farmers to be effectively involved in the planning, there needed to be some foundation laid which necessitated the nine month village contact work.

The nine month period may be adjusted to different circumstances; but the notion of spending time to prepare a foundation, or as we are calling it - developing a trust, is essential to any project designed to organize farmers. The Egypt Water Use and Management Project did not have the nine-month lead time to gain entry, but given the nature of the project there was a period of time prior to any organization effort that a number of small scale activities were being pursued and therefore the farmers did have an opportunity to know about the project. The entry by EWUP consisted of establishing teams of local officials who had worked in the project site areas before and then having them go to the official leaders of the village, and other "influential persons" in the village, to introduce themselves and present a general discussion of what the project wishes to accomplish and what it plans to do.

After entry is established, it is necessary to collect pertinent basic information about the community. The purpose of this information is to obtain fundamental data which can be used to identify problems which can then be addressed by the project and the farmers. This baseline data should be minimal and the collection of the data should be performed quickly. Appendix 1 present a model sociological baseline survey which has evolved over a four year time span. The information gathered essentially will tell the researcher what are the basic irrigation behavioral patterns of the farmers, both individually and collectively; the farmers' perceptions of the irrigation problems in the area; and who the defacto leadership is among the farmers. The sociological data needs to be combined with the baseline surveys of the engineers, agronomists, and economists to provide a base for the formal planning period. Experience from EWUP has shown that the farmers are willing to share information with the officials, especially complaints about how the system is functioning.

As the officials perform the entry and data collection tasks of this period, they should also be establishing a good rapport with the farmers. Building a rapport is more than saying to the farmers that we are coming to help them. Two issues dominate the relationship between the officials and the farmers at this stage of the project: (1) giving the farmers misleading information and (2) providing the farmers with incentives.

Once the government officials enter an area and begin to seek information about specific problems, the curiosity level of the villagers obviously is raised to the point of them asking the officials of what is to transpire. There seems to be a tendency in many officials to make statements

suggesting that they are going to solve particular problems. At this point in time, there is a possibility that the officials may promise more than was originally intended. Obviously, once a promise is made, the villagers are waiting to see if indeed the promise will be kept. If it is not kept, then the officials will have a much more difficult time in working with the farmers on a project providing a smaller scale of improvement. The farmers will accept the truth. There must not be any embellishment of what is actually going to occur. In fact, this should be the point where the farmers are told what the officials generally have in mind, and that they will need the farmers' involvement in the new project. This at once will place some responsibility on the farmers and provide a mechanism whereby a more realistic appraisal of the project will be made. This in turn will facilitate any organizational development among the farmers.

A second issue which emerges at this point concerns the use of incentives for the farmers. To begin with, the issue of incentives is not a simple "should we or should we not give them" debate. The use of incentives is highly situation-specific and thus there is no blanket statement which can be made concerning them. One rule which can most generally be made, though, is that the farmers should not be given anything without them performing some reciprocal action. Also cash money should not be just given to the farmers. There should be an understanding among the officials at the beginning that all incentives should be properly intertwined in the working procedures of the project and that policy should be clearly communicated to the farmers. The guidelines for incentives should be "there is no such thing as a free lunch".

The work of developing a rapport with farmers is a continuous process and should never be thought of in terms as a task of the introductory period alone. Yet, it is crucial that the rapport be firmly established in the community during the beginning of the project. This does not mean that every individual in the village must be friends with the officials, but it does mean that the leadership and a majority of the other members of the community have developed a trust with the officials to the point that they will cooperate with the officials in the future work plans of the project.

Legitimation of Collective Action:

The second step in the introductory period is to establish the acceptance by the farmers as to the possibility that they may have to participate in some sort of collective action. At this point in time, one cannot specify what type

of action will be needed to be performed by the farmers, and therefore what type of organization will be developed; but the farmer leaders should be advised that some form of collective action will be necessary and that the officials will work with the farmers to set up an appropriate organization. Information should also be picked up by the officials as to what may be facilitating conditions and obstacles to developing an organization in the area. Once such legitimation is established, then efforts in developing the actual organization will proceed in a more realistic manner; which may then yield a more viable organization.

Planning Period

The planning period is the time of the project where detailed problem identification studies are completed, and where the evaluation of solutions to specific problems are developed. If the alternative solutions include the development of a WUA, then a more detailed preparation for that organization needs to be initiated. The preparation for establishing the WUA includes the initial planning for developing each of the eight organizational processes. Underlying the planning effort is one of the most critical issues which needs to be addressed by the government officials: how will the farmers be involved in the planning of a new project? What will follow is a discussion of this issue of farmer involvement and then a description of how the organization is prepared.

The issue of how and when the farmers should be involved in the introduction of a new project is a long-standing one. Experience from other irrigation projects around the world suggest that for the best results, the farmers should work with the government officials right at the beginning of the planning phase. (Korten, 1982) During the introductory period, the farmers are asked their opinions about problems, but that cannot be defined as proper involvement. In order for the farmer to be properly involved in the introduction of a project, that individual must take part in the planning of the project. (Mayfield and Naguib, 1984)

What must be understood during this planning period is that there is knowledge available about the project area which is only known by the farmers. Any successful project must take into consideration the site situations and while the officials have the technical knowledge to design an irrigation system, unless they design that system taking into consideration the local idiosyncracies, that design will be much less than optimum. Incorporating the local conditions to the design is where the farmers may significantly contribute to the planning of the project.

The farmers have other types of knowledge, relevant opinions, and skills which can also be utilized in the planning period in order to make the project more viable. With the proper delineation of roles and responsibilities between the farmers and the officials, the planning period can be a cooperative endeavor with each side contributing valuable information.

Involvement at this stage of the project will create the circumstances where the farmers will have developed a type of investment in the project, and that in turn will facilitate implementation of the project. Experience by EWUP with different situations where the farmers were involved with some type of planning versus where no involvement was present verifies the findings in the literature; where no involvement was present, implementation was much more difficult to conduct.

The question then is raised, how can the farmers become effectively involved in the planning effort? Involvement of the farmers can coincide with the preparation of establishing the farmer organization. The key to this organizational/planning effort is the contact with the various leaders identified in the baseline survey during the introductory period. This concept of leadership will be more fully discussed in the next period, but for now the officials can use the identified leaders to establish initial contacts in terms of obtaining needed information for proposed alternative solutions. Discussions with the leaders about proposed alternatives can also include initial efforts to develop the WUA. This is done by planning with the leaders ways in which the eight organizational processes can be established.

For the task process, there are two major points which need to be developed. First, guidelines for establishing the organization must be agreed upon by the officials and the farmers. As stated in the previous sections of this report, a WUA can include many roles. However, what has been demonstrated in Egypt is that there needs to be a simple and clear objective for organizations which are being developed for the first time. Essentially, the objectives of the WUA's at the EWUP sites are to schedule water among the members and have the members collectively clean their portion of the mesqas.

A second point which needs to be worked out between the farmers and officials is how will the officials and the WUA work together while the organization is being developed. This delineation of specific tasks by both the officials and the farmers needs to be clarified at this stage of the organization building. What has to be clarified, based on EWUP's experience, is that the

officials will serve as an advisor to the organization and that a policy of incentives will be established.

The notion of serving as an advisor connotes that the officials see their obligations in terms of introducing the organizational framework, working to make that framework viable in the farmers' context, and disengaging itself from the organization when it is appropriate to do so. How EWUP has followed this approach will be further explained in the following periods, but what is necessary to point out now is that the government officials must have this long range view internalized before they begin to work with the farmers. Having this view will ensure that the officials will involve the farmers earlier in the process of establishing the organization and will not try to do everything for the farmers. At the beginning of the establishment of the organization, the officials will obviously be playing a major role in guiding the work, but EWUP's experience shows that when the officials do everything with no farmer responsibility, the organization will flounder at a later stage of development. When the officials begin to work with the farmers based on the understanding that they will leave in the future, then they will be more apt to involve the farmers earlier in the work.

The issue of incentives has been previously discussed, and so what is necessary to present at this point is that the officials and the farmers need to agree on a proper incentive program. Officials of the project should understand what their limitations are and honestly tell the farmers their situation. At the same time something must be done to encourage the farmers to work with the project. The officials should be aware that any major program is going to take time to develop. There is a need to create some short term mini projects which will offer immediate results for the farmers. During the introductory period the farmers did present their opinions on what were the problems of the area. This list would provide an excellent beginning for the officials and farmers to come together to start to solve one of the easier problems. Once work begins on a simple problem, then the farmers will have the opportunity to further develop a trusting relationship with the officials and also an investment into the major work to be done will be initially developed.

The previously mentioned points in the task process will serve as a foundation for legitimizing the need for a WUA. This can also serve as a basis to develop the next seven processes. Next, the officials should work with the leadership group to devise a method on how decisions are to be made in the organization. What needs to be established is how the leadership structure is

to be constructed (the managing body) and by what rules will the managing body conduct its responsibilities in making decisions. A jurisdiction of authority needs to be established between the farmers and the officials. Experience from EWUP suggests that this jurisdictional issue needs to be negotiated with the farmers in order to place more responsibility, and therefore investment in the process, with the farmers. Having them involved in the planning will help in clarifying this issue.

During this planning period which really initiates the work with the farmers, one problem needs to be acknowledged concerning decision making. Decisions made to perform a specific activity do not totally occur in the context of the project site alone; there are many types of external conditions which will influence various decisions. For instance, some of the circumstances which may influence a particular decision include time periods where no irrigation will occur, political pressures within the Ministry to "do something", necessary commitments which must be kept, and organizational/administrative constraints. The officials and the farmers at the project site needs to be aware of these factors and be prepared to address this issue when it evolves.

Closely connected to the decision making process is the communication process by which decisions and other information will flow throughout the organization, and between the WUA and the government. During this planning period, the thrust of the officials' effort should be in introducing the notion of leadership and farmer meetings. The farmers do have an informal communication net by which information is disseminated throughout the village and the area. Knowledge of this network should be obtained by the officials and should be planned to be used. What will prove to be difficult from EWUP's experience, is to formalize much of the organizational communication into specific meetings. More about this problem will be presented in the next period, but what needs to be noted now is that for many areas having meetings for a group of farmers are difficult to establish. Therefore, the responsibility of the officials, is to start to have such group meetings immediately when the leaders are discussing the various plans and alternatives at this stage of the project. If the government officials effectively utilize such meetings to obtain the farmers' input and demonstrate that they will include it in their plans, then the rationale for such meetings will be set forth and it will be easier to establish such a procedure.

The coordination process of the WUA can be initially developed in this planning phase by (1) sensitizing the leadership to the notion of delineating roles and responsibilities in the context of the organization, and (2) working with the leadership to follow these ideas during the planning for the new project. There must also be an understanding between the officials and the farmers as to each of their respective roles as the project evolves.

Initially, as the organization evolves, the major responsibilities of EWUP were (1) sensitizing the leadership to the notion of delineation of roles and responsibilities in the context of the organization, and (2) working with the leaders to act as an interface between the project and the farmers. The farmers' roles were defined as to schedule water, clean their portion of the mesqas, and to work with the leaders to maintain a viable organization. These basic responsibilities should be discussed with the leaders, thus showing them in a nutshell what their future work load will be like.

The leaders' primary role as an interface between the officials and the farmers can be practiced during this planning period if the farmers are properly involved. The officials can use the leaders as a means to contact the general body of farmers regarding what is being discussed and receive feedback from the farmers concerning their views of the situation. The officials will have to closely watch this process of disseminating information in order to evaluate the efforts of the leaders, but this exercise will demonstrate to the officials how well the existing network can perform the tasks which will be necessary to incorporate in the WUA.

Also, as this planning period continues, there will be an opportunity to show the farmer leaders how the roles and responsibilities of the WUA and the government will be discharged. During this period of establishing new behavioral patterns, the officials will be responsible to understand the remaining four organizational processes of control, conflict, maintenance, and adaptation. The officials will need to have in their mind what type of control patterns will be established between the government and the WUA during the project. They must also understand that as the organization is developing, the officials must see what type of authority is already granted to the leaders by the farmers, and what will be necessary to establish once the project begins and the WUA begins to administer it. The officials also need to be aware of existing conflict patterns among the farmers and have some initial ideas on how they plan to work with these problems. Working with the leaders in

planning for specific projects is satisfying the initial need to develop the maintenance process while a continued understanding of the surrounding social, physical, economic and political environments will determine how well an organizational effort can be made in adapting to its circumstances.

In fact, this adaptation process of an organization is an issue that should be at the forefront of the officials' thinking during this planning period. The issue will be discussed more in-depth in the continuation period, but the officials need to understand at the beginning that if there is no legal and political linkage between the WUA and the government, then the efforts made at this planning stage will be greatly wasted. The planners need to not only concern themselves with the introduction and implementation of a physical change, but they also need to work for that institutional change to support a WUA. This planning period should lay the foundation for both.

Organization Period

As the planning period closes, and a solution is accepted and ready to be implemented; the local WUA needs to be introduced to the farmers in the area. The phase of the project which presents the organizational format to the farmers is called the organizational period. During the planning period, the essence of the organization has been introduced to the farming community, work with the leadership has begun, and certain behavioral patterns associated with a WUA have been introduced. What will now occur is that the foundation which has been set will be built upon through the inclusion of all the farmers in the project area in the establishment of the WUA.

As this period evolves, two major points need to be taken into consideration. First, the development of the organization is tied to the progress of the physical change in the system. As stated before, there must be a purpose in organizing the farmers and just telling the farmers a purpose is not sufficient to ensure the successful development of the organization. The experience of EWUP has demonstrated that the most effective way to organize farmers in a viable manner is to do so concurrent with a physical change so the farmers immediately see why they are supposed to be organized. There is going to have to be very close coordination among the team of officials so that both the physical and organizational work develop effectively.

A second point which needs to be emphasized during this period is that the focus of activity needs to be placed on the proper development of the managing body of the organization; i.e., the leadership. The key to developing a local organization is to establish a responsible leadership group which will put in the time and effort to see that the group will collectively work together. The Egypt Water Use and Management Project has followed the procedure of developing the mesqa level of organization, or the lowest level, before it moves up to establish a canal-wide WUA. The movement from one level to another will be discussed in the operational period, and so the comments made in the next two periods will be related to the mesqa level of work. What will now be discussed is how the leadership at the mesqa level of organization is strengthened in terms of developing the eight organizational processes.

The task processes described in the last period are carried over to this period. Agreements made during the planning stage must be implemented now. If the physical work has progressed to develop a scheduling system among the farmers, the officials and the leadership work out a specific plan to do such. Also, the leadership is reminded that the farmers need to begin the maintenance work when appropriate.

How such tasks are carried out is interrelated to the development of the other organization processes. The officials of the project should deliberately set up situations where the organization starts to make decisions about the farmers' responsibilities in the project. For instance, EWUP allowed the farmers to decide where the inlets from the mesqa to the field were to be placed. The leadership was given the plans and the number of inlets to be constructed for each section of the mesqa, and then the farmers decided where the inlets were to be placed. This exercise allowed the leaders the opportunity to work with the other farmers to make basic decisions on a particular activity.

Not only are situations created to make the farmers decide on a course of action, but also the actual procedure for making decisions is presented to the farmers. If a particular problem arises, EWUP and the leadership would discuss alternative solutions to the problems. Some solutions could not be performed by EWUP and the farmers were informed of that fact. Other solutions which were especially disagreeable to the farmers, and could be logically defended as to why they should be discontinued were also eliminated.

For the most part, EWUP and the farmers were able to negotiate a solution and then that solution was implemented.

Such decision making situations always were integrated with the communication and coordination processes. The Egypt Water Use and Management Project made a special effort to follow a proper line of communication which was determined by the respective responsibilities of the leadership and the general body of farmers. The officials would always focus their discussions with the leaders who were suppose to discuss the specific items with the farmers. Also any feedback from the farmers had to be channeled through the leadership.

At the beginning of the organizational period EWUP obviously had to take a more direct role. Specific farmer complaints were directed to the officials directly. The Egypt Water Use and Management Project also found in following up on some of the leaders, that all the information given to a few of the managing groups was not being disseminated to all of their respective farmers. After such failures to disseminate information were discovered, EWUP would have to go back to the leaders and repeat what was previously said with an admonition to do their job better. Once the leadership began to perform their appointed task, then the farmers for the most part started to go to the leaders with their concerns. Still, there are some major problems which are directly communicated from a farmer to EWUP and they include problems involving the work of the contractor on the mesqas.

There still is a problem regarding the use of group meetings. The farmers for the most part are very busy and many have conflicting schedules. There has been a lot of effort put into developing a meeting type of communication format, but there is still much which needs to be accomplished. Experience in bringing farmers together shows that one needs to schedule meetings at least a few days in advance and even then one must be prepared to gather them together on the day of the meeting. The best time which to bring the farmers to gather has been on Fridays at the mosque. A future program regarding meetings may have to arrange the time on Fridays to ensure a maximum audience. Also, the officials need to use the informal network of the village more in order to disseminate information. When this medium has been used, it has been somewhat successful.

As the leadership of the mesqa began to develop, a picture of the use of authority was being painted. The leadership group chosen were designated by the farmers as the existing influentials on their respective mesqas. Because of

this, many of the mesqas were successfully organized to perform the stipulated tasks. For minor infractions, such as not cleaning the mesqa, the offending farmers were forced by the leadership to keep the agreed upon rules of the mesqa. However, there were a couple of situations which the mesqa leaders were not willing nor able to exert any authority. These types of infractions concerned themselves with existing conflicts among farmers or in matters which could possibly bring the police. In these circumstances, EWUP had to intervene and use its authority to solve the problem. The organizations on the mesqa level are fairly informal entities and therefore the informal leadership pattern works to a certain extent. Yet, it has been found that there is only so far the leaders will proceed and then the government must step in. Most problems can be solved by the parties involved and it is these type of problems which are best handled by the mesqa leaders; i.e., scheduling turns, not maintaining the farmers' respective portion of the mesqa, small conflicts concerning how farmers work with each other on the mesqa, the need to perform some job, and so forth.

Two of the important processes in this period are the conflict process and the maintenance process. Obviously when one introduces any change in a large area, some conflicts are bound to be started. A further description of the types of conflicts incurred will be presented in the operation period because most of that period is devoted to conflict management. What should be stated here is that the placement of the organization in an area constitutes the restructuring of many types of behavioral patterns. Existing conflicts may be exacerbated and new ones may develop. The establishment of the organization in the area will bring these about while it is in the operation phase where they have to be dealt with on a continual scale.

However, pertaining to the maintenance process, this period does bring out among the leaders those who will perform in their leadership roles and those who will not. The question then arises as to how the poor leaders will be handled. The Egypt Water Use and Management Project experience shows that one of two possible courses of action generally occurs. One option is that the farmers will elect a new leader to take the place of the one who is not performing his job. Another course of action is that the leadership group will be reduced to the leaders who will put forth the effort. Questions have been raised as to the consequences of the second course of action. As of now, the representation of the whole mesqa has not been adversely effected, but observations are continually being made as to what is happening on the

effected mesqas. In addition to leadership changes, a few new farmers had to be integrated into the new organization and EWUP along with the leaders performed this task.

As the farmer organization is being diffused, it must adapt to the various circumstances surrounding it. The major circumstances affecting the various activities of the WUA include the progress of the physical work being accomplished, and the external conditions influencing certain actions of the farmers.

All of the major problems EWUP has experienced with the farmers has been due to related problems with the progress of the physical work on the mesqas. These physical problems include improper work procedures, excess damage by the contractor to farm property, delays in starting and completing work assignments, and poor working relationships between contractors and the farmers. The damage to the development of the WUA because of these failures cannot be calculated at this point in time. One of the fundamental points in the area of innovation-diffusion is that nothing can kill an idea as fast as the poor application of the idea to the receiver. This has been demonstrated time and time again in EWUP's work in developing WUA's. Not only do these failures adversely effect the relationship between the officials of a project and the farmers, but it also undermines the effectiveness of the leadership by reducing the leadership's influence over the farmers and by turning the leadership against the project officials. This type of damage needs to be avoided as much as possible and can only be done so by competently doing the job the officials promised the farmers.

Other external conditions can just pop up to influence various activities of the WUA. These conditions can be natural (storms, droughts, etc.) or social. One instance affecting EWUP was that a task was to be done in a particular time period. Yet, the schedule for the task occurred during Ramadan which for various reasons caused a delay in the accomplishment of the task for about six weeks. Other social factors include deaths, births, marriages, sickness, legal problems, etc. These conditions cannot always be prevented and so as was stated in the planning period, a certain degree of flexibility needs to be placed in the organizational development process to account for such circumstances.

Operation Period

Once the organization has been set into place, the next step is to test the structures and procedures to see what needs to be done to maintain the viability of that organization. This is done by working with the organization to solve the myriad of problems created by the establishment of the new physical improvement along with its new management scheme. The major concerns to be addressed during this period is the management of conflicts and the modification of the original structure to meet the environmental demands placed upon the new organization.

The modification of the organizational design and procedures is especially prevalent when new tasks are included by the organization. In addition to regular scheduling and maintenance, the farmers in some areas wanted to do additional tasks like improve access roads and build bridges. These initial additions of tasks have helped to further enhance the decision making, communication, and coordination processes of the present organization; but eventually when more diverse tasks attached to a more established organization are being introduced, some new structural entities will emerge. For now, there is no real change in the organization, but the existence of new tasks at this stage of the development of an organization demonstrates how an organization has the capability to become a very dynamic entity.

As the organization develops, the decision making process becomes more specific in how it operates in this entity. The development of the decision making process occurs by the inclusion of new situations which define how decisions are made. For instance, a road was to be established in place of a new mesqa. This was a new situation not originally presented to the farmers. What happened was that the leadership did not yet have enough legitimacy or information to influence the farmers, so EWUP had to spend the extra time discussing the proposal with individual farmers on the mesqa. Other situations occurred where the leaders did not have enough influence to affect the decisions of the general body of farmers and so EWUP had to intervene. While The Egypt Water Use and Management Project tried to use the leadership; but with the physical changes occurring so rapidly and the leaders not being as sufficiently informed as they could have been created a situation which actually produced a two-tier decision making operation: (1) one by the leaders for the original design work on the mesqas, and (2) one by EWUP on new practices.

Hopefully, as the organization develops further, the situations which affect the decision making structure of the organization will stabilize allowing for the leadership to expand their base of legitimacy among the general body of farmers. Yet as these changes occur, the leadership needs to be guided by the officials as to how to meet the demands of the farmers and channel these demands into effective decision making opportunities that will reduce the role of outsiders.

In connection with this new decision making structure the communication, coordination and control processes are evolving as the organization continually meets new challenges. The communication channels which were initially one way have changed to a prolific flow of two-way communications. Farmers are beginning to ask more questions about what is occurring and are talking to each other more concerning the new changes. If the communication channels set up by the organization are not adequate to meet the new demands of the farmers, the farmers will go elsewhere to be heard.

Another purpose of this period is to enhance further the responsibility of the farmers regarding the project. All additional tasks should be performed as much as possible by the farmers. The farmers during this period especially will push the government to provide as much as possible. Obviously the farmers cannot do everything, but the project should negotiate every farmer request so that the farmers at least provide labor and as much of the equipment necessary to perform a task. Also, each negotiation should only be performed with the selected leadership. Every action by the government should be done to increase the legitimacy of the leadership and make sure that the leadership is performing the duties assigned to it in a proper manner.

One of the major ways to strengthen the leadership is to provide continual support to these leaders as they try to control the specific behavior of the farmers on the mesqa with relation to the organization. The government needs to establish situations where the leadership can gain experience in operating the mesqas. In one area each mesqa had a gate installed and the farmers chose one of the leaders to be the custodian of the key to the gate. In cases where the leadership does enforce legitimate sanctions, then the government should support them. Again there is a need to support the leadership as they properly fulfill their role while the organization is facing the numerous changes during this period.

Because of these changes a number of conflicting situations emerge. The conflicts either occur among the farmers themselves as a result of a change, or the conflicts occur between the farmers and the government over the activities involved in the project. An example of the first type of conflict, is that because of a new improvement by the project, some farmers in a village lost some valuable land upon which they were planning to build. A split occurred in the village and a couple of farmers went to jail before the dispute was settled. The leadership of the village, by the way, solved the problem.

Conflicts between the contractor and the farmers occurred too often. Basically, the cause of the problems were a result of the contractor not doing the job correctly. For instance, a major problem emerged when the contractor failed to adequately compact the banks of a renovated mesqa. The leakage which occurred when the mesqa was filled with water resulted in the farmers refusing to work with EWUP for a long period of time. Many of these types of conflicts originate back in the planning period when there is an inadequate degree of involvement by the farmers with the government. There are obviously individual conflicts between a farmer and the government due to some personal characteristic of that farmer; but for the most part, the major conflicts between EWUP and the farmers have been caused by the poor implementing practices of the government.

The statements regarding the maintenance and adaptation processes presented in the organizational period are similar to what can be said in this period. Changing the leaders needs to become better defined, and the organization should become better adapted to the environment with which its in and start developing linkages to relevant government and private entities.

The experience of EWUP at this point in time includes only part of the operation period. As the physical improvements continue further observations about the development of the different processes will exist. One critical development which must occur is the establishment of the canal wide organization.

During the continuation period, the originally conceived physical work of the area should be coming to a completion. If this work involves a number of mesqas and demands some type of cooperative action, then the canal-wide organization should begin to be developed. During the planning and organization periods, preliminary work should be done on establishing a canal-wide organization. In the planning period, a framework as depicted in Figure 3 should be considered. Initial ideas for the development of the eight

organizational processes can also be put forward. During the organizational period, the government officials can be observing the mesqa organizations and begin to talk to the leaders about the notion of a canal-wide WUA. In fact, EWUP did call all the mesqa leaders together once to explain the work which was to proceed a few months later from the days of the meeting. This allowed all the leaders to talk with each other and provided a precedent for some type of canal cooperation.

However, until the physical work proceeds to a point where there is some purpose for the WUA to function at the canal level, extensive organizational work should be delayed. This should be done for two reasons. The first reason is that the effort to establish the mesqa organizations is extremely important and must not be compromised at all. Based on EWUP's experience, the task to organize the mesqas is a long and involved process. Yet, it is at this level where the operational success of the organization becomes dependent. There have been many types of organizations which have been created and have had a number of leaders selected, but have not properly cultivated the different organizational processes at this level and thus have become merely "paper" entities. The establishment of a viable, dynamic group at the foundation-level is essential before any aspect of the WUA at the higher levels of operation can become truly functional. With the importance of establishing the organization at this level and the amount of effort it will take to do so, the first priority of the government officials should be at the mesqa level.

The second reason goes back to the premise put forward earlier. Without having a concrete reason for the farmers to work together, any organizational program will not last long enough to make any extensive effort worthwhile. The Egypt Water Use and Management Project used the canal meeting to present information and provide a forum whereby general points of concern could be discussed. A canal-wide organization idea was established, but because the mesqa work had not even been started, the leadership had nothing to do except to communicate the results of the meeting to the other farmers. No attempts were made to formulate any organization because the farmers in the site have made it clear that they do not want to be bothered with idle government actions where nothing of benefit can be demonstrated. Also, unless the farmers have something to work through whereby they can learn about their new positions and responsibilities, the concepts presented will not be integrated into their personality system and therefore the performance of the organization will be very difficult to develop.

Yet, despite the necessity to build the WUA from the ground up, the official must realize that there is much work to be accomplished in providing the government linkage to the association. That linkage cannot practically occur at the mesqa level, so there must be some means by which the government can be looking at canal-level organizations before they are established. This can be done by bringing the officials out to see the mesqa level organizations and talk to them about the future canal organizations. During the operational period, the government can begin to see what a WUA can actually do and also during that period the officials working with the WUA will also have an understanding of how such a canal organization can be most effectively established. Again, the foundation has been built on the farmers' side and on the officials' side pertaining to how an effective organization can be established. With this foundation built, then the canal organization can begin its development.

In constructing the canal organization, the parties involved need to return to the planning period and begin the cycle of activity again. (Figure 5) Much of the baseline work should already be completed for the planning period and the major focus of activity is to develop the organizational processes for the canal level body. While EWUP has not entered into this level yet in its work, there are some general points of this transition which are now being examined. With a much larger area, the decision-making and control processes will have to become more formalized. There will have to be some type of written rules and regulations and the use of sanctions will have to move beyond informal legitimacy and peer pressure. There will be a need to specify different administrative roles within the managing body and also decisions will have to be made on compensation for individuals who are committing large amounts of their time to the activities of the WUA. Communication networks will be more complicated and different types of conflict situations will emerge. There will also now be more of necessity to involve the local MOI administration and that point will raise many issues. All in all, the establishment of the canal WUA will demand a tremendous effort by those involved in developing the entity to become a significant link between the MOI and the farmers. While similar processes and procedures will be used as in developing the mesqa organizations, the scale of the entity will bring these processes and procedures up to a new dimension.

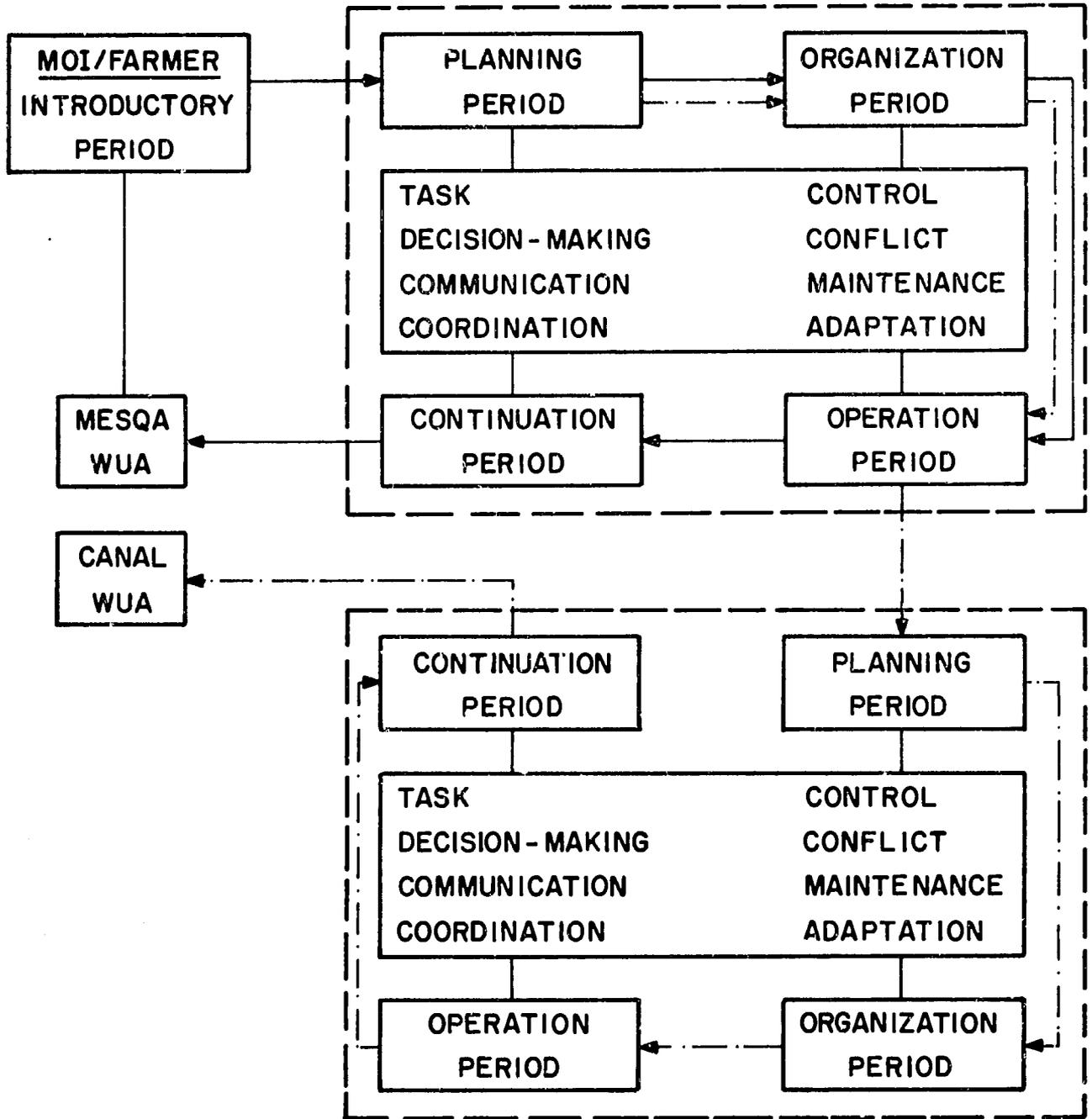


Figure 5 Establishing a Canal-Wide Water Users' Association

Continuation Period

The final period in this process of developing a WUA is called the continuation period. Since the experience of EWUP has not reached this stage yet, the following points will cover what should theoretically occur. Continual work with what EWUP has begun is necessary to see how these theoretical notions of turning over the WUA to the farmers actually evolve.

What needs to be done during this period is that the government should completely disengage itself from the operation of the organization and the organization in turn should be institutionalized in the existing network of organizations pertaining to irrigation and agriculture. Disengaging from the operation of the WUA assumes that all of the organizational processes have been developed to the point where the farmers can accomplish the tasks of the organization by themselves. Before this disengagement, the government officials need to perform a sound evaluation analysis while they gradually relinquish their involvement.

This disengagement should not occur before appropriate linkages to the MOI are firmly established. Figure 3 provides the organizational scheme through which various linkages can be established. What is critical to understand is that without the proper linkages to the MOI, the WUA will ultimately fail. The institutionalization of the WUA is essential and it should be the ultimate goal for the organization from the planning period and all activities should be performed with this in mind.

So the continuation period should prove to be the end of a process which has seen an organization develop in the minds of some government officials to an actual, viable entity where the farmers are performing tasks once reserved exclusively for the MOI. As previously stated, Egypt needs to significantly improve the management of its irrigation system at the distributary canal and below. Because of various circumstances, the MOI cannot perform the job alone. Work around the world and now in Egypt has demonstrated that given enough interest, time, and effort the farmers can indeed work with the government to help improve the efficiency and effectiveness of the nation's irrigation system.

The theory behind WUA's has been presented as well as a description of how that theory has been introduced to the Egyptian context. While the experience with WUA's in Egypt has only begun basic procedures can now be analyzed and improved. The different components of a WUA has begun to be

established. Future work will provide a more varied structural approach to constructing a WUA, but the basic foundation of the organization has been established at the mesqa level. The organizational processes encompassing the organizations have been brought forth. Future work with the WUA will further refine these processes. Also, a systematic procedure for developing a WUA has been practiced. While during EWUP's experience, these periods have not been totally observed, enough has been done to emphasize the importance of establishing some systematic approach to work with the farmers.

However, to repeat once again, the development of a WUA is a two-way process. There is indeed a need to work with the farmers. This report is a document designed to examine this process. However, there is also a critical need for the MOI to examine the role of WUA's in their own management plans and be willing to effectively work with such entities which are established. If the MOI does not provide the support to the WUA, then the farmer organization will not serve the purpose it was designed to serve. If this happens, then the management of the Nile system will essentially continue on its present course, and the country will continue to bear the consequences of a management system that will not use its water resources effectively. The question which then needs to be answered is, are these consequences acceptable to the nation?

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APPENDIX I

Sociological Base-Line Data Survey

(1) Farmer Name: _____

(2) Religion: _____

(3) Mesqa of Study: _____

(4) Full Time: _____ Part Time: _____

(5) Owner: _____ Renter: _____ Both: _____

(6) Mesqa Description

A. Number of Parcels _____

B. Inlet Location _____

C. Area of Fields _____

(7) Outside Mesqa Field Operation

A. Number of Parcels _____

B. Area of Fields _____

(8) Cooperative Affiliation

A. Credit Cooperative _____

B. Land Reform
Cooperative _____

C. Both _____

D. Board Member: Yes: _____ No: _____

(9) Who are the people that actually irrigate your fields?
(Select all which are applicable.)

- A. Yourself _____
- B. Your Spouse _____
- C. Your Children _____
- D. Your other
Relatives _____
- E. Hired Labor _____
- F. Other Farmers _____

(10) Source of Irrigation

- A. Saqia _____
- B. Pump _____
- C. Both _____
- D. Gravity _____
- F. Lift and
Gravity _____
- F. Other _____

CODE

(1) _____	(8) _____	D. _____
(2) _____	A. _____	E. _____
(3) _____	B. _____	F. _____
(4) _____	C. _____	
(5) _____	D. _____	
(6) _____	(9) _____	
A. _____	A. _____	
B. _____	B. _____	
_____	C. _____	
_____	D. _____	
C. _____	E. _____	
_____	F. _____	
_____	(10) _____	
(7) _____	A. _____	
A. _____	B. _____	
B. _____	C. _____	

Summer Season

Winter Season

(11) Crop	(12) Time of Irrig.	(13) Hour of Irrig.	(14) Days Between	(15) Time/ Season	(16) Plant- ing Date	(17) Time of Last Irrig.	(18) Time of Harvest	(19) Crop	(20) Time to Irrig.	(21) Hour to Irrig.	(22) Days Between	(23) Time/ Season	(24) Plant- ing Date	(25) Time of Last Irrig.	(26) Time of Harvest
<p>(12, 20) How long does it take for you to irrigate each of your fields? (Minutes/Feddan)</p> <p>(13, 21) For the last 3 irrigations which you performed, at what time did you begin to irrigate?</p> <p>14, 22) For the last 3 irrigations which you performed, how many days passed between each irrigation?</p> <p>(15) For the last summer season, how many times did you irrigate your field?</p> <p>(23) For the last winter season?</p> <p>(16, 24) What was the date for you planting your crop?</p> <p>(17, 15) What was the date of your last irrigation?</p> <p>(18, 26) What time did you harvest your crop?</p>								<p>0400-0800 : 1 0900-1300 : 2 1400-1800 : 3 1900-2200 : 4 2300-0300 : 5</p>							

CODE

- | | | | | | |
|------|----------|------|----------|------|----------|
| (11) | A. _____ | (16) | A. _____ | (22) | A. _____ |
| | B. _____ | | B. _____ | | B. _____ |
| | C. _____ | | C. _____ | | C. _____ |
| | D. _____ | | D. _____ | | D. _____ |
| (12) | A. _____ | (17) | A. _____ | (23) | A. _____ |
| | B. _____ | | B. _____ | | B. _____ |
| | C. _____ | | C. _____ | | C. _____ |
| | D. _____ | | D. _____ | | D. _____ |
| (13) | A. _____ | (18) | A. _____ | (24) | A. _____ |
| | B. _____ | | B. _____ | | B. _____ |
| | C. _____ | | C. _____ | | C. _____ |
| | D. _____ | | D. _____ | | D. _____ |
| (14) | A. _____ | (19) | A. _____ | (25) | A. _____ |
| | B. _____ | | B. _____ | | B. _____ |
| | C. _____ | | C. _____ | | C. _____ |
| | D. _____ | | D. _____ | | D. _____ |
| (15) | A. _____ | (20) | A. _____ | (26) | A. _____ |
| | B. _____ | | B. _____ | | B. _____ |
| | C. _____ | | C. _____ | | C. _____ |
| | D. _____ | | D. _____ | | D. _____ |
| (16) | A. _____ | (21) | A. _____ | | |
| | B. _____ | | B. _____ | | |
| | C. _____ | | C. _____ | | |
| | D. _____ | | D. _____ | | |

(27) What are the important indicators which tell you when to irrigate your fields? (Check all which are applicable and rank as to importance.)

- A. Level of water in the mesqa _____
- B. Wilting of plants _____
- C. Irrigate every on-period _____
- D. Schedule among farmers.
Sharing a lifting device _____
- E. Specific time period of days
between irrigation _____
- F. Cracks in soil _____
- G. Check the soil for moisture _____
- H. Other _____

(28) For each crop, how many times did you receive less than sufficient amount of water?

- (28.1) Crop
- A. _____
 - B. - _____
 - C. - _____
 - D. - _____
 - E. - _____
 - F. - _____
 - G. - _____
 - H. - _____

(28.2) Number of irrigations when you received less than a sufficient amount

- A. _____
- B. _____
- C. _____
- D. _____
- E. _____
- F. _____
- G. _____
- H. _____

(29) What is the cause of you not receiving an adequate amount of water?

- A. Too many lifting devices being used at the same time _____
- B. Rubbish in mesqa _____
- C. Poor performance by gatekeeper _____
- D. Insufficient water during on-period _____
- E. Small mesqa inlet _____
- F. Weeds in mesqa _____

(30) If you do not receive an adequate amount of water to irrigate during the on-period what course of action do you take: (Check all which are applicable.)

- A. Complain to District Engineer _____
- B. Complain to Local Officials (Omda, Community Council) _____
- C. Complain to other farmers along the mesqa _____
- D. Wait for the time when the adequate amount of water is available _____
- E. Complain to gatekeeper _____
- F. Other (Explain) _____

(31) Generally, what is the result of the action you take?

- A. You receive more water _____
- B. No change _____
- C. You receive less water _____

(32) Farmers sharing lifting device

(32.1) Number of farmers who share

- A. _____
- B. _____
- C. _____

(32.2) Number of Relatives

- A. _____
- B. _____
- C. _____

(33) When you wish to irrigate, do you talk with the other users of the shared lifting device before hand to arrange a schedule?

- A. Yes, all the time _____
- B. Yes, sometimes _____
- C. No _____

(34) If you and another person want to use the lifting device at the same time, what is the procedure to work out an arrangement?

(35) Do farmers operating from different inlets along the mesqa talk with each other on how to schedule water during the on-period?

- A. Yes _____
- B. No _____
- C. If so, what do they do? _____

(36) How often do you clean the part of the mesqa which lies adjacent to your land?

- A. Summer Season _____
- B. Winter Season
(Other than closure period) _____
- C. Closure period _____

(37) With regard to cleaning your portion of the mesqa who does the actual work?

- A. Yourself _____
- B. Your immediate family _____
- C. Your relatives _____

- D. Hired labor _____
- E. Machinery _____
- F. Other farmers _____

(38) Please list all of the problems you see with the physical condition of the mesqa. (Check all which are applicable and rank as to importance.)

- A. Weeds _____
- B. Seepage _____
- C. Too small cross section _____
- D. Too large cross section _____
- E. Narrow banks _____
- F. Fish dams in mesqa _____
- G. Rubbish in mesqa _____
- H. Farmer bridges in mesqas _____
- I. Failure of the banks _____
- J. High bed in mesqa _____

(39) Please list all of the problems you see with the physical condition of the canal - (Check all which are applicable.)

- A. Weeds _____
- B. Seepage _____
- C. Too small cross section _____
- D. Too large cross section _____
- E. High canal bed _____
- F. Failure of banks _____
- G. Fish dams in canal _____
- H. Trees on banks of canal _____

(40) Please list all the problems you see with the management of the mesqa. Consider the management by both the farmers and the government. (Check all which are applicable and rank as to importance.)

- A. Coordination of inputs and time of planting. _____
- B. Coordination at irrigation and time of planting _____
- C. Fluctuating level of water _____
- D. Shortage of water at the tail _____
- E. Lack of cleaning _____
- F. Gatekeeper doesn't perform job _____
- G. No regulator on mesqa _____

(41) Please list all of the problems you see with the management of the canal. (Check all which are applicable.)

- A. Coordination of the inputs and time of planting _____
- B. Coordination at irrigation and time of planting _____
- C. Fluctuating level of water _____
- D. Shortage of water at the tail _____
- E. Gatekeeper doesn't perform job _____
- F. Four-day on-period insufficient _____

(42) If you could make any improvements in the mesqa which you wish what would they be?

- A. 1st Response _____
- B. 2nd Response _____
- C. 3rd Response _____

(43) If you could make any improvements in the canal which you wish what would they be?

- A. 1st Response _____
- B. 2nd Response _____
- C. 3rd Response _____

CODE

(27)	_____	(29)	_____	(33)	_____
	A. _____		A. _____		A. _____
	B. _____		B. _____		B. _____
	C. _____		C. _____		C. _____
	D. _____		D. _____ (34)		_____
	E. _____		E. _____ (35)		_____
	F. _____		F. _____		A. _____
	G. _____ (30)		_____		B. _____
(28)			A. _____		C. _____
(28.1)	A. _____		B. _____ (36)		_____
	B. _____		C. _____		A. _____
	C. _____		D. _____		B. _____
	D. _____		E. _____		C. _____
	E. _____		F. _____ (37)		_____
	F. _____ (31)		A. _____		A. _____
	G. _____		B. _____		B. _____
	H. _____		C. _____		C. _____
(28.2)	A. _____ (32)		_____		D. _____
	B. _____ (32.1)		A. _____		E. _____
	C. _____		B. _____		F. _____
	D. _____		C. _____ (38)		_____
	E. _____ (32.2)		A. _____		A. _____
	F. _____		B. _____		B. _____
	G. _____		C. _____		C. _____
	H. _____				D. _____

CODE

- | | | | |
|------|----------|------|-------|
| (38) | E. _____ | (41) | _____ |
| | F. _____ | A. | _____ |
| | G. _____ | B. | _____ |
| | H. _____ | C. | _____ |
| | I. _____ | D. | _____ |
| | J. _____ | E. | _____ |
| (39) | _____ | F. | _____ |
| | A. _____ | (42) | _____ |
| | B. _____ | A. | _____ |
| | C. _____ | B. | _____ |
| | D. _____ | C. | _____ |
| | E. _____ | (43) | _____ |
| | F. _____ | A. | _____ |
| | G. _____ | B. | _____ |
| | H. _____ | C. | _____ |
| (40) | _____ | | |
| | A. _____ | | |
| | B. _____ | | |
| | C. _____ | | |
| | D. _____ | | |
| | E. _____ | | |
| | F. _____ | | |
| | G. _____ | | |

Leadership Survey**A. Power Competency**

1. Who are the 3-5 most influential people in the village?
2. Who are the 2-3 people in the village who must agree before a decision can be made about introducing a new project, making a change in the village, or doing anything in this village which is new or different?

B. Conflict Resolution Competency

1. Who in the village do you go to when you need help or advice on how to solve a conflict with other farmers on your mesqa?
2. Who in the village do you go to when you need help or advice on how to help solve a conflict with your landowner (or a government official)?
3. What one person in the village do you believe is a good compromiser between two people who have a conflict?

C. What are the major sources of conflict along the mesqa?

AMERICAN EQUIVALENTS OF EGYPTIAN ARABIC
TERMS AND MEASURES COMMONLY USED
IN IRRIGATION WORK

<u>LAND AREA</u>	<u>IN SQ METERS</u>	<u>IN ACRES</u>	<u>IN FEDDANS</u>	<u>IN HECTARES</u>
1 acre	4,046.856	1.000	0.963	0.405
1 <u>feddan</u>	4,200.833	1.038	1.000	0.420
1 hectare (ha)	10,000.000	2.471	2.380	1.000
1 sq. kilometer	100 x 10 ⁴	247.105	238.048	100.000
1 sq. mile	259 x 10 ⁶	640.000	616.400	259.000

<u>WATER MEASUREMENTS</u>	<u>FEDDAN-CM</u>	<u>ACRE-FEET</u>	<u>ACRE-INCHES</u>
1 billion m ³	23,809,000.000	810,710.000	
1,000 m ³	23.809	0.811	9.728
1,000 m ³ / <u>Feddan</u> (= 238 mm rainfall)	23.809	0.781	9.372
420 m ³ / <u>Feddan</u> (= 100 mm rainfall)	10.00	0.328	3.936

<u>OTHER CONVERSION</u>	<u>METRIC</u>	<u>U.S.</u>
1 <u>ardab</u>	= 198 liters	5.62 bushels
1 <u>ardab/feddan</u>	=	5.41 bushels/acre
1 <u>kg/feddan</u>	=	2.12 lb/acre
1 donkey load	= 100 kg	
1 camel load	= 250 kg	
1 donkey load of manure	= 0.1 m ³	
1 camel load of manure	= 0.25 m ³	

EGYPTIAN UNITS OF FIELD CROPS

<u>CROP</u>	<u>EG. UNIT</u>	<u>IN KG</u>	<u>IN LBS</u>	<u>IN BUSHELS</u>
Lentils	<u>ardeb</u>	160.0	352.42	5.87
Clover	<u>ardeb</u>	157.0	345.81	5.76
Broadbeans	<u>ardeb</u>	155.0	341.41	6.10
Wheat	<u>ardeb</u>	150.0	330.40	5.51
Maize, Sorghum	<u>ardeb</u>	140.0	308.37	5.51
Barley	<u>ardeb</u>	120.0	264.32	5.51
Cottonseed	<u>ardeb</u>	120.0	264.32	8.26
Sesame	<u>ardeb</u>	120.0	264.32	
Groundnut	<u>ardeb</u>	75.0	165.20	7.51
Rice	<u>dariba</u>	945.0	2081.50	46.26
Chick-peas	<u>ardeb</u>	150.0	330.40	
Lupine	<u>ardeb</u>	150.0	330.40	
Linseed	<u>ardeb</u>	122.0	268.72	
Fenugreek	<u>ardeb</u>	155.0	341.41	
Cotton (unginned)	<u>metric qintar</u>	157.5	346.92	
Cotton (lint or ginned)	<u>metric qintar</u>	50.0	110.13	

EGYPTIAN FARMING AND IRRIGATION TERMS

<u>fara</u>	= branch
<u>marwa</u>	= small distributor, irrigation ditch
<u>masraf</u>	= field drain
<u>mesqa</u>	= small canal feeding from 10 to 40 farms
<u>qirat</u>	= cf. English "karat", A land measure of 1/24 <u>feddan</u> , 175.03 m ²
<u>qaria</u>	= village
<u>sahm</u>	= 1/24th of a qirat, 7.29 m ²
<u>sagia</u>	= animal powered water wheel
<u>sarf</u>	= drain (vb.), or drainage. See also <u>masraf</u> , (n.)

EGYPT WATER USE AND MANAGEMENT PROJECTPROJECT TECHNICAL REPORTS

<u>NO.</u>	<u>TITLE</u>	<u>AUTHOR</u>
PTR#1	Problem Identification Report for Mansuriya Study Area, 10/77 to 10/78.	By: Egyptian and American Field Teams.
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