Irrigation Water Charges and Cost Recovery Policies

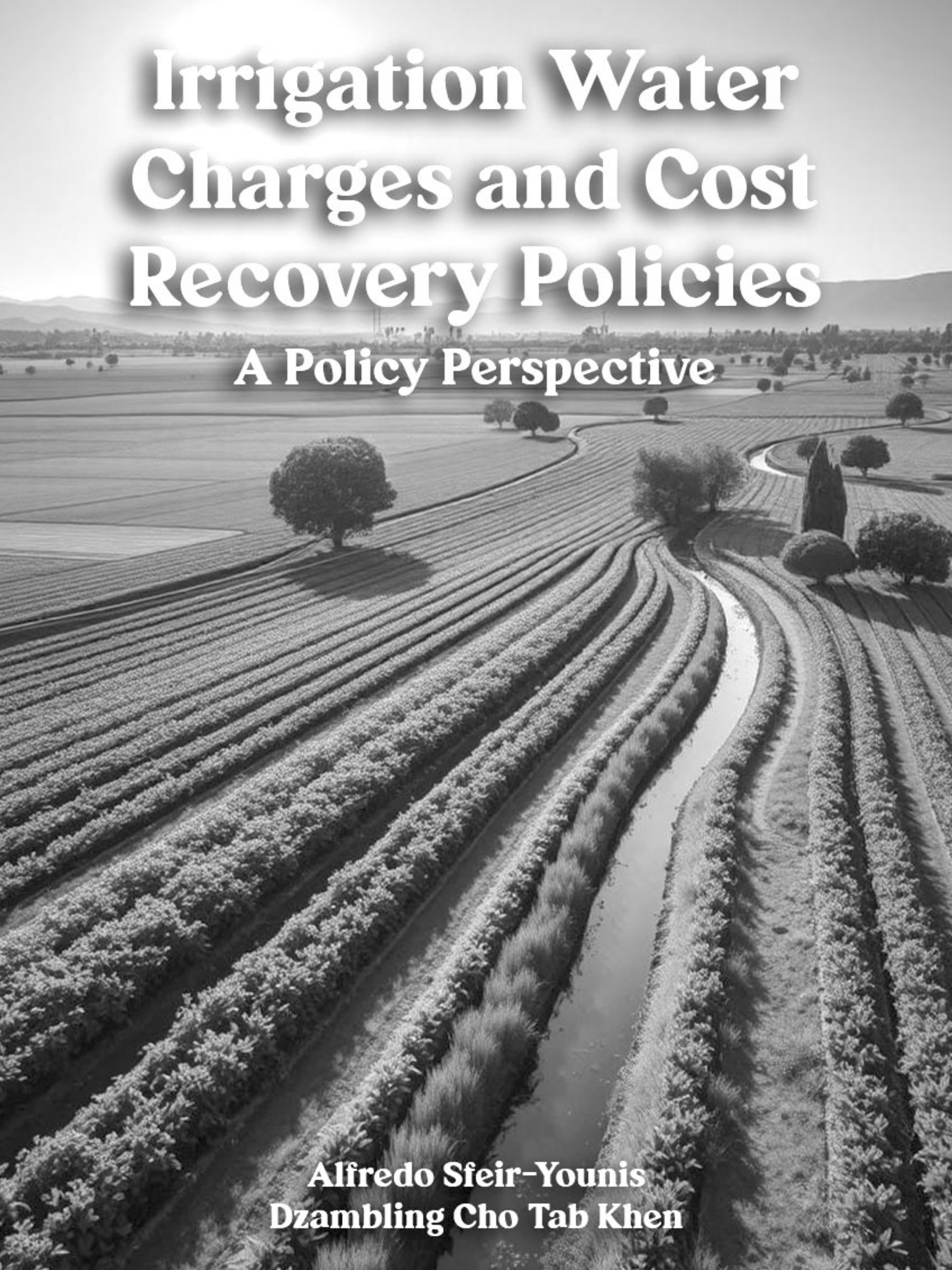
A Policy Perspective

Alfredo Sfeir-Younis
Dzambling Cho Tab Khen

SFEIR-YOUNIS, Alfredo
Irrigation Water Charges and Cost Recovery Policies: A Policy Perspective
AGREP Division Working Paper No. 84 Economics and Policy Division - Agriculture and Rural Development Department - World Bank - October 1983
Cover and Layout: Gonzalo Castellón Grime

Irrigation Water Charges and Cost Recovery Policies

A Policy Perspective



Alfredo Sfeir-Younis
Dzambling Cho Tab Khen

Mr. Alfredo Sfeir-Younis is an economist who graduated from the University of Chile, with a Master's and Bachelor's degree, and holds a PhD from the University of Wisconsin and the University of Rhode Island, United States. He is the representative of the Institutional Focal Point on human rights and related issues of the World Bank and President of the Zambuling Institute of Human Transformation.

I. INTRODUCTION

1.1 Bank policy on irrigation water charges is well defined in terms of guiding principles. However, experience in implementation of existing policies has led to a review of whether the Bank should change its policies. The results of this review may be summarized as follows: (i) in general the principles are sound and should continue to guide the Bank's efforts in this area; (ii) the evidence on implementation suggests, however, that more emphasis should be given to linking cost recovery with the operation and maintenance of irrigation systems.

1.2 This paper begins with a restatement of the relevant principles; this is followed by a review of experience in attempting to apply these principles in developing country conditions; thereafter an assessment is made of the implications of these lessons for cost recovery policies; and the paper concludes with a summary of implications for the Bank. Some of the field evidence is presented in annexes

II. POLICY PRINCIPLES

2.1 Cost recovery in Bank-financed irrigation projects is a complex issue, that has to take into account economic, social, financial and institutional considerations. On economic grounds, the major concern is with pricing water to maximize its efficient allocation and use. The concern on social grounds is the different impact of irrigation on farmers' incomes and hence on rents, so that it becomes important to the cost recovery system--which includes not only water charges but several other forms of taxation--to mobilize more resources from those who gain more than others. On financial grounds, projects should generate sufficient revenues to operate, maintain, and repair existing investments as well as to finance future investments in the irrigation subsector. And, on institutional grounds, the cost recovery system should have an appropriate set of rules and regulations to meet the above objectives, and the means to implement them.

2.2 The Bank cost recovery policy will continue to pursue these three basic objectives: economic efficiency, equitable income distribution and the marshalling of public savings. The application of this policy must be tempered, however, to accommodate the conditions which actually prevail in irrigation systems.

2.3 Economic Efficiency. The objective here is optimal allocation of water among different users and uses. In particular, the concern is with the level and structure of the prices to be charged for supplying irrigation water so as to allocate it optimally and minimize waste. In

theory, water would be optimally allocated if charges were set equal to as marginal value product. True efficiency pricing is rarely encountered in existing irrigation projects. Nonetheless, even a nominal price for water would offer users an incentive to-eliminate at least some of the conspicuous waste and overwatering that often results in drainage and salinization problems. However, the cost of administering such a pricing system is an important factor to be considered.

2.4 Income Distribution. This objective relates to the manner in which the benefits flowing from irrigation are shared among project beneficiaries. The cost recovery system should allow for differences in the ability to pay that is associated with income levels. Benefit taxes on the whole should be progressive, while taking into account production disincentives, tax evasion, and collection problems.

2.5 Public Savings. This objective refers to the extent to which part of the increased net benefits is captured by government for use in funding future investments in agriculture and elsewhere. In some cases, such as where public funds are limited, it may be desirable for the government to collect more revenue than would result solely from efficiency pricing. This is particularly true in the case where project beneficiaries have incomes well above the critical consumption level. Such charges could help to make projects self-supporting and enable governments to undertake that the cost recovery scheme could rapidly capture funds that could meet or exceed Operation and Maintenance (O&M) and capital costs, although no examples of such use have yet been observed.

2.6 The cost of administering and enforcing any system of cost recovery has to be weighed in respect of any proposals for changes in policies or their implementation. An added objective must therefore be to introduce cost effective systems for monitoring and collecting water charges. Our experience suggests that this has so far been a most elusive objective.

2.7 These objectives have been explored in detail and are reflected in current Bank policy on cost recovery as outlined in OMS 2.25, “Cost Recovery Policies for Public Sector Projects: General Aspects.

III. LESSONS FROM EXPERIENCE

3.1 A review was undertaken of a sample of developing countries to assess the effectiveness of different irrigation cost recovery systems. (See Annexes I and II) From this it is clear that in many countries, cost recovery systems do not operate effectively in terms of actual cost recovery or resource mobilization criteria. However, in a few countries there has been substantial progress, and it is expected that others will be able to establish or improve their procedures in the future.

3.2 The manner in which countries pursue cost recovery varies a great deal. In general, different approaches are an outgrowth of their differing legislative frameworks, public finance policies and development objectives. This section briefly summarizes the main findings of the review.

Different Approaches

3.3 Country policy makers in different countries and different ministries often define water charges in different ways. Some consider water charges to be a tax, while others consider water charges to be a user fee. When considered as a tax, the financing of an irrigation system becomes a part of the general fiscal policy i.e.,. dealing with both the micro and macro economic levels, considering all other taxes and subsidies. The appropriate level of water charges, in this case, depends on the specific opportunity cost of different sources of taxation. Because all revenues are fungible once collected, a decision to use water charges as a fiscal instrument must be evaluated in the context of all forms of taxation and not as a separate price for water.

3.4 When water charges are considered as a user fee, i.e., a price for water, it is generally recognized that water charges should be set at a level which maximizes economic efficiency with regard to water allocation and use. In practice, however, none of the cost recovery systems examined are actually designed to deal directly with economic efficiency in its “pure” form. Part of the problem is related to the nature of water as a commodity, to the technology or irrigation systems, and to institutional or social factors. These-are outlined below.

3.5 There is often a tendency to analyze the pricing- of irrigation water in contexts similar to those of public utilities. However, in practice this is unrealistic because attitudes toward water and irrigation are conditioned by a great many cultural considerations. Irrigation as an

activity goes back well over 2000 years and attitudes toward it are ingrained and strongly held. Therefore, global approaches based on first best principles are not always feasible. This is not to say, however, that water charges are not legitimate and vital tools in the pursuit of economic development through irrigation.

Limitations on Water Charges as an Instrument in Promoting Economic Efficiency

3.6 Experience has also shown that there are several reasons why markets for water do not work as efficiently as might be anticipated. First, water has many different price determining qualities. Such characteristics as time, quality, location and security of supply generate multiple sets of markets. Consequently, there will be a large number of efficient prices across the irrigation system if marketing of water is allowed. In practice, the decisions on buying and selling will be, at the most, confined to farmers in the same watercourse, and markets therefore can not assure efficient allocation of water for the whole irrigation system.

3.7 Second, the demand schedule for different farmers has proven, in many cases, difficult to assess in practice; it has seldom been considered feasible to meter consumption or schedule water on demand, due in large part to the existing technology of delivery systems and on-farm practices. Examples do exist, however, of successfully metered systems but the cost of the meters, recording and billing procedures and farmers' reactions thereto, must be carefully considered before introducing such modern technology and management practices.

3.8 Third, the existing water distribution systems, like those where water is allocated on rotation at fixed intervals of time, constrain the

possibility of clearing the market. In the majority of irrigation systems in developing countries, the rules within a watercourse, for supplying water to a farm unit are such that water is supplied at a particular point in time whether or not the farmer wants water at that time. For water allocation between any two watercourses, the systems operate under similar constraints. These systems impose patterns of water rationing that constrain the market from matching supplies with demands. While the rigidity of these practices could be modified to improve the effectiveness of water distribution, it is not always feasible to change long-established practices.

3.9 Fourth, experience also suggests that prevailing systems of water rights make it difficult to reassign optimally the factor endowments available to individual farmers. Water rights may be assigned formally or informally, but the systems are invariably defined as “unchangeable”. That is to say, once rights are assigned they are very difficult to reallocate particularly when, in order to achieve a more efficient allocation, the reallocation requires that a farmer(s) get less water.

3.10 Fifth, in many countries water is considered to be a “God-given” commodity,by both farmers and policy makers, and therefore free, which creates conflicts whenever attempts are made to charge for water.

3.11 Sixth, water demands are subject to climatic factors and, consequentially, water for irrigation may be needed only as a supplement to rainfall. This fact complicates the assessment of the

time value of water to each individual farmer at any point in time.

3.12 Seventh, water intertemporal efficiency aspects make it very difficult to charge for water when the irrigation system is not fully reliable, e.g., during construction or when the system is not properly operated or maintained.

3.13 Finally, water transport and distribution are affected by both natural factors (e.g., slope) and technology embodied in an irrigation project. Although, on efficiency grounds, it may be desirable to redistribute water from downstream farmers to those upstream, such a redistribution is often difficult and, in some cases, very costly. Therefore, changes in water allocation that would increase economic efficiency are not always possible.

Limitations on Using Water Charges for Equity Purposes

3.14 As suggested earlier, any pricing or taxation system has a specific distributional consequence that needs to be assessed. Water charges levied as a user fee have seldom been used to improve equity, although it is well understood that different systems will end up having important income distributional effects. In some cases, the pricing structure changes the equity pattern indirectly, e.g., in cases where farmers pay more for water when cultivating cash crops than food crops. This often involves the assumption that poorer farmers produce food crops and richer farmers produce cash crops, which in many cases may be questionable.

3.15 Irrigation affects farmers' rents (level of profits) differently. Such rents are generally captured via taxes (formal or informal) and water charges, but there are limits to the extent to which it is possible to set up a system that will capture farmers' rents differentially. The limit is set by cost of collection and the ability to enforce the proposed system. In dealing with equity issues, countries have opted to use one or more of the means of taxation at their disposal. For example, under certain conditions land taxes are thought to be a better means for achieving equity. As irrigation is made available, land values are expected to go up, and consequently land taxes to increase. The progressivity or regressivity of this tax depends, however, on the tax structure prevailing in the system.

3.16 Because it is believed that there are important indirect benefits generated as a result of irrigation investments, it is the view of many policy makers that rent should also be captured from other non-project beneficiaries (e.g., traders).

3.17 For the above mentioned reasons, any treatment of the equity issue must take into account the whole spectrum of taxes and subsidies facing farmers. The evidence from on-going irrigation projects suggests overwhelmingly that water charges are not used to "solve" equity problems resulting from an irrigation project.

Limitations to Public Savings

3.18 Policy statements are often made to the effect that water charges will “finance O&M costs,” with a few systems also including payments for capital costs. As irrigation technology changes over time, there may be significant tradeoffs between O&M and capital costs in the form of investments requiring less maintenance. Since most cost recovery systems in existence today require only payment of O&M costs, these tradeoffs are between the levels of resource mobilization needed for maintenance of the existing scheme, versus (perhaps at a later stage) the upgrading or replacement of the system.

3.19 Most cost recovery systems are not designed in such a way that direct beneficiaries have to repay the full capital costs. For large irrigation projects, many governments are willing to use sources of national revenues other than direct user fees, at least to some extent, to finance these projects.

Other Elements

3.20 In many developing countries legislation does not exist specifically on water charges or cost recovery generally. When it does, the laws are often not accompanied by the necessary codes and regulations which will allow a cost recovery system to be put into operation.

3.21 Few public irrigation agencies have autonomy -- defined as the capacity of the public agency to set, collect and allocate back to irrigation, funds for O&M and capital expenditures. Even in cases where autonomy exists, it is only nominal since increases in water charges often require a decision from a central agency of government. The absence of real autonomy has been identified as a key factor in explaining the lack of incentives for irrigation authorities to collect charges or to improve organizational performance (e.g., with respect to the billing system).

3.22 Many cost recovery systems, as they operate today, are shaped by institutional factors. Land tenure is one of these factors: where farmers are not owners of the land under irrigation, recovery is often supplemented by taxing output in cash or in kind.

3.23 Although public savings are alleged to be an important objective of existing cost recovery systems, actual collection is far below acceptable targets, even below targets 4he countries themselves have established. Most countries do not collect even enough to recover

O&M costs. Deficits may be covered by funds from the national budget, but not always. Inadequate funding results in poor O&M. The more sophisticated the irrigation water charge system becomes (e.g., encompassing both efficiency and equity schemes), the more expensive it becomes to operate and this can be carried to a degree where the cost of collection may be higher than the total amount to be collected.

3.24 Enforcement of existing laws is difficult and expensive. The sums of money owed by individual farmers are generally too small to justify court litigation by public agencies. Moreover, this mode of enforcement is not available to agencies which are not autonomous; in such situations, only the state can prosecute.

3.25 In many countries, project beneficiaries are taxed through multiple measures (e.g., land taxes, rate taxes), only a few of which are directly related to irrigation. Although it is recognized that such forms of taxation are not set up to deal with efficiency in water use, such indirect taxation is nevertheless a means of resource mobilization and must be taken into account adequately.

3.26 Further, cost recovery systems have rarely employed any kind of “indexation” (i.e., every payment is set in nominal terms during a given year), although a form of indexing takes place when payments are made “in kind.” The lack of indexing results in significant changes in equity, e.g., farmers located in “old” irrigation systems (where the

cost at the time of construction was relatively low in nominal terms) often pay much less for the same type of service than those located in “new” irrigation systems (where project costs have been higher in nominal terms). Further, in the absence of indexation, adjustments in water rates often calls for large quantum changes in water rates or taxes (reflecting changes of costs in real terms), which lead to political problems.

Planners' Myths

Charges are frequently based on over simplifications and false premises regarding water charges and their effects. These beliefs, often strongly held, in turn condition expectations held and proposals on the implementation of water charges. Some of these are examined below.

3.28 "Water charges will increase efficiency in water use." This is not always true. Although changes in the level of water charges will result in changes in the demand for water (depending on the level of water scarcity), water charges are not the only determining factor. The type of distribution system, the existing arrangements for water rights, the role of farmers' organizations, and the type of irrigation technology are also important determinants in the water allocation process.

3.29 "Water charges promote "good" O&M." This is only part of the equation. Funds from water charges are a necessary but not a sufficient condition for "good" or "adequate" O& activities. O&M includes a large set of rather complex activities. It requires adequate organizational arrangements, proper guidelines and standards, and several inputs such as skilled professionals, machinery and equipment, and overall management. Even where the funds collected cover 100 percent of O&M costs, unless these funds are channeled so as to support established O&M activities, the risks of a run-down of the system are very high.

3.30 “Only water charges can capture farmers’ rents”. As suggested earlier, there are other forms of taxation (direct and indirect taxes) that capture farmers’ rents. Moreover, proper consideration is seldom given to the “informal” ways in which the irrigation system, captures farmers’ rents, some of which accrue to the public sector and some which do not.

Summary of Experience

3.31 The review of experience 1# developing countries suggests a series of propositions that could provide the basis for some necessary refinements in the Bank cost recovery policy described in Part I:

i) Water charges are often difficult to implement because of strongly held traditional attitudes and values about water access which, in turn, make water charges politically difficult, if not infeasible.

ii) Implementing a system of water charges to achieve the efficiency and equity objectives may necessitate changes in the distribution system, which can make implementation prohibitively expensive.

iii) Collection mechanisms for cost recovery have often been neglected, resulting in very low rates of cost recovery.

iv) The necessary ingredients for a viable cost recovery system go beyond i) to iii), however. Other important considerations include: greater simplicity in establishing collection systems, need for indexation, organizational autonomy, and extent to which technology of irrigation affect recovery options.

v) Cost recovery systems based on water charges have, however, been successfully implemented in a number of developing countries, and when they have the financing of O&4 activities has generally been

improved.

vi) The returns to additional O&M expenditures in irrigation are often very high in terms of net benefits from increased and more reliable crop production.

vii) The organizational and practical aspects involved in O&M activities require much more attention if the effectiveness of irrigation systems is to be sustained.

viii) The importance and complexity of the micro and macro economic problems involved in cost recovery systems necessitates analysis at both the project and sector levels, in order to devise viable recommendations for the implementation of water charges.

2.32 Based on these propositions, the next section outlines the major policy conclusions.

IV. POLICY IMPLICATIONS

4.1 Irrigation lending constitutes the largest Bank subsector portfolio and represents more than one third of all Bank lending in the agricultural sector. Accordingly, such investments loom similarly large in the activities of developing countries, and are proportionately even greater in some countries, since irrigation potential is not evenly spread. As a consequence the economic and financial implications of cost recovery from irrigation are of major importance in a macro-economic context. Because of the direct link between irrigation cost recovery and O&M effectiveness, it is also of vital importance in the micro-management context. Therefore the Bank is obliged to pay continuing and concerted attention to this matter.

4.2 Past experience in the implementation of cost recovery systems, and water charges in particular, suggests however that a system which will fully meet the precepts of efficiency, equity and fiscal management is extremely difficult to devise and implement. It seems necessary, therefore, that Bank policy in this area should be based on “second best” criteria. “Second best” from a practical standpoint, may be to have cost recovery cover, at a minimum, the recurrent O&M costs-of irrigation systems.

4.3 . This is not to say that the fundamental principles outlined in Section II should be overlooked, Where the “second best” approach is adopted studies of the efficiency, equity and fiscal aspects of cost recovery should continue and efforts should be made to move

progressively toward a more comprehensive cost recovery system.

Operation and Maintenance

4.4 To achieve the full advantage from a system of cost recovery for O&M it is necessary that the revenues recovered are directed toward meeting O&M costs. This is not only because of the benefits to be obtained from adequately financed O&M but because there is an incentive for farmers to pay charges if they see that these benefits can accrue to them. It is necessary, therefore, to design and put into place institutional mechanisms that will collect the funds necessary for adequate O&M, and to ensure that they are made available for that purpose.

4.5 Such funds may be allocated from the central budget (derived either from general revenues or earmarked taxes), or from water charges or other taxes imposed on the beneficiaries and paid directly to the irrigation authority. The equity and efficiency of these alternatives should be assessed in each case.

4.6 National, regional, state and local authorities may be appropriate vehicles for both revenue collection and the implementation of O&M. For all such institutions, rules and procedures should be designed to fit country-specific conditions and to provide appropriate institutional incentives for effective implementation.

Water Charges

4.7 In many instances the cost of implementing a system of water charges to achieve efficiency and equity objectives may be greater than the expected financial returns. Whenever this is the case, a simpler system of water charges, or simply the rationing of water, may still be useful as a means of recovering costs (e.g., “area based,” “flat rates”). The potential of other taxes on beneficiaries should also be explored. The implications of various alternatives in terms of efficiency, equity and cost recovery should be addressed.

4.8 Due to equity consideration and other-issues discussed in Section II, a country may not be able to collect the full amount of O&M and capital costs through water charges assessed against farmers who directly benefit from the project. Other beneficiaries and other means of taxation should therefore be considered and, as stated earlier, a comprehensive analysis should be carried out in each case of the impact of alternative fiscal instruments on efficiency and equity.

Other Ingredients of a Cost Recovery System

4.9 There are various considerations which may increase the effectiveness of cost recovery systems in developing countries. Based on the experience in a sample of countries, the following factors need to be taken into account:

i) Simplicity: the achievement of a “first best” solution may introduce complications, e.g., too many water rates in a given area. These become difficult to enforce, and the !ost of collection and the billing system may be such that the main objective is defeated.

ii) Autonomy: organizational autonomy has proven to be desirable. Experience shows there is little incentive to collect from farmers if the collection agency, after all, is not in a position to offer the necessary O&M services that are required.

iii) Technology of Irrigation: depending upon the cost involved, projects financed by the Bank should attempt to incorporate technologies which enable planners and farmers to measure water use - a metering,system for example.

iv) Organization of O&M: actual willingness of farmers to pay for water depends on the reliability of the system. This requires attention to the organizational aspects of O&M activities. Effective O&M necessitates management inputs, guidelines, standards, etc., all of which need to be in place if the expected benefits from irrigation are to materialize.

v) Collection: it is clear that in most cases more funds should be mobilized from those who benefit from irrigation. The organization of proper collection systems (e.g., billing) has often been neglected.

And

vi) Indexing: as indicated earlier, the systems used to establish water rates must have an indexing procedure to avoid financial problems and inequities across irrigation projects.

V. OPERATIONAL IMPLICATIONS

5.1 The Bank will lend for irrigation development only to those countries prepared to mobilize funds and make them available for the purpose of financing irrigation (including O&M costs). The principles of cost recovery for irrigation will remain as specified. However, the approach to implementation may be modified, at least as an intermediate phase.

Implications for Project Work

5.2 At the project level, efforts will be made to establish a water charge system that-will recover at least O&M costs. Wherever possible, the funds collected should exceed the estimated requirements for appropriate O&M costs in order to meet other efficiency, equity and public savings objectives.

5.3 If the above approach is adopted, specific attention should be paid to the design of institutional arrangements for the collection and management of these funds. Other arrangements, as outlined in Section III, should also be taken into account.

5.4 All project documents sent to the Loan Committee must make provisions for the implementation of the proposed cost recovery system. Clearly the rate of progress and the type of instruments used can and will vary from one country to another and these variations should be reflected in the approaches proposed. Provision should also be made for evaluating progress in the implementation of whatever program is proposed.

Implications for Sector Work

5 5 Because water charges are one among the many prices, taxes and subsidies instruments faced by farmers, careful attention must be given to examining the overall framework within which cost recovery fits.

5.6 If reform of the fiscal system is needed, this should be a major focus-of attention in the Bank's dialogue with governments. The best vehicles for such a dialogue are probably through sector work and structural adjustment lending.

ANNEX I

COUNTRY CASE STUDIES

MOROCCO

1. Recovery of irrigation investments and O&M costs is based on the Investment Code (Dahir 1.69.25 and Decree No. 2.69.37, dated July 25, 1969), which stipulates that farmers' contribution is recovered through: (a) a volumetric water charge, covering O&M costs plus amortization of the main network (primary, secondary and tertiary channels); (b) a fixed betterment levy[1] on a per hectare basis -wunting to DR 1,500 per hectare, and which implicitly represents farmers' participation to the "on-farm" irrigation investment (e.g., quaternary channels, land leveling, drainage); and (c) a supplementary water charge to cover energy costs for pumping where it applies.

2. The total investment cost recovery cannot exceed 40 percent of the original investments and the Administration (MARA) has, in fact, discretion to set recovery between 0 and 40 percent.

3. A new proposal is to be introduced in the near future, whereby water charges would recover all O&M costs plus 10 percent of the investment costs, and the land betterment levy would recover the remaining 30 percent of investment costs. These modifications would result in: (a)

1 The first 5 hectares of holdings not exceeding 20 hectares are exempted from the payment of the betterment levy.

the introduction of more progressiveness in the system, and (b) the definition of a fixed minimum level of capital cost recovery.

4. Decree No. 2.69.37 defines, in addition, the following elements concerned with the rules of water use and distribution in the irrigation perimeters: (i) progressiveness--water rate would increase during the first years of the project before reaching a so-called “equilibrium rate”, (ii) correction factors-as a function of certain users, (iii) indexation as a function of general prices and wages, (iv) collection-Account Officers in the Irrigation Authority (ORMVA) collect the water charges since 1980 (before, it was done by the Regional Office of the Ministry of Finance), and (v) financing-for betterment levy (i.e., loan at 4 percent interest, 20 years maturity, 3 years grace period).

5. Although the Investment Code provides a very comprehensive frame- work and should result in a minimum level of cost recovery of at least 100 percent of the operation and maintenance costs, the actual rates are some- times-lower than the theoretical “equilibrium rates,” depending on the Irrigation ‘Authorities. In addition, total collection runs between 30 percent and 80 percent and is highly correlated with the nature of crops (e.g., there is high collection from industrial crops, which is due to their high degree of integration with the food processing sector and to the fact that water charges are deducted directly from the cash payments to farmers by the Irrigation Authority.

6. In practice, the rates are based on a ratio between the calculated

O&M costs and the number of m3 of water at the irrigation headworks. The Regional Development Authorities (ORMVA)-responsible for the irrigation projects-charge between USSO0.1 per m3 to US$0.02 per a , not including the supplementary water charges to cover pumping costs. As an example, on average each hectare consumes between 9,000 m3 and 10,000 m3, which implies a recovery of approximately US$100 per hectare. The actual O& costs run from US$100 to US$200 per hectare. The deficit, when it exists, is covered by subsidies from the central government.

7. By having a volumetric approach and a minimum charge (equivalent to 3,000 m3 /ha/year), there is an incentive to use water more efficiently and increase land use. Equity considerations are only included in the land betterment levy. With regard to water charges as a percentage of farmers, income, they exceed 30 percent but are less than 50 percent of the farmer’s rent, which corresponds with 15 to 30 percent of their incremental income generated by the irrigation project.

8. Although the Code requires the indexing of water charges, such procedures were not followed between 1969 and 1980. In 1980 the government doubled the water charges and is now keeping up with the indexing procedures (specific indexation procedures will be established soon).

9. Account Officers in ORMVA collect the water charges. The money collected does not go to the Regional Authority; it goes to the 1ational

Treasury. Therefore, the Authorities are not “autonomous” with regard to financial management. Such absence of autonomy has resulted in a lack of incentives to increase collection through water charges.

10. The cost recovery system in India is rather complex. Systems vary from state to state and water charges are considered as part of the government tax structure and not as “user fees”.

11. Under the constitutional division of legislative powers between the Union and the States, the primary responsibility for development of water resources, including irrigation, rests with the states. The tasks of assessing the level of water charges is consequently the responsibility of each state. The principal factors that seem to account for the variability from state to state are: geographical area, irrigation system, type of crop and season, nature of agreements (e.g., leases), and penalties.

12. With regard to intra-state variations, irrigation rates are uniform in four states (i.e. Gujarat, Haryana, Harnataka and Kerala), are different from region to region in six states (Andhra Pradesh, Jamun and Kashmir, Hadhya Pradesh, Maharashtra and H. Pradesh), and are project-based in six states (Bihar, Punjab, Rajasthan, Tamil Zadu, Uttar Pradesh, and West Bengal). Overall, the rates for lift irrigation are higher than other forms of irrigation. In tubewell irrigation, the most widely used structure is volumetric, although in Gujarat, for example, races are set on a per hectare basis. Season and crops play an important role in all states; in particular, crops that consume more water are charged higher than those consuming less water. Also, the more “profitable” the crop is, the higher the charge (e.g., farmers

growing sorghum pay less than those growing groundnuts).

13. In tank irrigation schemes in the South of India, cost recovery is implemented through land revenue schemes. Land revenue taxeds are structured based on the productivity of the Land (e.g., soil types, irrigated or unirrigated). In such cases, “irrigation cost recovery” is equivalent to the difference between the land revenue tax of irrigated land and rainfed lands.

14. In other parts of India, the cost recovery system depends on the existing tenancy arrangements. In feudal systems, cost recovery is based on a “share” of the crops produced; this share is higher for irrigated crops.

15. There are a number of conditions under which concessional arrangements are introduced. These conditions are determined by: (i) first time that irrigation is introduced, (ii) testing periods of canals, (iii) water- logged and salt-affected lands, and (iv) for leaching purposes.

16. Finally, irrigation cesses vary from state to state; charges are levied depending upon particular provisions outlined in the irrigation acts.

17. Therefore, explanations here would refer to an “average” situation, with some examples as to performance in individual cases.

18. Actual collection of water charges amounts to half of the total (i.e., 3 percent for foodgrains and 6 percent to 8 percent for cash crops). There is no relationship between the level and structure of these charges and capital costs or O&M expenditures. With regard to efficiency, it could be achieved by (a) selecting crops that maximize economic returns to water or (b) by rationing that is imposed by the water distribution schemes. Water charges have little impact on (a) and no impact on (b). With regard to equity considerations, the only relationship is the one defined as the differential between cash crops and food crops. An exception to this is paddy, because of the water-intensity nature of this crop.

19. The money collected goes to the general revenue of the State Government.

20. In public groundwater irrigation schemes, as expressed earlier, water charges are set on a volumetric basis. The Rs/m3 are set based on the rated capacity of the pump and the number of hours the system runs for each farmer. Collection is nearly 70 percent. The principles outlined for surface water apply only in half of the states.

21. Other forms of direct taxation include local cesses, employment guarantee scheme, betterment levy and informal charges. Local cesses are paid to the panchayats (village, taluka or district panchayats). The charges distinguish between irrigated and rainfed crops and are set as a percentage of the land revenue tax. These cesses often are

35 percent to 60 percent of the land tax. The Employment Guarantee Scheme is often Rs 50 on irrigated lands, whether it is irrigated from public or private sources. Rainfed farms are not subject to this tax. Betterment levies are related to land improvement associated with irrigation development (e.g., land leveling) is paid back to the state. Actual collection amounts to 50 percent of the total value of such land improvements. This system is running into problems because land values are estimated for an average farm, and, therefore, it does not represent, in many cases, the true value of individual farmers' land. In particular, people whose lands happen to be located in waterlogged areas or far away from the irrigation outlets, are not willing to pay these taxes. Informal charges are very important. As it has been reported elsewhere, there are many other ways of capturing the increase in farmers rent due to irrigation.

22. Indirect form of taxation includes the Agricultural Sales Tax which turns out to be 4 percent to 5 percent of the value of market transactions in "regulated" markets. This tax is always levied on cash crops, while charges on food crops vary from state to state. There are also Mandi Fees, which are levied as a percentage of total sales in the market. On average, these fees are 2 percent, of which one-third goes back to the operation of the market and two-thirds to the government accounts.

23. With regard to the organizational aspects of O&M, these are established for each project, and the system is based on physical

norms. The fiscal system budgets separately for special maintenance allocations to finance the cost of labor and material. This is now Rs 25/ha. The fee is set on a statewide basis regardless of the shape of the irrigation system. Once every three years, budgetary allocations are also set for “major repairs” of irrigation systems. Actual O&M expenditures are 30 percent to 40 percent less than what they should be.

PHILIPPINES

24. The National Irrigation Administration (NIA), a government-owned and controlled corporation, with 12 Regional Offices, is the agency that by decree is authorized to charge water fees. NIA was created in 1964 and was given the responsibility for developing, operating, and maintaining all national irrigation systems in the Philippines[1]. The Government finances NIA through the sale of bonds and from appropriations.

25. The Regional Irrigation Director is responsible for the collection of irrigation fees for his region. Under him there are Irrigation Superintendents and Watermasters who are responsible for the systems assigned to them. In large foreign-assisted projects, like Magat, the Project Manager is responsible for collection of irrigation fees in his project area.

26. 1 NIA is considered an “autonomous” institution in the sense that funds collected are brought back into the irrigation system. These funds are managed by the Regional Directors, or, in the case of a few designated projects, by the Project Manager. In fact, such autonomy is more apparent than real:, because any increase in the fees will become an issue of national concern and a central authority would be involved.

27. Prior to 1975, all irrigation fees were collected in cash. Now collection may be in cash or in kind.

1 NIA classifies its irrigation projects into two types: (i) nationally funded solely by country funds and (ii) special projects assisted by foreign financing.

28. The fees should be such that it would be possible to cover O&M costs of irrigation and, within a period of less than 50 years, to recover capital costs, taking into account farmers' incentives and capacity to pay. However, the total amount collected is not sufficient to cover O&M costs. This is due, in part, to the fact that NIA has little power for enforcement (i.e., they have to bring people to court).

29. In the national systems, the fees charged at present are equivalent to the value of two cavans of paddy per cropped hectare (i.e., 100 kg) during the wet season and to the value of 3 cavans during the dry season[1]. In the Special Projects, the rates are 2.5 cavans/ha and 3.5 cavans/ha, respectively, while for Pump Projects they are 3 cavans/ha and 5 cavans/ha.

30. Neither efficiency nor income distribution objectives are built into the overall rationale of the system. It is important to note, however, that most farmers own small plots of land and that most farming systems are characterized by monocropping.

31. Average actual collection is 60 percent but it varies from region to region and within a region. However, the NIA has recently created a sys- whereby "collectors" get a bonus in proportion to the fees they are able to collect. The full long-term impacts of such a system are not known yet. Since there is no other direct form of taxation for financing O&M and capital costs, the shortfalls come out of the

1 As of June 1981, paddy price was 4 1,550/ton. Therefore two cavans are equivalent to 4- 155/ha or US$20/ha.

national budget.

32. In areas where Irrigators Associations (IAs) have developed, collection has improved and, in some cases, is close to 00 percent. NIA has plans to progressively assist in the development of IAs, and to interest them with O&M and collection of irrigation fees from individual farmers[1].

1 NA is planning to undertake an Irrigation Fee Pricing Study which is expected to be completed by the end of 1983.

BURMA

33. Burma has a long history of land revenue charges which, up to March 1982, subsumed an element in respect of the quality of irrigation/ drainage infrastructure. Traditionally, the land revenue rate was fixed at between 1/4 and 1/2 of the net value of the product, subject to a limit of 1/10 of the value of gross produce. In theory, an annual assessment is made by the Settlement and Land Records Department. However, since the war, only limited revisions to the basic rates have been made, and they now range from about K 0.5/acre to K 12.0/acre (Kyat), substantially lower than 1/4 of the net value of produce. Actual collection of land revenue is handled by the revenue authorities, assisted by the local People's Councils and Land Committees.

34. In 1982, the irrigation/land reclamation component of the land revenue charge was separated out as a specific water charge. Land revenue continues to be collected, but at a reduced rate in areas also subject to the new water charge. The water charge was initially set at,K 10/acre in irrigated areas (US$1.27/acre) and K 5/acre in areas served by government flood protection facilities (principally in the Irrawaddy Delta).

35. The water charge continues to be collected along with land revenue by the revenue authorities. It therefore is still essentially a revenue measure which distinguishes between irrigated and nonirrigated areas

but which is not based on any principles of efficiency or equity in the use of irrigation water. Nevertheless, in two respects, the initiation of separate water charges represents a significant departure from traditional practice: (i) it provides a basis for increasing charges in irrigated and protected areas without recourse to a full reassessment of the basis for land revenue, and (ii) the rates established, although still very low, represent a major increase over recent levels of land revenue.

36. Both land revenue and water charge collections, which approach 100 percent, are made in association with the compulsory procurement system operated by the Government for major crops. Nevertheless, the amounts actually collected finance only 30 percent of current expenditures on irrigation. 0WX costs are estimated to be K 70 per acre. To give an idea of actual financial deficits within the system, in 1979 the irrigation component of the Land Revenue Tax was K 1.9 million, while actual O&M expenditures during the same year amounted to K 42.8 million. With the new system of water charges, the Government has been able to increase collections in respect of the irrigation-specific charges to about K 27 million--still well below actual expenses. The resulting deficits are financed by the Central Government which, at the end, represents only an accounting procedures.

37. Land revenue and water charges ar4, however, only one element (and a relatively small one) of recoveries from the agricultural sector. Major indirect forms of taxation are also imposed on farmers through

the commodities procurements system. Compulsory procurement of strategic exports (i.e., rice) and import substitutes (e.g., cotton, raw materials, wheat) affords the Government a system of implicit taxation through significant margins between export/import prices and government-controlled procurement prices. This system is reinforced by government specification of cropping patterns for critical crops. This implicit taxation has enabled Government to achieve high levels of cost recovery (O& and capital cost). Compared to other Asian countries, the policy ends up in excessive recovery. Another problem involves insufficient budgeting for O&M&R; funding now bears minimal linkage with tax revenue.

38. The system of water charges has been designed to deal with different cropped irrigated areas. The money collected is channeled to the Finance Ministry, and collection agencies are not “autonomous` with regard to financial management.

39. Farmers pay Rs 100/ha (USS7.6/ha) per crop. There is no difference among crops except for sugar. Payments are requested in both seasons (dry and wet seasons). Therefore, potential fees for individual farmers are not to vary between Rs 130 and Rs 180 per hectare per year. The fees are calculated as a function of expected total O&H expenditures. These O&M expenditures have been es ,mated at Rs 150/ha/year, although, the estimated value of “proper” O&M runs about Rs 220/ha/year.

40. Capital expenditures for projects are financed by the Central Government budget.

41-. No efficiency or equity considerations are taken into account. Farmers pay, in addition, land taxes. These taxes do not differentiate between irrigated and nonirrigated lands. The taxes amount to Rs 78/ha/year and are set according to some index of “land quality”.

42. The above principles also apply to groundwater schemes.

43. Total collection in surface irrigation schemes amounts to 1 percent or less. In those areas where tubewells are in operation, the total collection amounts to 70 percent in “good years”.

44. The recovery of land improvement costs and the costs of O& of irrigation works was to be effected under the Sale of State Lands Law of 1973 and the Land Betterment Law of 1977. However, neither of these laws could be implemented effectively, as a series of technical and procedural problems arose which defied resolution. The Government attempted to reintroduce provision for recovery of O& costs through water charges under the Irrigation Ordinance of 1946, as amended in 1968. It has also provided for the transfer of land title to settlers upon payment of costs of land improvements under the Land Development Ordinance of 1936, as amended in 1981. These laws are to have nationwide coverage.

45. Under the Irrigation Ordinance, Government was empowered to impose water charges toward recovery of capital and O&M costs of irrigation systems. Initial charges were set at Rs 30/ac (US$1.43/ac) in major schemes (200 acres or more) with cropping intensities of over 150 percent, and at Rs 20/ac (USSO.95/ac) with cropping intensities of 150 percent or less. Rates were to be gradually increased to at least cover full O&M costs.

46. Unfortunately, to date, no rate revisions have been made, and collections have been insignificant. These have not been successful despite attempts under the IDA-financed Mahaweli III Project to make water charges and collections Mahaweli Area-specific since

nationwide covenants under previous projects were not working. Under Mahaweli III, water charges were to be collected starting in 1982, with an increased rate, at a level equivalent to 22 percent of expected O&M costs and rising to 100 percent of such costs by 1991[1]. To date, no rate enhancements and only minimal collections of water charges have been made in the Mahaweli Area. In addition, land transfer rates have been neither fixed nor collected from Mahaweli settlers to recover capital costs.

47. Recently, it has been learned that the Irrigation Ordinance has proved problematical for implementing a water charge program, and Government has established a committee to work out a reasonable ‘oasis for collections. Government expects that the collection of water charges will start by 1984, after introduction of necessary amendments to the Irrigation Ordinance.

48. The Government is currently in default of cost recovery covenents under both the Tank Irrigation Modernization Project and Mahaweli Projects. An illustration of the ineffectiveness of current water charge recovery mechanisms is shown for the Tank Irrigation Modernization Project (TIMP) (CR. 666-CE) in Table 1.

1 Such rates cover but a fraction of more currently estimated O& costs about 25 percent under major tanks and only 15 percent under more complex Mahaweli schemes.

Table 1: COLLECTION OF IRRIGATION CHARGES FOR THE TTMP AREA (Cr. 666-CE) (in rupees)

		1978	1979	1980	1981
Mahakandarawa					
	Estimated charges	129610	129610	129610	129610
	Collection	-	-	-	-
Mahawilachchiya					
	Estimated charges	71840	71840	71840	71840
	Collection	-	-	-	-
Padaviya					
	Estimated charges	292080	292080	292080	292080
	Collection	-	-	-	-
Pavatkulam					
	Estimated charges	66380	66380	66380	66380
	Collection	-	-	780	-[1]
Vavunikulam					
	Estimated charges	107680	107680	107680	107680
	Collection	55196	8719	733	58
Total					
	Estimated charges	667590	667590	667590	667590
	Collection	55196	8719	1513	58[1]
	(% of estimate)	8.3	1.3	0.2	0

[1]Through May 1981.
Source: Ministry of Lands and Land Development.

SENEGAL

49. SAED is the entity authorized to charge the farmers for water. However, as a development agency, SAED is charging for a package of services. In particular, farmers pay a consolidated fee in kind which consists of a water charge per hectare cropped--which varies according to crop--and a charge for mechanical services--which varies depending on the service. Services include land preparation but also input supply[1].

50. SAED is an autonomous institution. Deficits are covered by funds coming from the Central Government.

51. Farmers are responsible for the O&M of the tertiary system and irrigation infrastructure located at the farm level.

52. There is no other form of direct project cost recovery. Indirect taxation, however, takes place through the procurement system: farmers have to sell their rice to SAED at procurement prices.

53. Actual payments for water charges are very low, e.g., F 25,000/ ha/ year (approximately US$71) for paddy and F 35,000/ha/year for tomatoes. Therefore, the system does not cover O&I or capital costs.

54. The other package of services carries a subsidy of nearly 80

1 Such rates cover but a fraction of more currently estimated O& costs about 25 percent under major tanks and only 15 percent under more complex Mahaweli schemes.

percent.

55. Efficiency and income distribution considerations are not relevant in setting up the structure of water charges. It is important to note, however, that most farmers have very small plots of land.

KOREA

56. Korea has a well-established system of charges applying to government-planned land development projects. These charges are split into recurrent O&M costs and capital repayments. Farmers pay full annual O&M costs, and the terms of capital cost repayments vary according to the type of land development. For irrigation works, farmers repay 30 percent of capital costs over 35 years at 3.5 percent interest per year, with an initial five-year grace period followed by 30 years of repayments.

57. The collection of water charges in Korea are commonly greater than 98 percent of assessments. The absolute level of charges and general taxes in the Yong San Gang Project are considerable, varying from US$245 to US$375 per hectare per year of the existing farm land.

58, As described above, no specific consideration is given to the efficiency and income distribution criteria.

59. From an institutional perspective, four types of taxes are charged to farmers: (a) social sector income tax, mostly allocated to finance such activities as health, education and “republic taxes.” These taxes cover about 10 percent of farmers’ net income. The tax base increases if the area is under irrigation. (b) land taxes, which are calculated on the basis of the quality of land, cadastral location, and production capability. These rates also change depending on the extent to which irrigation is available. (c) water rates, where for purposes of collection, the portion equivalent to O&M is not computed. And (d) maintenance and operation charges.

60. Projects are supposed to collect investment costs, O&M costs, interest charges, and other service charges (particularly, service during construction).

61. Actual recovery is carried out by the communes,. The money collected is then deposited in a local bank. The local authority is rather “autonomous” in the sense that money flows back into the irrigation subsector. There are no direct interventions from the Central Government.

62. Water rates and other cost recovery taxes are set in “minimal” terms. No indexing. In real terms (i.e., accounting for inflation), the cost recovery amounts to only 14 percent of total costs. It has also

been estimated that the taxes in (b) and (c) above do not always cover 0V costs.

63. Where metering exists, water rates are set at 2D/m3 (USsO.04/m3 at full development[1]. Where no metering exists, the number of m3 used per crop is calculated on the basis of an average water requirement per crop, i.e., the amount of water needed to satisfy the plant cycle. Land taxes are set at D 1,000 to D 2,000 per hectare (US$22 to US$45 per hectare).

64. No specific consideration is given to “efficiency” and “income distribution” as criteria for establishing the level and structure of water charges. However, “possibility to pay” is an important consideration, where authorities put up subsidies equivalent to the difference between costs to be financed and the capacity of individual farmers to pay.

1 Because it has been set in relation to “full development,” in the first years the public agency will run into financial deficits. Communes are supposed to cover such deficits.

PAKISTAN

65. Pakistan's main economic lifeline, as 90 percent of agricultural value-added, is produced using the Indus Basin's water supply. Its system is old and deteriorating and, therefore, will warrant, on an ongoing basis, substantial O&M and capital expenditures; the latter item will involve particularly, drainage-related improvements to provide urgent relief to a growing problem in water-logging and salinity.

66. Water charges are aimed to generate, by about 1990, adequate funds to meet the full O&M requirements of the irrigation system. In some provinces, the Department of Revenue, within the Provincial Government, collects those water charges. In other provinces, collection is done through the Irrigation Department.

67. The funds collected go into the general revenue funds of the Provincial Government. It has been stated that inadequate funding for O&1 has been the major cause for the accumulation of deferred maintenance and resulting problems affecting irrigation, drainage, and flood protection facilities. Although O&M allocations have increased in recent years, they are still well below requirement levels, At this time, Government does not collect charges on the capital costs of irrigation investments. This policy, however, is currently being reassessed with the aim of introducing recoveries on a reasonable portion of irrigation capital costs.

68. There is no precise information about the actual amount being collected, but it is believed that the collection rates are relatively high (70 to 80 percent).

69. Water charges in Pakistan are imposed on acreage basis and vary with the crops grown each season. The current average water rate per acre per season is about Rs 30 (or US$2.7). The charge represents only about 6 percent of the net per-acre income of crops.

70. Though water rates vary substantially among crops, this variation has little relationship with the consumptive crop water requirement. Hence, correct water rates have little effect on the mix of crops grown by farmers. Because of variations in water supplies, to meet crop water requirements, water rates have serious limitations as instruments for optimizing water utilization. There is evidence of considerable water being wasted during deliveries to farms and fields.

SUDAN

71. There are three types of irrigation schemes: (a) large schemes (over 20,000 fds) managed by government-related bodies and cultivated by tenants-total area covered is 3 million fds; (b) medium schemes (200 fds to 20,000 fds), mainly nationalized pump schemes with net command area of 900,000 fds; and (c) small schemes, mainly private, with net command area of 300,000 fdas-two-thirds gravity irrigation, one-third, pumps.

72. Land and irrigation services are supplied by government through the Ministry of Irrigation (M01) and the Ministry of Agriculture, Food and Natural Resources (XONR). 101 is responsible for control, regulation, and development of water resources, and also has the day-to-day responsibility for O&M up to field output pipe. Public corporations manage major schemes controlled by NIANR.

73. Farmers are allotted tenancy units of 10 fds to 40 fds, similar to sharecroppers. Complex relationships between government, management, boards and tenants are defined legally (e.g., profit-sharing or crop-sharing schemes in public irrigation schemes). In return for land, irrigation and preparation, and managerial services, tenants share half of net cotton proceeds with government and production boards. Tenants receive full benefits from subsistence crops. Proceeds to tenants are often delayed. New cash crops--

groundnuts and wheat-are not incorporated in crop-sharing scheme. Tax and exchange rate distortions produced incentives for tenants to concentrate on crops which are marketed independently for immediate cash payment.

74. Higher priority to new schemes has decreased potential benefits from existing schemes. Budget deficits in many schemes eliminate profits for government. This has been recognized by government and resulted in a strategy of rehabilitating/modernizing existing irrigation schemes and price reform. Consequently, government has begun restructuring input-output relationships, adjusting marketing procedures, and instituting new measures for tenants.

75. There are three major elements in the cost recovery system:

(i) expenditures and revenues of the cotton crop are shared between the partners--Government, corporation, and tenants-through the “joint account”;

(ii) input costs and services costs for noncotton crops are charged to farmers’ individual crop accounts;

(iii) management and indirect expenses are recovered by management through its share of net proceeds of the cotton crop.

76. The system has resulted in a bias against cotton, because cotton

effectively bears the burden of all land, water, and management charges on all crops. Cotton revenues are often the source from which to recover costs against other crops.

77. Recent changes in cost recovery system of Gezira attempt to recognize these problems:

(i) cotton-grower incentives based on increased cotton yields;

(ii) water and management charges levied on other crops than cotton, reflecting a portion of the current expenditures of the MOI on Gezira as well as the amortization of the capital invested. Newer schemes have a service charge system which in addition to charges for all inputs and direct services, imposes a land/water/management charge. This covers all corporate expenses, including payments to MOI for irrigation services, wages and salaries of corporate staff, and general administrative expenses. Fee for all crops. Tenants receive the full crop proceeds. This is a sample contractual arrangement between tenants and the corporation controlling the scheme. Credit arrangements may be made to permit tenants to meet the charges. Individual crop accounts are kept for each tenant.

78. Prevailing problems are insufficient incentives for cotton production, the failure to recover costs and poor collection on noncotton crop accounts. The complex institutional relationship existing between the government, corporation, and tenant requires an identification and

recognition of all the expenditures and revenues of the partners. The service charge scheme provides greater incentives for tenants to be productive but only at the expense of bearing the full risk where often they are not in full control, while the other partners are (theoretically) guaranteed a fixed income. An insurance scheme may have to be designed to act as a reserve account for poor years.

79. The cost recovery schemes also take external factors of financing into account, e.g., indirect coot recovery through customs duties on imports, development taxes on imports and exports, and implicit effects of exchange rates. Not all cost items can be qualified, e.g., managerial assistance or guidance. Question remains of whether project responsibilities and costs are optimally allocated; this is also related to allocation of benefits.

MEXICO

80. The 1971 Federal Water Law and the subsequent policy elaborations in the National Water Plan set out the legal requirement for recovering costs of operation, maintenance, and capital expenditure and provides for suspension of services to those in default of payment. However, the Water Law is not specific on levels of recovery, saying that recovery would depend on the purpose of the works (headworks versus on-farm channels) and the capacity of the beneficiaries to repay (Article 16). The mechanism for determining water charges is given as an inter-institutional committee working on the basis of socioeconomic studies, actual system costs, volumes of water delivered, and type of crops irrigated.

81. At the aggregate level, recovery of investment costs has been negligible. For operation and maintenance, the long-run recovery rate averaged some 70 percent between 1950 and 1972. Since then, failure to pass on inflationary cost rises has resulted in a 75 percent subsidy on operation and maintenance. Many of the irrigation schemes exhibit diminished performance because of inadequate maintenance and lack of system completeness at the field level. In July 1982, the Government signaled its inability to support the subsidy level and canceled 50 percent of the balance of authorized budgets of the irrigation entities. Because of the inability to reduce personnel costs, cuts will fall heaviest on maintenance and rehabilitation expenditures.

At the level of the local irrigation entity, recovery rates vary widely from about 2 percent to 100 percent of operation and maintenance costs depending on the characteristics of the scheme and of the beneficiaries at each site.

82. A review of existing policy studies on irrigation water charges indicates that the Government of Mexico, through the Secretariat for Agriculture and Hydraulic Resources (SARH) has a well-developed policy on water charges that spells out income and production considerations in a manner consistent with the theory of pricing of public goods. Detailed guidelines are passed on to the local level for calculating system costs and desired recovery levels. Nevertheless, implementation of the policy has not been adequate due to the inter-institutional committee manner of setting water charges and the flexibility of interpretation possible within the Federal Water Law. In the mid-1970s, a Commission to Study and Formulate Regulations of the Federal Water Law -was established by the Mexican Government to define specific by-laws, setting out detailed water pricing guidelines. The Commission's report[1] provided thorough basis for the establishment of sound water pricing procedures derived from marginal cost and equitable distribution considerations. Although the report's recommendations have not been implemented, its conclusions are still valid and the new Administration has signaled its intention to reduce the use of indiscriminate subsidies.

1 A. Olaiz, J. Montes, and A. Salazar, "Precios Del Agua En Irrigacion," Comision del Plan Nacional Hidraulico, October 1977.

INDONESIA[1]

83. In addition to funding from Government sources, farmers make contributions toward the costs of operating and maintaining communal systems and the tertiary sections of operated systems. Farmers' payments usually consist of two elements: a payment to the local irrigation official (ulu ulu) for services related to water distribution, and a contribution in the form of donated labor (gotong-royong) toward the maintenance of irrigation and drainage channels. The payment to local officials is nearly always in kind, thus forming a protection against inflation. Payments vary widely depending on the type of irrigation system and reflect the reliability of water supply.

84. Contributions from water users toward O&M at the tertiary level are relatively well collected due to community pressure and the fact that most of the payments are made in kind. Areas supplemented by groundwater imposed a charge in cash for the pumped water in addition to the contributions in kind for tertiary O&. In addition to tertiary level contributions to O&M costs, water users pay a land tax, IPEDA. It is designed to capture some of the benefits resulting from improved productivity due to irrigation. Collections are estimated to represent between 5 percent and 10 percent of the water users net income.

---

1 This section includes direct quotations from D. Thompson, "Financing of Operation and Maintenance Activity in the Irrigation Subsector in Indonesia: Implications for Cost Recovery," AGREP Draft Report, Chapter III, August 1982.

85. Indonesia has a long history of levying tax on land. During Dutch rule (1600-1942), land users paid rent to the colonial government. Land rent was levied on agricultural land from the beginning of the 19th century to 1942. From the beginning of the 20th century, land surveys and measurements were undertaken to classify agricultural land on Java, Bali, Lombok, and South Sulawesi[1] to provide accurate assessments. After independence, the land tax was replaced by an agricultural income tax. Administrative difficulties led to the introduction of a tax on agricultural yield. The name IPEDA was adopted in 1965 to stress the objective of the tax to contribute to regional development. 86. Annual targets for IPEDA are set by the IPEDA Directorate together with the Ministry of Finance and the National Development Planning Board (BAPPENAS). The target is set using previous collection experience and aims to recover 80 percent of the current year's "pure assessment" (i.e., of the whole area) plus 50 percent of arrears. Land classification, assessment, and collection of IPEDA is largely the responsibility of the local IPEDA offices within the Regional Offices of Taxation.

87. The most recent regulation (1979, effective 1981) classifies irrigated paddy land into 15 productivity classes and nonpaddy rural land into 17 classes. These classes are further grouped into five major plot sizes[2]. The resulting matrix of IPEDA coefficients is applied to the formula for calculating IPEDA, which incorporates rice prices and land values. IPEDA charges are basically set at 5 percent of the value

1 These areas are subsequently known as the "old" areas.

2 Land productivity depends on consideration-of physical and chemical fertility of topsoil, topsoil depth, slope location, cropping rotation, degree of soil conservation, and type of existing irrigation system. Test plots are used in the village (about 200 m3 for every 150 ha) to estimate the land classification.

of net production per year from productive (paddy) land or 5 percent of the annual rental value of unproductive land. It is collected from five sectors: rural, urban, plantations, mines, and forests.

88. Although the IPEDA Directorate is responsible for collection, in practice it collects IPEDA only on estates, forestry, mining, and the urban sector in Jakarta. IPEDA from other sectors is collected by desa government officials and passed through the kecamatan to the kabupaten. Individual tax assessments are made on the basis of ownership certificates, a copy of which is held in the village. Payments may be made to the lurah (village headman) or the nearest unit of the Bank Rakyat Indonesia (BRI). Ten percent is redistributed as a collector's bonus, 10 percent is forwarded to the Provincial Government, and 10 percent is used to purchase shares in the Regional Development Bank (BPD) on behalf of the kabupaten government. The remainder, about 72 percent of the total revenue, is paid to the kabupaten government. Allocations are as follows:

IPEDA Collection			1
Collection Fees		10% of 1	2
	Balance	90% of 1	3
Deposit with Provincial Government		10% of 3	4
	Balance	81% of 1	5
Payment to Regional Development Banks		10% of 5	
	Balance to kabupaten	72% of 1	

Collections are usually made annually after harvest of the main crop, although it is possible to pay in installments. Incentives 'exist for good collection rates.

89. Regulations (Instruction #3, 1969) exist to determine the uses to which IPEDA revenue may be put. Collections are to be used for development of infrastructure for raising food production including irrigation, transportation, flood control, and energy distribution[1]. There is no specific guideline for the percentage of IPEDA which should be spent on the irrigation sector, and, within the broad categories mentioned above, the Bupati (head of kabupaten) has considerable discretion on the allocation of the 72 percent of IPEDA revenue he receives. A very small percentage is spent on agriculture development and within that, perhaps only 1 percent is spent on irrigation development. This is probably due to the fact that the Bupati is interested in making “visible” expenditures for political reasons and does not wish to allocate funds to a sector which is already supported by a central or provincial government subsidy. It must be emphasized that, particularly on Java, with present regulations, IPEDA revenue is regarded solely as a development fund and not as a routine O&M fund. However, in practice, data from the IPEDA Directorate reveal that on average, in Indonesia, 19.7 percent of IPEDA revenue was allocated to a routine category in 1979/80, falling to 13.3 percent in 1980/81. These routine expenditures covered salaries and office expenses.

1 An additional instruction from the ‘Minister of Home Affairs in 1972 stipulates that 20 percent of the IPEDA fund may be allocated for the maintenance of infrastructure created through INPRES (rural public works) programs. Discussions in the field, however, revealed that this allocation was not always made.

ZIMBABWE

90. In Zimbabwe, water rights of all the water found in streams and rivers and underground supplies is vested in the State. The use of such water is regulated under the Water Act of 1976. The Water Act is very complete, modern water legislation providing, among other matters, for the planning and optimum utilization of water resources, the structure and jurisdiction of the Administrative Court, the declaration of public water shortage areas and its regulation; the prevention and control of water pollution; for the safety of dams, etc. Rights for agricultural uses are collected by the Administrative Court, presided over by a judge of the High Court.

91. The moderation and maintenance of all major storage dams and main delivery systems up to the “field edge” are the responsibility of the Ministry of Water Resources and Development (MRD). To this end, MRD provides water bailiffs, technical personnel, and maintenance crews at all major dam sites responsible for the maintenance work and for controlling, releasing, and recording all water allocations. From the “field edge,” the conveyance, distribution, and application of irrigation water is the users’ responsibility. Overall, there is very high quality O&1 work.

92. Given the price of water supplied by Government to the commercial areas, the general formula was aimed at recovering all actual capital expenditures and O&M costs incurred by MWRD over a 40-year

redemption period at the rate of interest prevailing at the time the project was completed. The initial agreements entered into by the users were based on fixed water prices. Because of inflation, this has led to inequitable unit charges depending on whether the reservoir is old or new.

93. Current water charges per 1,000 m3 vary widely from Z$2.5 to over Z$25 in the newer schemes. Indexing is now being considered. Correction of historical costs is done through negotiations with the consumers.

94. In the communal areas, after an initial period of nominal water charges, a simple land rent formula has been applied since 1972. The plot holder pays Z$70/ha when water is given to him at 10 days intervals or less. When the irrigation interval is between 10 and 14 days, the charge is reduced to Z$35/ha, and for schemes with water turns in excess of 14 days, the charge is set at Z$6/ha. The modest charges ceased to be levied during the last three years. In groundwater irrigation schemes, the farmers also pay for the electricity costs.

TAIWAN[1]

95. The Irrigation Association (IA) recovers a proportion of its capital and recurrent costs from farmers through the collection of membership fees. These consist of three elements: (a) a basic fee for canal and drainage O&M for which the present annual per hectare rate is not allowed to exceed the monetary equivalent of 270 kg of rice (i.e., about $70 in 1975/76; about $80 in 1976/77); (b) an engineering fee, which is a contribution toward the costs of new construction and rehabilitation; and (c) a pumped-water fee for tubewell and pumpstation O&M.

96. The basis on which the fees are calculated is complex. The basic fee is made up of two parts: a general charge which is common to all areas having the same designated crop rotation within a given canal command; and a “local” charge, which may vary between quite small localities, depending on the amount of money which small groups (SGS) in the area concerned vote to have earmarked specifically for reinvestment in their own locality. SG’s interest in having a substantial proportion of their funds reserved for local reinvestment is stronger in the Touliu area, with its numerous small systems and local variations, than in the more homogeneous Chuo Main Canal area. A consequence of the LA’s acceptance of this practice is that there is a very large number of different rates at which the basic fees are charged-over 100. In 1975/76 the average rate was about USS56.50 per hectare-

1 This section includes direct quotations from A. Bottrall, “Comparative Study of the management and Organization of Irrigation Projects: Report No. 6,” Field Study in Taiwan, Yulin Irrigation Association. World Bank Research Project o. 671-34, Chapter 3, July 1978.

-about US$9.50 below the maximum permissible rate, which was levied in those areas cultivating two crops of rice a year. Although areas with larger water entitlements generally have to pay slightly higher basic fees than those with smaller entitlements, the fees are not intended-according to the IA management-to reflect variations in the cost of O&M work in different areas. If the fees were to be calculated on a quasi-volumetric basis, their incidence would be very different. A calculation by Ko and Levine suggests that water is allocated to "rotationed cropping areas," single rice areas and double rice areas roughly in the proportion 1 : 2.5 -: 5[1]. Yet, basic fees in the Chuo Main Canal Command for 1/3, 2/3, single and double rice areas are in the proportion 1 : 1.03 : 0.85 : 1.06.

97. Engineering fees also vary between localities, largely according to the extent to which they are likely to be direct beneficiaries of differ-ant items of new construction. The proportion of total construction costs which farmers are expected to bear is fairly low at present, following the government's policy changes since 1973: for example, the rate of government subsidy for tubewell construction is now 85 percent, as against 40 percent and 1960s, when the bulk of Yunlin's tubewells were installed[2]. The Government has, however, fixed no upper limit on the level of engineering fees that may be charged-and these can be quite high in IAs with new reservoirs, e.g., Chianan IA, where the extra fee for Tsengwen Reservoir water may be as high as US$42/ha. In Yunlin TA, however, average engineering fees are only

1 It is not clear whether "rotational cropping areas" refers to 1/3 or 2/3 rice areas, or a mixture of both. A. de Lasson, The Farmers' Association Approach to Rural Development-The Taiwan Case (University of Gdttingen, 1976), p. 50.

2 The same applies to other investments, such as land consolidation, which are not the LA's immediate concern. When land consolidation began in the early 1960s, farmers were required to pay for the whole cost. Now the Government offers a 30 percent subsidy.

about US$6.70/ha. As in the case of the basic fees, they often contain two elements: a general charge and a local charge. For example, in the case of drainage improvement, 60 percent of the cost of field drains is charged to the immediate beneficiaries, while 13 percent of the cost of large drains is borne by all association members equally; the rest of the costs are subsidized.

98. Pumped-water fees are also charged in accordance with the amount of benefit which farmers in different localities are expected to derive from supplementary water provided by tubewells or low-lift pumps. They are considerably closer to being volumetric water charges than the basic fees, although they appear to be calculated in advance on the basis of planned rather than actual pumpage. Present rates average about US$20/ha over the IA areas as a whole--or at least US$45/ha in those areas which directly benefit from pumped water and have to pay for it.

99. The present level of fee recovery is high: 97.8 percent in 1976/77 (97.6 percent in Chuo Main Canal, 100 percent in Touliu, and 87.4 percent in Chusan). Forty percent of all SGs were reported to have achieved 100 percent recovery rates in that year. This may be partly a reflection of the reduced financial burden on members as a result of the recent policy changes: an analysis of fee levels in Chianan IA between 1967 and the present indicates that basic fees have increased substantially over the period (in terms of rice equivalents), but there has been a still larger decrease in the level of engineering fees as a

result of the much higher government subsidies introduced for capital works. Ko and Levine report that in 1971 the average recovery rate in Chianan LA fell to 72.6 percent, and this was thought to be largely the consequence of the farmers' unwillingness or inability to pay high engineering fees. Before its amalgamation into Yunlin IA, there were particular problems of fee recovery from some of the coastal areas of the Chuo Main Canal system for a different reason: farmers were not receiving reliable water supplies and were refusing to pay on the grounds of "poor service"--recovery levels fell to 28 percent (3 per-cent in the case of one working station). Since amalgamation, however, the problems of these areas have been given special attention, and recovery rates have now risen to 98 percent.

100. There appears to be little dissatisfaction among IA members at the present level of fees: none of the farmers interviewed complained that they were too high and one SG leader argued that they were too low, on the grounds that higher fees would enable the IA to provide members with a better service. The Government is known to be interested in the possibility of raising IA fees above their present level, and conditions in Yunlin suggest that it may be feasible to do so there. However, it would clearly be Unwise to make a general decision to raise IA fees substantially without careful consideration of the level of farm costs as a whole and particularly the level of the agricultural tax.

101. According to analysts in the Joint Commission on Rural

Reconstruction (JCRR), the present level of IA fees is insufficient to cover Q&X costs, and the Government has, for that reason, been obliged to subsidize IAs through the creation of its special fund for deferred maintenance. This may be true of IAs in Taiwan generally, but it was not true of Yunlin in FY76, as can be seen by comparing the revenue from membership fees shown in Table 2, with recurrent costs shown in Table 3. 'Revenue from basic fees was sufficient to cover canal and drainage O&M4 costs, and the pumped-water fees were substantially higher than the corresponding O&M costs. Total revenue exceeded budgeted revenue, even though subsidies were lower than planned, because the contribution from membership fees was higher than expected. Total revenue also substantially exceeded total costs. These points would all seem to be indicators of good performance on the part of Yunlin IA and its management. However, it is impossible to be certain how good the performance has been in the absence of a clear explanation as to why actual costs fell so far short of budgeted costs--whether it was the result of prudent financial management or whether expenditure was simply inadequate, in the sense that it involved reductions in investment and services which could have adverse long-term consequences.

102. Township farmers' associations. The revenue per hectare of the two Yunlin County TFAs in de Lasson's[1] sample in 1972 was as follows:

	Extension Section	Credit Section	Economic Section	Total
Silo	13.23	66.14	89.03	168.4
Tounan	8.58	55.11	102.91	166.6

1 Op 1t1 pp. 113-14.

Part of the extension revenue came from the TFAs' profits of the previous year, part from government subsidies. Both TFAs made substantial profits in the year concerned through the combined activities of their credit and economic (marketing) sections. Several of the less successful TFAs made overall losses, however, and this contributed to their difficulties in providing adequate extension services.

BANGLADESH

103. The Bangladesh Water Development Board (BWDB) is responsible for implementation, operation, and maintenance of both large and small flood control, drainage and surface irrigation schemes. The Bangladesh Agricultural Development Corporation (BADC) is, inter alia, running rental and sales programs for low-lift pumps, deep tubewells, and shallow tubewells. Sales programs are being expanded and rental programs have been reduced in recent years and continue to be reduced. BADC also provides repair and maintenance services for minor irrigation equipment. The private sector, however, participates increasingly in both sales and repair activities, as a result of the Government's deliberate privatization policy.

104. Differences in cost recovery policies between BWDB and 8ADC are now harmonized. Since 1982, both organizations are under the control of the Ministry of Agriculture and Forests.

105. Cost recovery ranges at present from almost zero for gravity-flow systems to about 30 percent for deep tubewells, about 50 percent for lowlift pumps, and about 75 percent to 90 percent for shallow cubewells. For the three types of irrigation pumps, these percentages are gradually increased.

106. BWDB routinely assesses the gross incremental benefits due to its surface irrigation schemes. The assessments are passed on

Table 2: REVENUE, YUNLIN IA, FY1976

	US$	US$/ha	Percent of total revenue	Increase / decrease on budget revenue
IA Membership Fees				
Basic	4045270	59.78		
Engineering	452915	6.69		
Pumped water	1368175	20.22[1]		
Total, fees	5866360	86.69	70.1	+2.6%
Other LA Revenue				
Other water fees[2]	128815	1.9		
Interest on deposits property, fines, etc.	402515	5.95		
Total, other revenue	531330	7.85	6.4	-1.9%
Government Subsidies				
Provincial government	4045270	59.78		
ARDP (via JCRR)	452915	6.69		
For O&M[3]	219260	3.24		
Total, subsidies	1966980	29.07	23.5	-5.5%
TOTAL Revenue	8364670	123.61		
Budgeted Revenue	8335405			

[1]Spread over the whole 'A. Calculated on the same basis as the pumped water costs per ha, the figure would be US$44.60.
[2]For example, sale of water for industrial use.
[3]Assumed to be from the Government's special fund for deferred maintenance.
Source: Yunlin Statistical Yearbook, 1976, pp. 167-69.

to the District Deputy Commissioner who is supposed to collect the charges at the rate of 3 percent of incremental benefits. It has been estimated that charges would be about T1k 80 to Tk 100 per acre (about US$3 to US$4 per acre). Actual collection is however minimal. A new draft “Irrigation Ordinance” was circulated in late 1982 and is soon expected to be signed by the Chief Martial Law Administrator. Changes from earlier ordinances refer mainly to the authority of BWDB Engineers to impose fines on people who abuse the systems. Until n-w, the engineers have to go to the Deputy Commissioner with their complaints. Enforcement of legislation, not its provisions, is the main problem however.

108. Low-lift pumps (LLP). In the past, the Government had the monopoly on the import of pumps, engines, and spare parts, and effectively controlled the supply of locally made pumps. Private dealers are now allowed to import, sell, and service irrigation equipment. Rental charges are now Tk 3,600 (US$147) for a 2-cusec pump and Tk 2,300 (US$94) for a 1-cusec pump during the dry season. Lower rates apply for supplementary irrigation during the wet season. Users pay the full costs of spares and fuel. Annual operating cost for a 2-cusec LLP, operating 800 hours per year, are now about Tk 30,000 (US$1,225). Until now, some 15,000 LLPs have been sold, while some 25,000 LLPs are still being rented.

109. Deep tubewells (DTW). Some 1,500 DTWs have so far been sold, while about 10,000 DTs are rented out. Rental charges are now

Table 3: CAPITAL AND RECURRENT COSTS, YUNLIN IA, FY1976 (US$)

	Canals	Tubewells, pumpstations	Drainage, levees, etc.	Total
CAPITAL WORKS				
Construction costs	719415	456515	627120	1803050
Repayment, interest	345150	306480	70210	721840
Salaries, Engineering Division (50%)	49585	-	32510	82095
Salaries, Mechanical Section (50%)	-	132035	-	132035
Total, capital works	1114150	895030	729840	2739020
	($16.5/ha)	($29.1/ha)[1]	($10,8/ha)	($40.5/ha)
RECURRENT COSTS				
Maintenance, repairs	1119365	172100	261835	1553300
Elecrricity	-	334535	-	334535
Emergency repairs	302635	46590	70515	419740
Communications	11270	1735	2625	15630
Salaries, Management Div. (excl. Mechanical Sec.)	473955	-	111175	585130
Salaries, Mechanical Section (50%)	-	132035	-	132035
Salaries, Engineering Division (50%)	66500	-	15595	82095
Salaries, HQ and Other Divisions	315000	48495	73400	436895
Small Group costs	247140	-	-	247140
Other expenses[2]	415170	799405	96740	1311315
Total, recurrent costs	2951035	1534895	631885	5117815
	($42.6/ha)	($26.0/ha)[1]	($9.3/ha)	($64.8/ha)
TOTAL, Annual Cost: $7121345		Budgeted Annual Cost: $8110720		

[1]The cost/ha for tubewells and pumping stations has been estimated on the assump- cion that the average area irrigated by each tubewell is 40 ha and that the area irrigated by each low-lift pump is about 6.6 times greater.
[2]Including collection of membership fees, property maintenance, research, settling water disputes, etc.
Source: Yunlin IA Statistical Yearbook, 1976, pp. 170-85.

Tk 3,400 (US$139) per year. Spares and fuel are sold at cost. New DTWs are sold at present to farmers at about one half of the cost (the equivalent shallow tubewell price).

110. Shallow tubewells (STW). All STWs are sold at about 90 percent of cost with credit provided by banks, when required. There is no rental program for STWs.

111. The strong demand for minor irrigation equipment and the willingness of farmers to pay a substantial premium over the official rates are indicative of the farmers' ability to pay for water.

ANNEX II

BANK EXPERIENCE WITH WATER CHARGES AND OTHER TAXES[1]

1. Water charges are the most common Bank requirement for funding O&M costs, and Bank policy emphasizes recovery of amounts sufficient to cover O&M costs (together with, in most cases, a "reasonable" proportion of capital costs). The underlying rationale is that farmers should be required to pay as much as is reasonably possible-within their ability to pay and without this acting as a disincentive--of the full cost of water diversion, storage, and distribution to their fields like any other input; this particular input should not be subsidized. Further, it is assumed that greater care would be taken by farmers to use water judiciously if they have to pay a charge. This would encourage better water management in the fields and, in turn, water savings. Fiscal considerations are also cited in support of water charges.

2. The Bank introduced covenants in the loan/credit agreements of the projects under review stipulating that the borrower would levy such water charges as to cover fully (or "recover") O&M costs. The Bank thus succeeded in having its cost recovery policy formally accepted by borrowers, although in several cases only after extended negotiations. For example, the Government of Malaysia argued strongly during negotiations that O&M costs were subsidized by

1 This was quoted from OED, Water Management in Bank-Supported Irrigation Project Systems: An Analysis of Past Experience, April.16, 1981.

the Federal Government, that water charges were collected by the State Governments, and that no mechanism existed for transferring collected funds back to the Federal Government.

3. During project implementation, it became clear that covenants do not guarantee introduction or increase of water charges. In eight cases, no action was taken by the respective governments: Indonesia I (where charges were not levied as originally intended), Indonesia II (where charges are not imposed, nor are they likely to be in the near future), Indonesia III and IV (where water charges are to be levied one year after rehabilitation is completed); MEXICO-San Juan del Rio and MEX1CO-Rio Colorado (where water charges remain at preproject levels); SRI LANKA-Lift Irrigation (where charges are imposed in only one of the subproject areas); and TRAILAND-Chao Phya Irrigation Improvement (no water charges have been levied on any irrigation project operated by RID in Thailand). Insufficient action was taken in three other cases: IRAN-Ghazvin (where farmers pay only 40 percent of O&M costs) and MNALAYSIA-Muda and MALAYSIA-Kemubu (where they recover 35 per- cent, and this only after gradually raising water charges from US$4/ha to USS9/ha)[1]. Thus, in 11 of 26 projects the relevant covenant was not fulfilled.

4. In four additional projects, no action was taken throughout implementation but water charges were established or raised after completion. In two cases, their levels were then still unsatisfactory. In COLOMBIA- Atlantico, water charges, which seem adequate to

1 This was not without Bank representation, particularly in Malaysia, where water charges remained a hotly debated issue throughout the investment phase of both the Muda and Kemubu projects.

cover O&M costs, were only collected in late 1973, some years after farmers in the first and second phase areas were getting the benefit of additional water. In PERU-San Lorenzo, little attention to cost recovery was paid until 1969 because of other urgent problems, conflicts on water allocation, unreliable and inadequate water supplies, and lack of government backing. In 1971, when all project works (except the small drainage component) had been completed, water charges were trebled. They were doubled again in 1976, becoming the highest water rates in Peru, but even if these charges were collected in full, they would cover only 65 percent of the O&M costs, excluding drainage. In SRI LANA-Drainage and Land Reclamation, no action was taken until all physical works were completed. In 1978, water charges were assessed at a level which, if and when collected, would cover about 30 percent of O&M costs. And in Turkey, farmers were paying less than 20 percent of O&M costs. Cost recovery through water charges was the subject of high-level policy discussions between the Bank and the Turkish Government throughout implementation. In Indonesia, Bank practice regarding water charges contrasts most strongly with that in Turkey. No satisfactory level of water charges is assessed or charges collected for any of the four completed projects; and no charges at all are levied on farmers under the second. The Bank has continued to lend, although making such lending contingent upon adequate and timely budgetary provision for maintenance. The Indonesian series, started at about the same time and on the same scale as the Turkish operations, now numbers fifteen projects, with total lending of US$735 million. There would seem to be a need to review Bank

practice in respect of the use of water charges or a means for cost recovery and to apply it with greater consistency among countries.

5. Governments had substantive reasons for avoiding, as .far as possible, the introduction or increase of water charges. First, in most countries, water is considered a free resource-for religious, natural, or historical reasons--or as something governments must provide free of charge. In MEXICO-Rio Colorado, water charges have never been increased because of expected farmer protests and political consequences. In Malaysia, local political pressures on state governments and poor relations between farmers and project authorities have been important reasons for the limited action taken on water charges. And in Madagascar, following the political unrest in 1972, the Government decided to reduce water charges by about 30 percent.

6. Second, governments' reluctance to levy or raise water charges is often operational. If project management cannot guarantee continuous and adequate water deliveries to most, or all, project beneficiaries, the government becomes liable. This factor was mentioned explicitly in the case of the Malaysian projects, but is implicit in several others. In contrast, reliable water supplies were explicitly mentioned as a key factor in both levying and collecting adequate water charges in the Philippines Upper Pampanga. Further, downstream farmers, who derived more benefits from the project because proper system operation had prevented water monopolization by upstream farmers,

show the best payment records.

7. Third, equity at national level, was not taken into consideration by the Bank in several cases. In 4alaysia, particularly, where water charges were hotly debated, the states involved, and especially Kelantan (home state of Kemubu), are among the poorest in average income. Further, farmers in richer states were still paying only a fraction for essentially similar services while project farmers were expected to pay fully in the poor states. Increasing water charges to the agreed levels would have made regional income distribution more unequal- besides being politically unacceptable.

8. There are cases, however, where water charges were promptly set or raised at required levels. In the two Korean projects, in. MEXICO-Region Lagunera and in PHILIPPINES-Upper Pampanga, water charges, which initially were quite low and did not cover preproject O&M costs, were progressively raised and currently cover these costs in full. In two other cases, CAMEROON-SEMRY and SENEGAL-River Polders, water charges also cover all O&M costs.

9. Experience under this set of projects further shows that it is not enough to set adequate water charges and collect them to secure funds for financing O&M costs. In the case of Senegal, the project agency, chronically short of local funds, used collected water charges to finance its general budget. As a consequence, maintenance suffered.

10. Setting water charges at levels sufficient to cover O&M- costs in full is one thing; maintaining them at that level over time, preventing their erosion due to inflation, is another. In most cases, water charges were established in nominal monetary terms by either an act of the legislature or an executive decision. Safeguarding their real worth over time requires periodic political decisions which some governments find difficult to introduce. The case of the Philippines is interesting in this respect. The act which established the water charges set them in kind (250 kg of paddy per hectare). Therefore, the real worth of water charges closely follows the inflation trends as typified by paddy prices.

11. Collection rates have been good where water charges were set at levels. In Korea, 96 percent of the assessments were collected in Pyongtaek (no figure is provided for Kumgang) and 97 percent for Yong San Gang. Collections are quite adequate in MEXICO-Region Lagunera, too, although PHILIPPINES-Upper no figure is reported. Collections have improved dramatically in Pampanga, from 23 percent in 1976 to 76 percent in the wet season of 1977 (falling to 60 percent in the dry season of 1979), but are still at a low level. Besides improved and more equitable water distribution, establishment of a billing system and formal procedures for collection have been important reasons for this considerable improvement. “Collection” rates are also good in Cameroon and Senegal, because the project agencies collect water dues through deductions from producer prices when paddy (and tomatoes in Senegal) are sent to the mill/factories for processing.

The collection rate is 87 percent for Senegal[1]; no figure is provided for Cameroon. In Korea, farmer groups assist in the collection; in the Philippines, farmer units headed by trained leaders have better repayment records.

12. The final point on water charges is whether they promote a ore efficient use of water at the farm level, i.e., whether farmers paying full water charges use less water per hectare--or use it more efficiently-than farmers paying less than that, who would not be expected to care for using efficiently a cheap or free resource. There is very limited information on water use or water efficiencies at the farm level, and this generally showed no association between water charges and water use. For instance, farmers in Turkey paid only 20 percent of total O&M costs and nothing toward capital cost recovery. Since the marginal cost of water was, for them, very low, they should have been expected to use large amounts of water. But they did not; other factors proved more important and they are using only 60 percent of total water available. In contrast, the low field efficiency reported might be construed as a demonstration that cheap water leads to inefficient water use. SRI LANKA-Lift Irrigation shows a similar development regarding the volume of water used. Farmers in five of the six project areas pay nothing toward O& costs. They would be expected to use inordinately Large volumes of water, and wasting a lot. Quite the opposite happened. Most of them did not even adopt irrigated agriculture, despite free deliveries of water. In contrast, farmers in the sixth subproject area, who pay USS50/ha per

1 It falls short of 100 percent because some farmers, who are theoretically required to sell all their paddy and tomatoes to the project agency for processing, sell some of it on the "free' market instead.

season, began to utilize irrigation water as soon as it was made available and have maintained a high rate of use. The audit report on IAN-Ghazvin explicitly addresses the question and concludes that there is no evidence that water subsidization has resulted in serious and continuous misuse of water by farmers. The audit report credits the project agency's tight control over the farmers as the main factor for such behavior. In conclusion, the limited information available suggests that other factors are much more important in determining farmers' water management techniques and criteria at the field level; the amount of water charges may be--if at all--one of these factors, and its actual weight among all factors would have to be independently assessed in each case.

3. A substitute for farmer contributions was devised in some cases. In Malaysia, after years of argument, the Bank eventually agreed to accept, as a substitute for the requested increase in water charges, the compulsory religious tithe zakat, which is proportional to the volume of production and thus reflects the increased productivity brought about by the projects. At audit, water charges together with land taxes and the zakat were sufficient to pay O&4 costs in full; in addition, funds remained to repay 20 percent of the projects' capital costs. In Indonesia, the regional land development tax, which all farmers must pay and which is adjusted periodically to means reflect levels of production, has been accepted by the Bank as an adequate of cost recovery on all recent irrigation projects; races will be revised every two years; collections have improved dramatically since appraisal. Thailand, an indirect tax--the rice export tax--is borne by those farmers who produce a marketable surplus.

14. Taxes as an alternative or complement to water charges offer some usually advantages. First, fiscal mechanisms for enforcement and collection are effective and efficient than those for water charges; penalties are more credible, too. Second, those taxes which are related to actual only volumes of production are more acceptable to farmers. These are to be paid grain after crops are harvested; uncertainties on yield and quality of the or produce on weather, labor, and market conditions are over. Payment is proportional to what farmers actually

get. Water charges, in contrast, are often collected before harvest. In such cases, water charges add to the production cost, which the farmers must incur well before having any harvest and when there are still uncertainties on yields, etc. Paying water charges, thus raises the “bec” put on a crop. Part of the success in raising water charge collection in the Philippines may be due to the new act, which made them payable in kind and after the harvest (para. 6.10), making them while more like a tax. And third, taxes are more likely to be progressive, water charges are strictly proportional. For example, the Thai export tax weighs more heavily on larger farmers, who produce marketable surpluses, and spares subsistence farmers. Therefore, the Bank currently accepts taxes as one of the alternative ways of collecting money from farmers to finance O&M costs.

15. Direct contributions. Whenever farmers are responsible for operations and maintenance below the tertiary outlet level, they must finance their costs directly. In Indonesia, Korea, the Philippines, and Thailand, farmers usually collect contributions to defray the water master’s salary, but some farmer groups in Indonesia have chosen to donate land at the bottom of the tertiary unit in lieu of wages, to ensure the water master’s interest in a more equitable water distribution. In INDONESIA-Second Irrigation Project, of paddy the value of these direct contributions has been estimated at 50 kg of paddy per farmer per year. Whenever such farmer contributions are sig- they should be computed as a payment against O&M costs, even if the “proceeds” never reach the executing agency. This is currently Bank policy.

16. Budgetary allocations. In most projects reviewed[1], O&M costs covered by budgetary allocations to the project authority. The Indonesian projects demonstrate how fragile this source of funds may be. Shortfalls in government finance for OUI services were noted by supervision missions, beginning as early as 1970. Amounts were inadequate: releases, late. The project agency for the Second Project had--and still has-budgetary flexibility and could thus cover shortfalls in the O&M budget from its construction budget. The agency in charge of the First, Third, and Fourth Projects lacked this flexibility, however, and had to wait for allocations in the budget of the following year to cover shortfalls. Because financial constraints were negatively affecting system maintenance, the Bank made pro- vision of the required funds in full and on a timely basis a condition for approval of the Seventh Irrigation Project (1976). Budget allocations have since proved adequate.

17. There is a second situation where O&M costs have to be financed through the budget: this is where it may prove difficult for a government to give better treatment--or perceived as being better-to a project area than that accorded to irrigation systems elsewhere in the country. If allocations for other systems are traditionally low, usually allocations for the project system will follow the same pattern. This is the case with PERU-San Lorenzo. There is no project-specific, only a sectoral or national solution for such a problem.

---

1 An exception is MADAGASCAR-Lake Alaotra, where the project agency was required to use earnings from its ancillary activities--marketing and paddy estate production-to supplement budgetary allocations. This condition resulted in disproportionate attention being paid to such activities.

----Dr. Alfredo Sfeir-Younis

Dzambling Cho Tab Khen

World Bank, 1983----