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# A NATIONAL WATER SERVICES COST SHARING PROGRAM: PROPOSED MECHANISMS AND PHASING FOR IMPLEMENTATION

**Report Number 5**

**Prepared by the**

**International Irrigation Management Institute**
**Sri Lanka**

**For the Study,**

***"Strengthening Irrigation Management in Egypt"***

**Ministry of Public Works and Water Resources**
**Government of Egypt**

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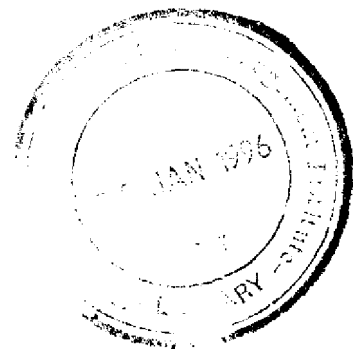

## PREFACE

This Report has been produced as part of the cost recovery component of the Study, "Strengthening Irrigation Management in Egypt." The Study is being implemented by the International Irrigation Management Institute (IIMI) and the Ministry of Public Works and Water Resources (MPWWR), Government of Egypt, with the support of the United States Agency for International Development (USAID) under Cooperative Agreement Number: 263-0132-A-00-5036-00.

The stated objective of the Study relative to cost recovery is not very specific -- to "make further progress towards clarifying and establishing Egypt's future policy toward cost recovery and cost sharing to ensure the sustainability and efficiency of water resource management." Nevertheless, IIMI's previous reports on agricultural and non-agricultural water service cost sharing, the report on budgeting and accounting in the Ministry, and the results of the workshop on cost recovery have provided a clear basis for making the necessary political decisions. The present report is intended to contribute to the planning for implementing a phased program for water services cost sharing.

IIMI would like to acknowledge the contributions of the cost recovery task force appointed by the Ministry to participate in preparing the previous reports on cost sharing; although the task force did not participate directly in preparation of this report, its previous work has provided the basis for this report. Among the IIMI team, Chris Perry was the leader of the work on cost recovery and much of this report reflects his work; Rita Cestti, a consultant, prepared an excellent report on non-agricultural cost recovery which has been drawn on here, and Adrian Hutchens, Raouf Khouzam, and I Elassiouti contributed as IIMI consultants on cost recovery. Jeff Brewer made important contributions to clarifying the presentation in this report. Doug Merrey was responsible for preparation of the first draft and making final revisions, based on the work of the other team members. IIMI is grateful to Rollo Ehrich, Wadie Fahim, and Donnie Harrington of USAID in Cairo for their comments on earlier drafts. Wadie Fahim was the Project Officer for the Study, and Donnie Harrington took over as Activity Manager when this report was being prepared.

The first draft of this report was circulated in September *1995*. IIMI received comments from USAID in November. No formal comments were received from the Ministry. Given its similarity in content to the cost sharing chapter of the Action Plan, IIMI has taken the Ministry's comments on the Action Plan as being its comments on this report as well.

The opinions expressed in this report are those of the authors and do not necessarily reflect the views of USAID.

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## EXECUTIVE SUMMARY

This paper describes an approach and associated actions for introducing cost sharing for water services in Egypt, if such a political decision is made by the Government. It is based on work carried out by IIMI in collaboration with the Ministry of Public Works and Water Resources (MPWWR) during 1995. The paper first summarizes the main conclusions from the previous studies, and outlines the present policy of the Government of Egypt. At present non-agricultural water users pay no fees to the MPWWR, and farmers pay no fees toward O&M above the *mesqa* (field channel). Farmers pay the capital *costs* of tile drainage of a 20-year periuod at no interest, and will soon begin paying the capital costs of a mesqa improvement program. The MPWWR has committed itself to developing an implementation plan for further sharing of the costs of providing water services with non-agricultural and agricultural water users.

Based on the conclusions of a Workshop on Cost Recovery in Egypt held in May 1995, the paper suggests a three-phased approach to cost sharing, beginning with the simple goal of recovering some or all of the costs of providing water services, moving to an additional goal of encouraging water conservation by users, and finally adding the goal of encouraging improvements in the efficiency of the service provider. While the first goal could in principle be achieved with relatively few institutional or infrastructural changes, achieving the efficiency goals requires increasingly important and difficult changes.

The paper suggests beginning with the implementation of cost recovery for the mesqa improvement program and for non-agricultural users. The three phases with the associated actions are:

*Phase I: Implementation of Cost Sharing for Non-Agricultural Water Services, and Preparation for Implementation in the Agricultural Sector*

1. Prepare a detailed implementation plan for cost sharing.

2. Implement the program of *cost* recovery for mesqa improvements and document the experience.

3. Introduce *cost* recovery for water services provided to non-agricultural users.

4. *Carry* out a public education campaign on the benefits and *costs* of water delivery services.

5. Test and validate a functional budgeting and accounting system so that actual costs can be identified clearly and transparently.

6. Carry out preparatory studies, for example social marketing studies on conditions affecting willingness to pay, and studies on what disadvantaged users actually pay at present.

7. *Carry* out a further study on the options for service fee collection as a basis for a firm recommendation.

8. Implement the proposed Irrigation O&M Program contained in the Action Plan to test ways of consolidating and improving service with users' involvement.

9. Adopt legislation for cost sharing,

***Phase II: Implementation of Cost Sharing for Agricultural Users and Pilot-Testing of Alternatives for Improving Efficiency***

1. Implement a flat area-based fee, in subphases. Over a five year period, the fee could be initiated at 33% of the total cost (years 1 to 2), raised to 67% (years 3 and 4), and finally to 100% in year five.

2. Implement the validated functional budgeting and accounting system throughout the Ministry.

3. Expand the results of the Irrigation O&M Program to other districts and directorates.

4. Pilot test crop-area based charging systems to assess: a) impact; b) infrastructural needs; c) capital costs; d) administrative costs; and e) social acceptability.

5. *Carry* out further pilot studies of more fundamental institutional reform at local and intermediate levels, to include experiments with volumetric delivery and charging at appropriate levels to water users associations or other organizations above the farm.

6. Through legislation, strengthen the MPWWR's regulatory function and use this function as a mechanism for cost recovery.

*Phase III: Implementation of Cost Sharing Linked to Service, and Institutional Consolidation*

1. If the results of pilot tests are positive, implement crop-area based charging and/or volumetric charges for water delivery services at appropriate locations and times (one possible conclusion is that these two types of mechanisms may prove appropriate in different environments).

2. Consolidate and strengthen the institutions *necessary* to sustain *this* program.

The paper discusses the implementation steps required for each of these *steps.*

# A NATIONAL WATER SERVICES COST SHARING PROGRAM: PROPOSED MECHANISMS AND PHASING FOR IMPLEMENTATION

## 1. Introduction

This report outlines an approach, and associated actions, for the introduction of cost sharing for water services in Egypt, based on IIMI's work with staff of the Ministry of Public Works and Water Resources (MPWWR) in 1995. It draws on a number of studies carried out during that period[1].

The results and conclusions of the MPWWR/IIMI Workshop on Irrigation Service Cost Recovery in Egypt, which involved senior Ministry officials as well as IIMI and USAID representatives, are summarized in IIMI (1995a). The deliberations of that workshop provide the basis for many of the proposals set out below, although some ideas have evolved further since May 1995.

The major conclusions for Egypt from the IIMI-MPWWR studies relative to agricultural water service cost sharing include:

- Full recovery of water service charges to agriculture would amount to about LE 75 per feddan per year[2], or some 4.5 to 5% of farm income.
  - This figure is relatively insensitive to allocation of costs among sectors, since agriculture is by far the Iargest consumer.
  - There are large regional variations in costs of agricultural water service charges because of differences in pumping, with regional *costs* estimated at LE 130, 80, and 60 per feddan for Upper, Middle and Lower Egypt respectively.
  - More precise estimates of the cost are prevented by the highly aggregated accounting system used in the MPWWR.
- Service charges that relate either indirectly (crop-based) or directly (volumetric measurement) to water use will have a rather limited effect on farmers' choice of crops. The physical measuring infrastructure and complex accounting principles for volumetric charging is unlikely to be feasible or cost-effective in the near future.

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[1] These studies are listed in the references, and include: Cestti (1995); Hutchens (1995); Lofgren (1995); Lewis and Hilal (1995); IIMI (1995b); Harvey and Zimbelman (1995); Gerards (1995); Svendsen (1995); and Perry (1955).

[2] In 1995, US$ 1.00 was equivalent to LE 3.40. One feddan equals 0.42 ha. Therefore, this charge is equivalent to about $52 per ha.

The present situation regarding recovery or sharing of water service costs is as follows: non-agricultural users (municipalities, industries, navigation for example) pay no fees to the Ministry, which is the bulk provider or wholesaler of water in the Nile system. Within agriculture, in the old lands there are no procedures for directly recovering any portion of the capital or operating costs for water services above the mesqa[3]. Farmers are responsible for O&M of their "private" mesqas, but if these are not adequately maintained, the Ministry can (and sometimes *does)* undertake the work and charge the farmers. In *the* New Lands, farmers are responsible for capital costs for infrastructure downstream of the booster pumps drawing water from distributary canals, serving areas of about 100 to *200* feddans. If the investments are made by government, they are recovered over twenty years at no interest (IIMI 1995b).

Under Law Number 12 of 1984, the Government has a policy of collecting the *costs* of installing tile drainage from beneficiary farmers. The costs are to be recovered over twenty years, beginning after a five-year grace period; included in the costs is an administrative fee of ten percent. However, no interest is charged, so that even with perfect collections, the government collects less than *25%* of the real costs (IIMI 1995b; Mohieddin 1995). Mohieddin (1995:15) found collections are far from perfect: up to mid-1995, less than 6% of the total cost of the tile drainage program had been recovered.

Under Law Number 213 of 1994 and Decree Number 1490 (1995) of the Minister of Public Works and Water Resources, the Irrigation and Drainage Law was amended to enable recovery of capital costs of mesqa improvements (including pumps) such as those being done under the Irrigation Improvement Project (IIP). These costs are to be recovered over a period not to exceed 20 years, at no interest. Implementation of this cost recovery program has not actually begun, though this is expected soon. Experience over the next several years will be an important source of lessons regarding future cost sharing or recovery mechanisms.

In September 1995, MPWWR co-signed with the Ministry of Agriculture and Land Reclamation a Memorandum of Understanding (MoU) with USAID which indicates the government's commitment to move forward on cost sharing. The MoU *calls* for completion of the IIMI studies, development of an implementation plan for cost *sharing* based on the outputs of the IIMI studies, and initiating capital *cost* recovery for improved mesqas as called for in Law 213 of 1994. Under the heading "farmer cost sharing" the commitment is re-stated to "develop an implementation plan for allocating and recovering O&M costs."

Although water service cost sharing is a very sensitive issue in Egypt, the Minister has made public statements about the need to develop and implement a phased *cost sharing* program. This report is intended to suggest in broad terms the possible mechanisms and phasing of such a program.

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[3] Historically, the land tax was based on the "rent" or estimated income from land. Income was made possible because of irrigation. Further, peasants were subject to providing free labor for irrigation maintenance. Therefore, there is a tradition, now conveniently forgotten, of recovering the cost of providing irrigation services (*see* Mohieddin 1995).

## 2. Background

Charging users for provision of water and water services is a sensitive issue in many countries, including Egypt. It involves political, historical, social, religious and economic factors. Beneficiaries will tend to prefer low or zero charges, and this preference will be reflected by their political representatives. Their position may be reinforced when investments have been made in the national interest -- to ensure food security, develop new areas or diversify the economy -- thus implying some higher goal than the direct productive impact on those receiving the service. In the case of agriculture, and in a predominantly agrarian economy, the combination of these factors is often powerful, and full recovery of service charges correspondingly rare.

On the other hand, the availability of public resources is increasingly constrained, and the maintenance of infrastructure is consequently at risk, threatening a vicious circle of reduced productivity, reduced financial surpluses to direct beneficiaries and to government, and further reduced capacity to fund maintenance and replacement of capital investments. In Egypt, the public subsidy to irrigation services (about LE 670 million annually) is approximately equal to foreign assistance to the Government's programs of vertical and horizontal expansion and new lands development.

Depending on the design of the service charge mechanism, one or both of two additional objectives beyond recovery of the cost of providing the service, can be achieved.

First, if the charge is directly linked to the cost of providing the service, pressure is created on the service agency to control and reduce its operating costs -- beneficiaries will point to any apparent inefficiencies in the service agency, and use this as a reason to resist increases in charges, or demand reductions. Similarly, beneficiaries may be encouraged to undertake some O&M activities themselves if they believe they can do so at lower costs than incurred by the agency[4].

Second, if the charge is directly linked to the quantity of service provided (in this case, a charge per Unit of water delivered), the users are encouraged to be more efficient -- for example by using water-saving technologies, or selecting crops which produce higher returns to water (wheat rather than sugar cane, for example)[5].

Against this background, the introduction of service charges is increasingly perceived as an economic necessity, whose political consequences must be addressed through a process of public awareness and persuasion.

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[4] Examples of this phenomenon come from many countries. including Indonesia (Gerards, 1995); the USA (Harvey and Zimbelman, 1995; Svendsen and Vermillion, 1994); Argentina (Chambouleyron, 1989); and Colombia (Garces and Vermillion, 1994). See also Small and Carruthers (1991).

[5] Israel may be the most advanced country in this regard. In 1955 it passed a law requiring metering of all water. Agricultural water allocations are fixed and farmers must get an annual license. While irrigated area has increased since the mid-1950s, water application rates per ha have fallen from 8,000 $m^3$ to 5,200 $m^3$ today, while agricultural yields have increased steadily. See Bhatia et al (1995:68-70; 73-76).

This simple rationale underlying the introduction of service charges does not translate into simplicity in their formulation and introduction. As discussed below, a number of actions are required: some are mutually supportive and require parallel activities by more than one agency; others are sequential, where the results of one step determine the nature and timing of subsequent steps; and some are beyond the control of MPWWR.

## 3. Agricultural Water Service Charges -- Mechanisms

This section summarizes the consensus reached at the Cost Recovery Workshop. The five-element framework used in that workshop (goal, definition of service, rate base, collection, use of funds) provides the basis for *this* discussion. More details of the wide discussion that resulted in these conclusions can be found in the Workshop Report (IIMI 1995a). To summarize the five inter-linked elements of a charging mechanism:

- "goals" are the purposes and objectives;
- "service" refers to the entitlement of the user -- where and when it is provided and its essential characteristics;
- "rate base" refers to the amount charged users per unit of service;
- "collection" is the process and implementing agencies that secure payments from users; and
- "use of revenue" refers to the destination of the funds collected and how they are used, including deductions for collection costs and rules specifying sharing of costs.

Participants in the Cost Recovery Workshop agreed that the goals of service charges, in order of priority should be:

1. Recovery of operation and maintenance expenditures;
2. Conservation of water; and
3. Improved efficiency of service (better service for the same cost, or equal service at lower cost).

It was agreed that the definition of the service should move from the present partially demand-based allocations, to a clearer definition (in terms of volumes, flow rates, and schedules) of the seasonal irrigation program. At present, system operation is initiated using projected demands based on experience, and then frequently modified in response to information from the field. Liberalization of cropping controls has complicated this process substantially, as historical information now provides only limited guidance to farmer intentions, and the areas under water-consuming crops (rice and sugar cane) have increased rapidly. The progression of service definition from the present to the future will require closely linked infrastructural and management changes. Until more information is available about actual deliveries at the distributary level (for example through the proposed irrigation O&M program; see IIMI [1995c]), little can be done towards defining operational schedules;

and without infrastructure similar to that proposed in the IIP in place, there is no possibility of defining and measuring service to the individual farmer.

The rate base should be simple, and based initially on a flat rate per unit area (undifferentiated by crop or cropping intensity). To encourage awareness of water scarcity, it was further proposed that service charges should eventually reflect consumption of water, and be differentiated by crop, or crop category, with more water-consuming crops subjected to higher charges.

The collection of funds should be entrusted to the existing Ministry of Finance's field collection staff, who currently collect both land taxes and charges associated with the recovery of investments in drainage. A question not addressed by the workshop was whether the existing land tax commissions could collect irrigation service fees effectively, and whether service charges based on more than the area of the farm, i.e., a more complex charging system, could be undertaken through this agency. Seasonal accounting for area irrigated and crop type is clearly a far more complicated and potentially contentious issue than assessing an annual charge based on the cultivable area.

Since that Workshop, IIMI has commissioned a study of the present functioning and capacity of the land tax commissions in three selected districts, to test the assumption the Ministry of Finance could collect irrigation service fees effectively through its existing organization (Mohieddin 1995). The study raises great doubts on this point, The study found low motivation of staff as a result of poor compensation and facilities, and as a consequence, low levels of performance, inadequate record keeping, and overall, low levels of recovery of tile drainage costs[6]. Mohieddin concludes that irrigation service fees should not be collected through the land tax commissions. He recommends the MPWWR itself should take on this function.

The use of funds should be for the purpose of system operation and maintenance, and thus funds should come directly to a fund within the MPWWR established for this purpose. A number of additional complexities were foreseen within this simple objective: if charges are linked to expenditures, should charges vary regionally, or locally? How would revenues be distributed among local, regional, and national levels?

The average annual cost of O&M services at LE 75 per feddan masks huge differences in regional costs because of differential dependence on pumping: costs by region are estimated at LE 130, 80, and 60 per feddan for Upper, Middle, and Lower Egypt respectively (IIMI 1995b:8). Uniform rates may be more "equitable" and politically attractive but would involve substantial subsidies and/or transfer payments from one region to another. This is an important political decision to be made. Related to this issue is the distribution of revenues. In other countries, revenues usually remain within the system except for an agreed payment to higher levels for higher level services; in Indonesia for example, 90% of the fees collected remain in the system while 10% goes to offset higher level administrative costs. This is another important decision, and is related to the regional differences in costs.

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[6] As noted in Section 1, less than 6% of the total cost of the tile drainage program has been collected to date (Mohieddin 1995:15).

Finally, and intrinsic to the whole service charge exercise, a system of accounting for expenditures by purpose and location as proposed by Lewis and Hilal (1995) would need to be in place if anything beyond simple flat-rate charges are proposed – and indeed improved accounting may be required to justify the selected level of flat rate charges. At the moment, the cost of irrigation services can be estimated in the aggregate; but it is not possible to identify local and functional costs. What does it cost to maintain X canal, and how are these costs allocated among cost categories? This is a legitimate question for a farmer to ask, and it cannot be answered precisely and transparently. It will be essential information if cost recovery becomes a mechanism for inducing better water delivery efficiency by the Ministry.

Table 1 provides a matrix showing how choosing increasingly complex goals can have important implications for the other components of a water service charging mechanism. Pursuing only the goal of recovering some or all of the costs could be implemented through a flat area-based rate; in principle this would require the fewest institutional changes, although Mohieddin's study of the land tax system shows some changes would be required. Pursuing other goals through a water service charging program has more important implications for the institutional framework for delivering the services (and vice versa). If achieving these higher order goals is important, and most would agree they are, then the Table can be read as suggesting three stages of cost sharing. Egypt could begin with the simple approach, while experimenting with how more complex goals could be achieved, and implement these more complex approaches based on lessons learned over time.

The stages are based on the priorities agreed at the Cost Recovery Workshop (IIMI 1995a). There is no *a priori* reason why achieving the goal of efficient use of water by users ("conserve water") should come before the goal of achieving improved efficiency of the service provider.

Successive stages involve a degree of sequential dependence within some (not all) specific components of the charging mechanism: for example, defined allocation and management of water at the regional level is a pre-requisite to defining allocations at the mesqa or farm levels. In addition, there are dependencies across components -- most particularly between the service and the rate base, and dependencies beyond the components of the charging mechanism -- for example to the infrastructure, since the present facilities cannot provide measured volumetric services. There are intermediate options within the third stage: volumetric charging can be done at the mesqa or distributary level if they are under the control of an autonomous unit; that unit can find other means to charge its members instead of measurement at the farm level. Not all the component characteristics are dependent on the goals -- some are "desirable" rather than strictly necessary.

## 4. Non-Agricultural Water Service *Cost* Sharing

The IIMI-MPWWR Study used the Separable Cost-Remaining Benefits (SCRB) method to allocate operation, maintenance and replacement costs among beneficiaries (Cestti 1995; IIMI 1995b). Following this method, about 85% of the OM&R costs are allocated to agriculture, and the remainder is allocated among a variety of other users (see Cestti 1995: 26, Table 14). The largest non-agricultural category is municipal and industrial intakes from canals

**Table I Relationship between Goal and Other Components of Service Charging Mechanisms**

| *Component* | *One goal [Stage 1]* | *Two goals [Stage 2]* | *Three goals [Stage 3]* |
|---|---|---|---|
| *Goal* | Recover *costs* (partial or full) | * Recover costs<br>* Conserve water | * Recover costs<br>* Conserve water<br>* Improve service efficiency |
| *Service* | Responsive to Demand | Predefined schedules, or responsive to demand | measured delivery at defined point |
| *Rate base* | Flat rate per feddan | Crop based | Volumetric |
| *Collection* | Ministry of Finance? or MPWWR | MPWWR assisted by WUAs? | Delivery agency assisted by WUAs? |
| *Use of Funds* | Central MPWWR | Regional and Central MPWWR | WUAs, Regional and Central MPWWR |
| *Accounting requirements* | Total National Cost of O&M | Cost of O&M by Function and Region | Cost of O&M by Function, Region, and Distributary |

(9.4%); "tourism and recreation" is next with 2% and all other categories each represent less than 1%. Nevertheless, some of these users could possibly be charged at higher rates, thus in effect subsidizing other users.

For municipal and industrial sectors taking water directly from canals, it seems feasible to introduce volumetric water charges for raw water at the intake point; similar systems are found in other countries (Cestti 1995:28). The MPWWR keeps records of the volume of water delivered to each water treatment and each major industrial unit; charging for these volumes, aside from recovering some costs, may introduce incentives for improving efficiency. For example, Cestti (1995:28) suggests that if the General Authority for Greater Cairo Water Utility were charged for each cubic meter of water withdrawn from the Nile, it would have more incentive to reduce its current (very high) level of losses. If industries were similarly charged, they too may increase their efficiency.

Charging volumetric rates from self-supplied firms for direct intakes either from the Nile or from groundwater may be more difficult as there is presently no system in place for monitoring. A possible solution is selectively taxing pumping costs by increasing the electric rates for pumps by about 10%, but implementation would be difficult.

Other non-agricultural sectors receive very small portions of the benefits and generally do not consume water. Fixed charges could be levied based on their proportion of OM&R costs; for example, a tax on boats; a higher tax on tourist cruise boats; and a payment by the Electricity Authority to the MPWWR for the construction and operation of Aswan Dam and the barrages for hydropower.

An additional option is to strengthen the Ministry's regulatory function as laid out in Law 48 of 1982, and use this function as a mechanism for cost recovery as well. Thus, the Ministry should charge reasonable fees for all water intake as well as discharge permits and floating vessel permits; monitor the quality of discharges and charge high fees for water that does not meet a defined quality; and levy stiff fines for non-compliance with regulations. This strengthened regulatory role would require considerable political commitment, but would have many benefits beyond cost recovery.

Initiating cost *sharing* with non-agricultural users may be politically more feasible as a first step, and may make a future program of cost sharing with agricultural users more palatable. Most of the major non-agricultural users are other government institutions (municipalities, many industries, hydropower); therefore what is required is political agreement at the highest levels. *Once* other users are paying their share of the cost of water services, this information can be used in a public education campaign aimed at agricultural users.

## 5. Phasing of Water Service Cost Sharing

If a decision is made to proceed with asking users to share directly the costs of providing water delivery services, this decision *can* be implemented in phases. This section outlines a possible approach *to* implementing a cost sharing program in phases, with an emphasis on agricultural users.

### *Phase I: Implementation of Cost Sharing for Non-Agricultural Water Services, and Preparation for Implementation in the Agricultural Sector*

1. Prepare a detailed implementation plan for cost sharing.

2. Implement cost recovery for mesqa improvements and document the experience.

3. Introduce cost recovery for water services provided to non-agricultural users.

4. *Carry* out a public education campaign on the benefits and costs of water delivery services.

5. Test and validate a functional budgeting and accounting system so that actual costs can be identified clearly and transparently.

6. *Carry* out preparatory studies, for example social marketing studies on conditions affecting willingness to pay, and studies on what disadvantaged users actually pay at present.

7. Carry out a further study on the options for service fee collection as a basis for a firm recommendation.

8. Implement the **proposed** Irrigation O&M Program contained in the Action Plan (IIMI 1995c) to test ways **of** consolidating **and** improving **service with** users' involvement.

9. Adopt legislation for cost **sharing.**

### *Phase II: Implementation of Cost Sharing for Agricultural Users and Pilot-Testing of Alternatives for Improving Efficiency*

1. Implement the **flat** area-based **fee,** in subphases. **Over a** five year **period,** the fee could be initiated **at** 33% of the total cost (years 1 to **2),** raised to 67% (years **3** and **4),** and finally to 100% in year five.

2. Implement the validated functional budgeting and accounting system throughout the Ministry.

3. Expand the results of the Irrigation **O&M** Program to other districts and directorates.

4. Pilot test crop-area based charging systems to assess: a) impact; b) infrastructural needs; c) capital costs; **d)** administrative **costs; and** e) social acceptability.

5. ***Carry*** out further pilot studies of more fundamental institutional reform at local and intermediate levels, to include experiments **with** volumetric delivery **and** charging at appropriate levels to water users associations or other organizations above the **farm.**

6. Through legislation, strengthen the MPWWR's regulatory function and use this function **as** a mechanism **for** cost recovery.

### *Phase III: Implementation of Cost Sharing Linked to Service, and Institutional Consolidation*

1. If the results **of** pilot tests are positive, implement crop-area **based** charging and/or volumetric charges for water delivery services at appropriate **locations** and times (one possible conclusion is that these two types of **mechanisms** may prove appropriate in different environments),

2. Consolidate **and** strengthen the institutions necessary *to* **sustain** this program.

Items under **phases** II and **even** III **can** be initiated even while the first phase activities are still under way; in other words, these can **be** considered as overlapping in time.

## 6. Implementation of Service Charges

This section sets out actions that would be required to implement service charges. For completeness, the proposed program covers all three of the "stages" identified above (Table 1), in terms of moving from a single objective to having two or more objectives'. However, some introductory notes of caution may be appropriate.

First, it is difficult -- indeed impossible at this stage -- to anticipate much of the detail. The political decision to proceed with service charges will determine many of the subsequent preparatory and implementing activities by defining the targeting, phasing, and detailed objectives of the proposed cost sharing program. At one extreme, it may be decided to recover all costs from non-agricultural users, which would mean that no further consideration needs to be given to mechanisms for agricultural cost recovery. At the other extreme it may be decided to charge fully, and immediately, under which circumstances there is no alternative to a flat rate, as this is the only mechanism which *can* be fully defined and implemented with available information and infrastructure.

More likely, it may be decided to introduce service charges gradually, over a period of time. This would provide a context within which alternative mechanisms can be field tested. Both IIP and the proposed Irrigation O&M Program provide opportunities for such field testing.

Second, while a progression of objectives and charging mechanisms was agreed by the participants in the workshop to be desirable, it is possible that further study (again, in light of political decisions) will show that the first or second stages of charges as defined in Table 3.1 will be optimal (see Phase 11, points 4 and 5, above).

As mentioned in the introduction, IIMI's studies show that the impact on water use efficiency of charges which are related to water use at the individual farm level is marginal -- volumetric charges would result in a reduction in water demand of only about 4%, and improvement in the productivity of water by somewhat more than 3%. The reason for this is that the charges required to recover full O&M costs are a relatively small component of the overall farm budget, and thus do not play a substantial role in selection of crops and technologies. Such benefits fall far short of those required to justify the associated costs of investment and administration. In other words it is not worth investing in activities such as the IIP only in order to allow volumetric pricing of water at individual or mesqa levels. Thus such volumetric-based charging will be limited in its applicability to that small proportion of Egypt where IIP facilities (or analogous infrastructure in New Lands) will be in place in the foreseeable future. However, it may be feasible at higher levels of the system if public utilities or water users' organizations are developed at main or branch canal, or distributary levels, provided internal accounting procedures acceptable to individual farmers can be developed below the turnout.

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[7] Chapter 3 of the Action Plan (IIMI 1995c) provides a more detailed discussion of actions in Phase I, the period covered by that Plan.

The major actions to be taken primarily by MPWWR (and in some cases other entities of the Government of Egypt) corresponding to each of the three "stages" are summarized below. The sequence of activities is also to some degree a sequence of dependencies -- Action 2 requires Action 1 to be completed.

*Political Commitment to Introduce Service Charges*

This decision will indicate the allocation of costs *between* irrigation and non-irrigation users, whether agricultural rates will reflect differential costs or be uniform, and the *sequence* of application of charges (whether simultaneous, or phased across industrial, commercial, domestic and agricultural users).

Therefore the political decision should address three specific points within the context of charges for irrigation:

a. whether the differential costs of pumping in Upper, Middle, and Lower Egypt will be charged (resulting in estimated rates of LE 130, 80, and 60 per feddan per year, respectively), or whether an average rate will be charged;

b. the extent to which cross subsidization across sectors should be provided (possibly including direct subsidy from government); and

c. the time scale over which cost sharing should be achieved.

It is suggested that the rationale for service charges should be based primarily on the cost of providing the service, and the possibility that service quality would decline in the absence of additional resources from the beneficiaries. Promising that services will improve as a result of the charges should be avoided; this may indeed happen but should not be promised, because demonstrating improvements will be difficult, and would provide a possible reason for beneficiaries to refuse to pay in the absence of demonstrated incremental benefits.

The precise nature of all subsequent actions will depend entirely on the nature of the political decision reached. It is assumed below that it is decided to introduce full cost recovery, possibly phased over time, with progressively more service-related charges to achieve conservancy and service improvement goals as set out in Table 3.1.

**Phase I: Implementation of Cost Sharing for Non-Agricultural Water Services, and Preparation for Implementation in the Agricultural Sector**

1. Prepare a detailed multi-year implementation plan for cost sharing with emphasis on the agricultural sector. This plan should be quite detailed in terms of what will be done, by whom, in what sequence, etc; it should list what legal and administrative changes are required, what the training requirements will be, and what issues need further investigation before decisions can be made. There should be a time frame for implementation, but with the understanding that it will be a "rolling plan," subject to revision as lessons are learned.

2. Document the results of cost recovery for mesqa improvement under the IIP. Rules are presently in place, though not yet applied, for the collection of investment costs associated with IIP. Implementation should begin soon. There are still a number of implementation details to be sorted out, and farmers need to be fully informed up front on their financial obligations. The implementation process and results should be studied carefully to learn lessons. This will provide valuable field experience in defining procedures for use in non-IIP areas.

3. Formulate detailed plans for introduction of charges to non-agricultural users, including how to deal with the relationship between charges and the quality/quantity of effluent. The Government may find it attractive to initiate charging non-agricultural users (especially municipalities and industry) before moving to a program of cost *sharing* with agricultural users. Implementation of this plan can be initiated during Phase I.

4. Design and implement public awareness campaigns targeted at beneficiary groups as well as the public in general. Irrigation-related campaigns should highlight the recent improvements in agricultural income which have resulted from liberalization of crop prices, parallel changes in pricing policy in many other areas of the economy, the cost of providing the service, and the tradeoffs -- what is lost in other sectors because of the use of public funds to subsidize irrigation.

   An internal awareness campaign for the officials of MPWWR, and also senior representatives of government agencies outside the Ministry which consume water, or rely on water services (power, navigation, urban, industries, tourism, etc.) should also be arranged to ensure that they are aware of the rationale for charges, and have a forum to express their preferences in finalizing charging structures.

5. Develop and pilot test improved accounting procedures to identify service costs by function and location, as proposed by Lewis and Hilal (1995). This exercise could be initiated at the field level as part of the proposed Irrigation O&M Program, and with parallel, top-down introduction more generally.

6. Carry out field studies on farmer attitudes to service charges, to identify areas of particular concern which could be addressed in the rules and procedures for levying charges. When the subject is raised with farmers, they resist the idea of paying for irrigation services (e.g., Mohieddin 1995). Nevertheless, many farmers are presently paying extra costs to overcome water supply problems. The problem arises when farmers are simply asked if they would like to pay more -- the response is obviously pre-determined. But using more sophisticated survey methods such as "contingent evaluation" (Griffin et al 1995) will produce more useful and accurate information on how much people would be willing to pay, under what conditions.

7. Systematically study service fee collection options. Mohieddin's study of the land tax collection system was not intended to be conclusive; the questions it raises require further study. If the land tax collection system is as ineffective as his report suggests, it will be necessary either to reform and strengthen it, or develop an alternative capacity within the MPWWR itself for fee collection. The latter will be a considerable investment and its cost effectiveness needs to be examined carefully.

8. Use the Irrigation O&M Program proposed in the Action Plan (IIMI 1995c) to pilot-test a package of institutional and technical innovations for decentralized irrigation management with user involvement. If the results are positive, they will have important implications for future institutional and financing arrangements.

9. Prepare, and obtain confirmation by the Peoples' Assembly of, legislation reflecting the agreed political decision, including definition of phasing, basis for charges, assignment of responsibilities for implementation among departments, the use of funds recovered from users, and arrangements for financing O&M during the period of partial cost recovery. This legislation can be developed based on the detailed implementation plan and findings of the studies suggested for Phase I.

   Two basic options can be considered. One is to amend the existing laws on irrigation and drainage and water pollution (Laws 12/1984 and 48/1982) to enable collection of fees and levying of high pollution fines, and depositing these funds with the MPWWR. The other option is a more comprehensive legal reform that would change the status and organization of the MPWWR itself. This latter option goes beyond the objective of this Report, but is discussed in more detail in in the Action Plan (IIMI 1995c).

**Phase II: Implementation of Cost Sharing for Agricultural Users and Pilot-Testing of Alternatives for Improving Efficiency**

1. Design the procedures and implement the flat area-based service fee, in phases. Based on the decisions and legislation in Phase I, the detailed formats, procedures, rules for collection and use of funds, etc must be developed and tested, and field staff must be trained. Whether collection is done through the Ministry of Finance or by a new unit within the MPWWR, a considerable amount of training will be required. Steps include:

   a. Define procedures for collection at field, district and directorate levels
   b. Assign responsibilities to field and administrative staff
   c. Prepare formats for billing and accounting
   d. Define procedures for distribution of funds among Ministry levels and units
   e. Prepare implementation program, including phasing-in of charges (by time and location)
   f. Train administrative staff in accounting procedures
   g. Train field staff in specific collection procedures and record keeping
   h. Continue public awareness campaign.

2. Implement a functional budgeting and accounting system throughout the Ministry. This will be a major institutional reform, based on the results of the pilot testing of the revised system completed in Phase I. It will allow the Ministry to become more cost-conscious, make better use of funds to achieve management objectives, understand what the costs of a variety of functions are more clearly, and become transparent in the use of funds. In addition to the benefits within the Ministry, it will also provide a basis for more fundamental reforms leading to more efficient service delivery.

3. Expand the results of the Irrigation O&M Program to other districts and directorates. If successful, this program will provide a decentralized management package that will improve the effectiveness of water delivery services.

4. Pilot test a crop-based charging system. A pre-requisite for pilot testing alternative charging mechanisms is that the principle of payment be established and implemented for all agricultural users. Building on this, it will be possible to pilot-test alternative approaches including crop-based charging systems. The objective will be to assess the impact on cropping patterns, productivity of water, and farmers' incomes; identify any infrastructural implications and their costs; identify the administrative costs, including difficulties encountered in setting charges, measuring service, and collecting service-based charges; assess the benefits and costs of such a system of charging; and assess its social acceptability.

   Activities might include:

   a. Identification of pilot areas where infrastructure allows introduction of service-based charges (e.g., Fayoum, IIP areas, New Lands)
   b. Formulation of alternative charging mechanisms
   c. Field testing of charging mechanisms
   d. Evaluation of costs of collection, impacts on crop selection and productivity of water, and social acceptability
   e. Review of results with farmers and concerned government agencies.

   One rationale for moving to the second and third phases is the assumption that service-related charges will induce improved efficiency (on the part of MPWWR) in providing the service. A review of another utility (such as the Electricity Authority) where service-related charges are presently in place, might yield useful experience and evidence of how and whether such forces have worked, and what particular features of the charging structure have proved important. This review should cover both the internal transactions among entities within the generating and distribution sector, as well as the interface between the Authority and its customers.

5. Based on the results of the Irrigation O&M Program and early lessons from implementing the cost sharing program, it may be possible to carry out pilot tests of more fundamental institutional reforms at local and intermediate levels. This could include establishment of new institutions (for example public utilities or user-based irrigation district organizations); and experimenting with volumetric delivery and charging at appropriate levels (for example to a distributary or head of a mesqa with single-point pumping).

   Service charges based on predefined delivery schedules or volumetric deliveries depend upon the ability of the water management Unit to deliver water to agreed points in the system in accordance with a predefined schedule, including timing and discharge, to meet the needs of the agreed cropping pattern. This in turn requires upgraded infrastructure to allow more precise control and measurement of deliveries, corresponding to the "Measurement-based Flow Control" activity in the proposed Irrigation O&M Program.

Supporting activities may include:

a. Definition of seasonal operational plan
b. Definitions of measurement points, measuring standards and procedures
c. Definition of adequate and inadequate provision of service
d. Definition of farmers' remedies against MPWWR in case of inadequate supply
e. Definition of remedies against farmers in case of misuse of water, or deviation from agreed cropping pattern
f. Definition of crop charges
g. Definition of responsibilities for surveying and recording crop areas
h. Definition of procedures for billing (frequency, responsibilities, accounting and processing of funds)
i. Definition of allocation of funds among levels in the irrigation system.

6. Strengthen the MPWWR's regulatory function and use it as a mechanism for cost recovery. As new autonomous units emerge to manage water at local and intermediate levels, the Ministry can shift its attention to stronger regulation of water quality and use. Legislation can be developed and submitted to the Peoples' Assembly to strengthen its role and use these regulatory powers as a way of generating funds for improving water quality and control.

A number of issues may become relevant as a result of the political decisions taken regarding cost recovery. For example, if rates are to be low for a considerable period of time, or a flat rate is selected as the ultimate basis for charges, the question of controlling the area under high water-using crops will remain important, If relatively high charges are proposed, the question of ensuring that farmers do not switch to uncontrolled groundwater exploitation to avoid surface water charges may arise, Such topics cannot be defined in advance as they will relate to the selected basis for charging, but provision should be made for a review of likely impacts once the charging mechanism and phasing have been selected.

## Phase III: Implementation of Cost Sharing Linked to Service, and Institutional Consolidation

MPWWR is not staffed to undertake the responsibility of accounting for water to the farm level, Thus an intermediate organizational structure, probably Water Users Associations, is required to have a defied relationship with the MPWWR (or with an autonomous water delivery service unit) and with individual farmers, to allow them to perform this function.

I. The experiences from Phase II pilot testing will provide a basis for making firm decisions and implementing future cost sharing policies, including mechanisms for collection (flat rate, crop-based, or volumetric), and the institutional framework for sustainable water management. It is likely that an entirely new decentralized customer-oriented institutional framework will emerge that will dso be financially sustainable. It is also likely that different mechanisms for collecting water service charges will be appropriate for different areas and conditions.

2. Once these basic decisions are made, there will be a long-term consolidation and institutional strengthening phase as Egypt uses its new-found institutional capacity to "do more with less water."

## 7. Conclusion

Deciding to proceed with a program for cost sharing by asking users to contribute to *the costs* of *the* service will itself be difficult. Whenever people are accustomed to receiving a "free" service, they naturally resist being asked to pay. But the service is not free. This fact must be clearly communicated. The cost of delivering water to the millions of water customers in Egypt is being paid now. The lack of a transparent relationship between the service and the costs complicates the problem of improving the service. But in the long run, once this relationship is established, there will be strong incentives for the users both to demand a good Service and to use the resource more wisely; and for the delivery services to provide a good service to keep the customers happy. This is a challenge faced by many countries in many sectors. But the precarious balance of Egypt's water supplies and demand make it imperative €6 move ahead with a program for cost sharing to achieve financial sustainability and as a motivator for improving the services.

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