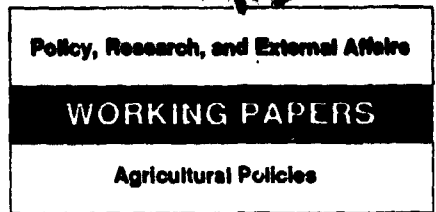


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Making Bank Irrigation Investments More Sustainable

Gerald T. O'Mara

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It is time to rationalize policy guidelines on Bank irrigation projects.

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Until 1976, Bank policy emphasized recovery of all costs on irrigation projects, or at least complete recovery of operating and maintenance (O&M) costs. Subsequently, policy specified three pricing objectives for the design of irrigation service fees: economic efficiency, income distribution, and public savings.

The objective of economic efficiency was framed in irrelevant terms and the detailed objectives for income distribution were unworkable. This left the objective of public savings — for which there are no clearcut instructions.

So between 1976 and 1988 no effective formal policy guidelines existed for cost recovery on irrigation — although the Bank was active in lending for irrigation in those 12 years.

No OED review of loan conditionality on cost recovery for irrigation has been produced for the period, but the 1986 OED review on the period before 1976 concluded that the record for the earlier period was not good.

In at least two-thirds of the projects reviewed, the covenant requiring cost recovery to cover at least O&M costs had not been honored. In many cases, the covenants covering cost recovery were so vague that it was difficult to judge if there had been compliance. Auditors found O&M of the irrigation satisfactory in only half of the projects.

Existing guidelines are inadequate, and the need for quality control is great, so O'Mara proposes six points as the basis for a new policy framework for Bank irrigation projects:

- Accept the diversity of cultures and institutional arrangements in borrowing countries and incorporate flexibility and ingenuity into the design of feasible irrigation institutions.

- Focus the Bank dialogue on the physical sustainability of irrigation investments and associated natural resources. In short, the Bank should be more flexible about institutional preferences but should insist more strongly on arrangements that preserve sustainability.

- Approach the financing of irrigation as a policy adjustment issue.

- Base cost-recovery policy on an analysis of the total complex of government interventions. Most countries prefer to impose direct and indirect taxes on agricultural commodity output although such taxes are often unjustified in terms of equity or cost recovery.

Decisions on the third and fourth points require thorough economic analysis.

- Assign tax policy instruments to appropriate policy objectives.

- Accept indirect cost recovery where it exists, but insist on an accounting of the equity issues associated with rent transfers for irrigation.

On the fifth and sixth points, analysis must take into account the welfare effects on the major groups involved. The appropriate objective for irrigation service fees (if there are no equity issues) is public savings or cost recovery.

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Making Bank Irrigation Investments More Sustainable

by
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I. INTRODUCTION

This paper is about sustainability of irrigation investments in both the financial and physical senses. Clearly the two senses are closely related, almost like difference sides of the same coin. Finance provides the claim on resources necessary to accomplish physical operations in an economic system, while physical operations provide a flow of services for which beneficiaries are willing to pay in terms of claims on resources (i.e., money). Thus stated, the matter seems only to require that private agents organize a market. The difficulty is that irrigation is almost never organized as a market for water. The reasons for this situation will now be sketched.

The use of man-made structures to alter the temporal and spatial distribution of water provided by the natural hydrological cycle goes back thousands of years. Yet the economic, political and legal issues associated with irrigation remain sources of conflict to this very day. Some societies regard the water from the hydrological cycle as a God-given commodity and object to arrangements which require payment for access to irrigation (for a review of water law systems, see Radosevich (1988)). Moreover, mother nature can be capricious in her distribution over time of rain and snow fall; and the bounty from nature tends to create its own pattern of distribution in the absence of human intervention.

The natural patterns of distribution are often taken as given by legal systems in assigning property rights to water. Thus, the riparian rights legal doctrine assigns rights of use to property owners whose land touches upon a stream, river, or lake created by natural drainage flows. When demand for use tends to exceed supply (in years of low flows) along parts of a natural drainage system, the historical rights legal doctrine often supersedes in an effort to establish well defined legal rights. However, this precedent-

based criterion--"first in time, first in right"--puts latecomers in a disadvantaged position and thus provides an incentive for promotion of investments that will increase the rate of capture of naturally occurring flows as well as facilitating their distribution over time. Since water rights are problematic in the absence of clear legal definition and effective enforcement, the supply available to any user depends on the actions of other users and potential users. This physical linkage between users makes it difficult to finance and organize irrigation investments privately, except in the case of tubewells abstracting from groundwater where land owners face no significant legal restraints and smallscale surface irrigation where several landowners each invest together. For a discussion of the economic effects of physical linkages between irrigating farmers, see O'Mara (1988). In simple consequence, irrigation supply comes overwhelmingly from investments by some branch of government, even in countries such as the US where custom strongly prefers private sector development.

When the stage of significant public sector investments is reached, the natural pattern of drainage is changed, and the allocation of water supply inevitably becomes a matter of public policy. Note, however, that distribution is constrained by topography and the large increase in cost that occurs when water must be pumped uphill. Despite this constraint, the introduction of surface irrigation to an arid or semi-arid region creates a production potential that is very large in relation to previous production. The value of this potential production when realized minus the social opportunity costs of all nonwater inputs defines the rent that is available to be distributed via public policy. To the extent that policy permits access to irrigation water at a price less than its marginal value in agricultural production, the irrigation rent is captured by land owners and ultimately capitalized into land values. Thus, charges for irrigation services inevitably have

strong distributional implications; and the determination of such charges is almost invariably subject to a political process. For example, a political leadership that assigns large irrigation rents to a favored group of land owners may create a powerful supportive constituency that will ensure political control over many years. The introduction of surface irrigation to more humid regions as a supplement to rainfed flows is similar except that the irrigation rent will be smaller per unit of land.

Given that irrigation supply comes largely from public sector investments, the related issues of financial and physical sustainability of supply tend naturally to be linked to the revenue and expenditure sides of government operations. That is, ultimately these issues are determined by the political processes that shape the institutional content of government operations. One institutional possibility is almost complete autonomy for irrigation system operations in both the financial and operational senses, permitting an irrigation organization highly specialized to its function in terms of administration, personnel, technology, operations and investment planning. Another possibility is the almost complete submersion of irrigation finance and operations within general government. The institutional options have significant implications for the efficiency of irrigation operations, and a strong case can be made for a more specialized, quasi-autonomous organization. However, in this paper the ultimate right of governments to choose preferred institutional forms is accepted; and the focus is on sustainability in both senses.

In the next section, two polar models of irrigation finance are discussed, followed by a discussion of quality control in irrigation and reviews of World Bank irrigation pricing policy, irrigation cost recovery and operations and maintenance funding conditionality experience and a discussion of some reasons for noncompliance with Bank irrigation

lending conditionality. Then a framework for the design of sustainable irrigation investments is presented and a summary of results and recommendations is given.

II. MODELS OF IRRIGATION FINANCE

Analytical characterizations of irrigation finance tend to conform to one of two polar types: 1) the fiscal autonomy model, and 2) the fiscal dependence model. The former emphasizes efficient delivery of a well-defined irrigation service, and the latter looks at irrigation as only one among many governmental activities directed toward agriculture.

The Fiscal Autonomy Model

This model consciously seeks the analogy of irrigation finance with the specialized finance of services such as electricity or telecommunications. It envisions a quasi-autonomous organization which supplies clearly specified irrigation services to a clientele of irrigating farmers in a river basin or similar natural irrigation unit. The irrigation organization controls investment, operations and maintenance decisions, assesses and collects irrigation service fees, and arranges long-term finance by issuing bonds. Irrigation service fees are set such that they cover costs. Intrinsic to the effective and reliable functioning of this model is an institutional context that enforces public accountability of the irrigation system management. This requirement must include public reporting of operations, maintenance, finance and investment activities (much in the manner of the reporting required of a private sector corporation in the U.S.) and annual audit by an independent auditor. It should provide for farmer and finance ministry representation on a review board that must approve budgets and investments. If government wishes to subsidize irrigating farmers, then the subsidies are paid to the

Irrigation organization in return for setting fees at a level that is less than cost. In principle, the irrigation organization has an incentive to provide services efficiently (if it is diligently monitored) and should provide no more or less service than farmers are willing to pay for. In practice, once subsidy is admitted, the simple efficiency claims for the fiscal autonomy model no longer hold. In addition, once sustained operation comes to depend on subsidy, it is very likely that the irrigation organization will no longer be as responsive to farmer demands.

The Fiscal Dependence Model

This model views governments as irresistibly drawn to intervene in agriculture by means of taxes or subsidies on the prices of outputs and inputs, by means of investment in infrastructure, research and extension, and by means of services such as irrigation, pest control, marketing of outputs and inputs, commodity inspection and grading. From this perspective, the provision and pricing of irrigation services is simply one among many interventions by government, and both efficiency and equity concerns require the consistency of irrigation policy with the other governmental interventions in agriculture. The fiscal dependence model finds no special merit in either financial or operational autonomy. Irrigation revenues are collected in the same fashion as any other tax, and irrigation investments, operations and maintenance are part of the general government budget and subjected to the same fiscal scrutiny. Thus, routine maintenance of an irrigation system must promise marginal returns equal to the marginal cost of government revenue even in times of fiscal stringency if it is to be fully funded on a sustained basis. It also follows that there is no necessary connection between payment of irrigation service fees and the financing of irrigation investments, operations and maintenance. Moreover, the information and high level management requirements for determination of

consistent, efficient and equitable policies toward agriculture are increased by at least an order of magnitude. In consequence, many developing country governments are unable to generate policies toward agriculture that are consistent, efficient and equitable.

III. THE GROWING CONCERN OVER QUALITY CONTROL IN IRRIGATION CONSTRUCTION, OPERATIONS AND MAINTENANCE

Quite quietly Bank staff directly concerned with irrigation lending have increasingly identified an alarming trend toward loss of control over crucial aspects of quality in Bank financed irrigation projects at both the stage of construction and the subsequent stage of operations and maintenance. Thus, staff with technical functions now think of project sustainability largely in physical terms. That is, an investment is not as sustainable as it should be because of shoddy construction using inferior materials or because of poor management of operations and maintenance (O&M). As two technical staff members wrote to us: "Massive special maintenance budgets or rehabilitation only 10 to 15 years after construction is not the best way to reach sustainability." Thus, the issue of project sustainability goes way beyond the issue of providing adequate funds for O&M as well as construction.

Bank irrigation staff in Asia region have developed a proposed policy response to address the emerging problem of physical sustainability that deserves repetition here. The suggested policy response is itemized in descending order of priority as follows:

- (a) Institutional arrangements should be in place to meet the various objectives of water resource development and exploitation. In general, this means an organizational framework with rules of operation and staffing which allow the various specialist functions (planning, design, construction, O&M, and regulatory) to be carried out by specialized staff.

- (b) For Operations, this requires rules and procedures for serving all potential customers (agricultural, municipal, and industrial). Such rules should define priorities and rights in times of shortage or excess, and define how temporary surpluses (during project construction) would be allocated and withdrawn over time. Within irrigation projects, rules for allocating water among farmers, the basic allocation (water right) of each farmer in the "design year", the responsibilities of the beneficiaries for specific items of operation or maintenance and the penalties for non-compliance should also be established.
- (c) For Maintenance, this means an organization with funding, equipment, and materials adequate to maintain facilities to their design standard of performance indefinitely. Provision of such resources as are required to meet this objective should be an explicit requirement in legal agreements.
- (d) Maintenance of accounts reflecting actual expenditures on O&M, and the sources of funds for such works (separately identifying revenues from water charges).
- (e) Establishing the basis for assessing water charges for each class of water (basic allocation, interim surpluses during construction, annual surpluses).

While the proposed policy clearly envisions at least a modified fiscal autonomy institutional framework, with minor changes to reflect the absence of a return flow of water charges that characterizes the fiscal dependence model it can be used as a standard for construction and O&M within the fiscal dependence institutional framework.

This would, however, require explicit agreements with respect to organization, staffing and funding of O&M that are not always part of the context of fiscal dependence. Experience of irrigation staff has been that where these conditions do not obtain, gross deterioration in project sustainability is much more likely; and this means when it occurs that irrigation projects are converted from ostensible investments to disguised consumption subsidies through failure to maintain capital. It is clear that such projects do not constitute development in any meaningful sense. On the contrary, with the proposed framework in place, it can be argued that: those responsible for operating and maintaining projects would be provided with the facilities required; projects would be maintained; all beneficiaries would have a clear basis for planning their operations with the maximum degree of assuredness; and the real cost of providing water resources to various users would be known. It can also be argued that the proposed policy is utopian in that it presupposes a degree of lender leverage that the Bank very seldom enjoys, to say nothing of its neglect of a hard-nosed analysis of the real incentives for action that confront politicians drafting legislation or authorizing budgets directed toward irrigation as well as those incentives facing bureaucrats managing irrigation systems. Yet the primary issue remains. Some of the Bank financed irrigation systems are falling apart, and what is going to be done about it?

IV. WORLD BANK IRRIGATION PRICING POLICY

From the beginning, Bank policy emphasized recovery of all costs from project beneficiaries. This policy was re-affirmed by Operational Policy Memorandum (OPM) No. 2.61 (March 1971), which admitted that agricultural projects were sometimes an exception, but

added that "as a minimum, operational and maintenance (O&M) costs should be recovered completely." This was the policy in place for the sequence of irrigation projects assessed in the latest Operations Evaluation Department (OED) review ("World Bank Lending Conditionality: A Review of Cost Recovery in Irrigation Projects", June 1986), which is discussed below.

However, cost recovery policy was significantly changed in 1976 with Central Projects Memorandum (CPM) No. 8.4, which imposed detailed instructions with respect to the progressive taxation of incremental project rents. The policy of CPM 8.4 was slightly revised to provide more flexibility in implementation by Central Project Note (CPN) No. 2.10 in 1980. This policy statement, which is now called OPN 2.10, is operant current policy.

The policy instructions of OPN 2.10 set forth three pricing objectives for design of irrigation service fees: economic efficiency, income distribution and public savings. The instructions under each objective will be discussed in turn.

Economic Efficiency

The instruction is in terms of "efficiency prices", which are not defined, and it recommends volumetric pricing (where possible) of irrigation service fees. Clearly it is intended that utility maximizing farmer irrigators should be given an incentive to apply irrigation water up to the point at which the value of the expected utility from an additional unit of water would be equal to its marginal cost. If all farmers have the same expected utility and the private marginal cost (i.e., unit irrigation service fee) is equal to the marginal social cost of irrigation water, then the marginal condition for economic efficiency (Pareto optimality) is met. However, only a tiny minority of irrigating farmers in developing countries face volumetric pricing of water and can obtain additional water on demand (even within limits). All other farmers receive an exogenously determined

allocation that varies stochastically from period to period (this neglects the fortunate few that have a tubewell). Such farmers form expectations of how much water they will receive (and when) over a cropping cycle and allocate the expected quantity so as to maximize their expected utility. That is, they allocate expected deliveries to given crop acreages according to farm specific shadow prices. The irrigation service fee (usually area based) is perceived as a lump sum tax which is irrelevant to their water allocation decision. The quantity allocation to farmers, insofar as system design permits choices, is accomplished by the irrigation system managers under guidelines from their political masters. There is no reason why such an allocation cannot be efficient. To achieve efficiency consistently, however, requires appropriate incentives for system managers, detailed information on the value of the marginal product of water across farm types and regions, and for many countries enabling legislation. OPN 2.10 does not consider these possibilities, but rather notes that "other methods of assessing charges may also have to be considered to ensure an equitable income impact of the project and an adequate recovery of project costs."

Income Distribution

This instruction is seemingly more precise. It asserts that taxes (irrigation service fees) to capture a share of project benefits should take into account the ability to pay of different farmers. That is, benefit taxes should be progressive although "taking into account disincentives, tax evasion and problems of cost collection." The indicator of benefits is the incremental value at the farm level of what we have called the irrigation rent (net of irrigation service fees or their equivalent). Farmers below a critical consumption level (CCL) would not be taxed, while those above that level would be taxed progressively as income increased above the critical level. Note that this instruction

requires the calculation of income on a farm by farm basis, although a proxy such as farm size or marketed output might be used, and then assessing irrigation service charges under a progressive schedule. The information requirements for implementation of this instruction are considerable, as are the opportunities for arbitrary assessment by tax collectors. Moreover, the income distribution instruction is totally at variance with the thrust of the economic efficiency instruction.

Public Savings

This instruction aims at increasing the volume of investable resources in the hands of the government in preference to additional consumption by at least the more affluent citizens. However, it recognizes a potential conflict with the income distribution objective if many of the project beneficiaries are poor. It is noteworthy for the absence of any instructions on project sustainability or replicability.

In summary, existing policy guidelines provide little guidance in applying multiple criteria for pricing of irrigation service fees. In particular, the income distribution instruction seems unworkable and inconsistent with the spirit of the economic efficiency instruction. The project analyst is left free to develop his own weights for the several objectives; and in that sense, anything goes. One suspects that the unworkable income distribution guidelines have mostly been ignored. The spirit of OPN 2.10 is clearly laissez faire. It recognizes that "efficiency pricing" may be in conflict with the other objectives and suggests that other forms of taxation, such as a land tax or a betterment tax might be substituted. Presumably these taxes may be set at levels which do not conflict with other objectives. The instruction on benefit taxes also advises that the effects of a project on revenues from other taxes should be taken into consideration, i.e., increments in other revenues due to the project should be deducted from the irrigation rent on

which water charges or benefit taxes may be levied. OPN 2.10 goes on to observe that: "There is no prima facie reason why any particular share of costs, such as O&M costs, should normally be recovered."

A further note on financing operations and maintenance (O&M) was issued by OPS in 1984. This note asked that assurances be required (at the appraisal stage) that sufficient funds would be available for O&M. It also specified that there should be an analysis of how the fiscal system affects farmer incentives. Perhaps most interestingly, the 1984 note did not require that O&M costs be covered by direct cost recovery from project beneficiaries. It should be noted that none of these instructions asked for an analysis of the consistency of the many government interventions in agriculture with the proposed scheme for irrigation service fees. In particular, there was no reference to an analysis of direct and indirect taxation of agricultural outputs. Nor was any justification ever given for using irrigation water fees as a vehicle for income redistribution when much more efficient means for targeting the poor were available.

V. A BRIEF REVIEW OF BANK EXPERIENCE WITH IRRIGATION COST RECOVERY CONDITIONALITY

This section summarizes documented Bank experience and is based on the aforementioned OED review of June 1986. As noted above, the review covers the period up to 1976, when relatively unambiguous policy guidelines were in place. The long gestation period for implementation of irrigation projects and the lack of consistent guidelines over the 1976-88 period make it likely that the appearance of a similar review for that period is some years away.

Since the overall assessment of Bank experience given in the summary of the 1986

OED review is clear and concise, it is repeated here:

"Overall, the cost recovery record in irrigation projects has not been good. Frequently, the Bank's requirements as expressed in lending covenants, particularly with respect to recovery of investment costs, have been so vague that compliance or noncompliance is difficult to determine. In at least two-thirds of the projects reviewed the covenant requiring that cost recovery satisfy O&M funding has not been complied with. The proportion of O&M costs recovered was frequently between 15 and 45 percent. In addition, there were very few cases where capital costs were recovered."

The OED report goes on to note that O&M of irrigation systems was considered satisfactory at audit in only about half of the projects. Compliance with cost recovery covenants was assessed as satisfactory in only 15 percent of the cases. When the pricing covenants required a socio-economic survey and it was implemented, the recommendations were "generally not applied". The response of Bank operations staff to noncompliance with cost recovery covenants has been quite variable, covering the gamut from refusal to consider further financing of irrigation projects to no reaction at all.

VI. SOME REASONS FOR NONCOMPLIANCE WITH IRRIGATION LENDING CONDITIONALITY

The 1986 OED review on irrigation cost recovery singles out three major reasons for the record of noncompliance with cost recovery covenants: I) the often heavy burden of direct and indirect taxes already imposed on agriculture; II) unreliable water supply due to poor O&M of irrigation systems; and III) the lack of government commitment. The evidence with respect to each reason will be briefly assessed in turn.

Direct and Indirect Taxes on Agriculture

The most comprehensive and consistent evidence on direct and indirect taxation of agriculture comes from the World Bank comparative study of the political economy of agricultural pricing policies directed by Anne O. Krueger, Maurice Schiff & Alberto Valdes (hereinafter KSV). This study provides estimates from country-level research studied for eighteen developing countries. The initially published results focus on the impact of direct and indirect policies on the prices of major export and import-competing commodities. For details of the KSV methodology, the reader is referred to their published papers.

Table 1 (from KSV) presents their estimates of nominal direct, indirect and total intervention for representative export crops in sixteen countries over the period 1975-79 and 1980-84. The numbers on direct intervention give an estimate of the percentage by which domestic producer prices deviated from the border price (adjusted for transport, storage, other costs and quality differentials) measured at the official exchange rate. The estimates of indirect effects make allowance for the effect of trade and macroeconomic policies on the real exchange rate and the extent of protection given to nonagricultural commodities. The total effect is simply the sum of the direct and indirect interventions. For the sixteen countries and representative export crops listed in Table 1 the total of direct and indirect taxation of agricultural exports averaged about 40 percent over the 1975-84 period. For most countries, there was significant taxation of exports at both the direct and indirect levels. All of these countries are Bank borrowers, and many have borrowed to finance irrigation projects--e.g., Egypt, Malaysia, Pakistan, Philippines, Portugal, Sri Lanka, Thailand, and Turkey. Clearly, the dominant pattern is one of heavy taxation of agricultural exports, with indirect taxation via trade and macroeconomic policy accounting for about two-thirds of the total on average.

Table 1: Direct, Indirect, and Total Nominal Protection Rates for Exported Products (percent)

Country	Product	1975-79			1980-84		
		Direct	Indirect	Total	Direct	Indirect	Total
Argentina	Wheat	-25	-16	-41	-13	-37	-50
Brazil	Soybeans	-8	-32	-40	-19	-14	-33
Chile	Grapes	1	22	23	0	-7	-7
Colombia	Coffee	-7	-25	-32	-5	-34	-39
Cote D'Ivoire	Cocoa	-31	-33	-64	-21	-26	-47
Dominican Repub	Coffee	-15	-18	-33	-32	-19	-51
Egypt	Cotton	-36	-18	-54	-22	-14	-36
Ghana	Cocoa	26	-66	-40	34	-89	-55
Malaysia	Rubber	-25	-4	-29	-18	-10	-28
Pakistan	Cotton	-12	-48	-60	-7	-35	-42
Philippines	Copra	-11	-27	-38	-26	-28	-54
Portugal	Tomatoes	17	-5	12	17	-13	4
Sri Lanka	Rubber	-29	-35	-64	-31	-31	-62
Thailand	Rice	-28	-15	-43	-15	-19	-34
Turkey	Tobacco	2	-40	-38	-28	-35	-63
Zambia	Tobacco	1	-42	-41	7	-57	-50
Average		-11	-25	-36	-11	-29	-40

Source: Krueger, Schiff, and Valdes, 1988, "Agricultural Incentives in Developing Countries," World Bank Economic Review 2(3):p.262.

Note: Korea and Morocco are not included because all main agricultural products are imported.

The direct nominal protection rate is defined as the difference between the total and the indirect nominal protection rates, or equivalently as the ratio of (1) the difference between the relative producer price and the relative border price, and (2) the relative adjusted border price measured at the equilibrium exchange rate and in the absence of all trade policies.

Table 2 (from KSV) presents comparable data for representative import-competing food crops in 16 countries. In contrast to the export crops, which were taxed at both the direct and indirect levels on average, the import-competing commodities are usually given significant direct protection, but then are indirectly taxed at higher rates so that the total effect is taxation of import-competing crops on average by about five percent. However, if two countries which have given exceptional protection to rice--Korea and Malaysia--are excluded, the average for total protection changes to -15 and -18 percent for the two periods. Some countries tax import-competing commodities at both levels,

achieving total protection of about -60 percent in the cases of Pakistan (wheat) and Zambia (corn).

Table 2: Direct, Indirect, and Total Nominal Protection Rates for Imported Food Products (percent)

Country	Product	-----1975-79-----			-----1980-84-----		
		Direct	Indirect	Total	Direct	Indirect	Total
Brazil	Wheat	35	-32	3	-7	-14	-21
Chile	Wheat	11	22	33	9	-7	2
Colombia	Wheat	5	-25	-20	9	-34	-25
Cote d'Ivoire	Rice	8	-33	-25	16	-26	-10
Dominican Repub.	Rice	20	-18	2	26	-19	7
Egypt	Wheat	-19	-18	-37	-21	-14	-35
Ghana	Rice	79	-66	13	118	-89	29
Korea	Rice	91	-18	73	86	-12	74
Malaysia	Rice	38	-4	34	68	-10	58
Morocco	Wheat	-7	-12	-19	0	-8	-8
Pakistan	Wheat	-13	-48	-61	-21	-35	-56
Philippines	Corn	18	-27	-9	26	-28	-2
Portugal	Wheat	15	-5	10	26	-13	13
Sri Lanka	Rice	18	-35	-17	11	-31	20
Turkey	Wheat	28	-40	-12	-3	-35	-38
Zambia	Corn	-13	-42	-55	-9	-57	-66
Average		20	-25	-5	21	-27	-6

Source: Krueger, Schiff, and Valdes, 1988, "Agricultural Incentives in Developing Countries," World Bank Economic Review 2(3):p.263.

Note: Argentina and Thailand are not included because their main food products are exported.

Turkey was a net exporter of wheat in some years, and in the Dominican Republic rice was not traded in some years.

The Direct nominal protection rate is defined as the difference between the total and the indirect nominal protection rates, or equivalently as the ratio of (1) the difference between the relative producer price and the relative border price, and (2) the relative adjusted border price measured at the equilibrium exchange rate and in the absence of all trade policies.

While discrimination against agriculture is well known, the KSV results provide quantitative measures of the degree of bias against agriculture. In the face of such massive direct and indirect taxation of agricultural commodities, it is not surprising that farmers resent additional taxation. Nor is it surprising that many governments are reluctant to impose additional taxes on farmers. In fact, many of their direct agricultural

interventions, e.g., subsidies on irrigation water, fertilizer, pesticides and credit, are in the nature of second-best measures designed to offset (at least partially) the disincentives to agricultural output from macroeconomic, trade and agricultural pricing policies.

Unreliable Water Supply

If operations and maintenance are not adequate, or if the irrigation system is poorly designed, water supply may not be dependable. In such circumstances, farmers are understandably reluctant to pay irrigation service fees, particularly if they are confident that system managers will not cut off their supply for nonpayment. Since the design of irrigation systems in most developing countries prevents system operators from discriminating between paying and nonpaying farmers, the threat of loss of supply seems remote to many farmers. Moreover, in most cases, system operators do not depend on irrigation service fees for finance of O&M. Thus, while good O&M may be a necessary condition for adequate direct cost recovery, it is not sufficient since many countries follow the fiscal dependence model which commingles irrigation fees with general government revenues and finances irrigation O&M from the general government budget. Bank policy and practice have often implicitly assumed that governments follow the fiscal autonomy model of irrigation service provision when in fact they do not. In addition, as Wade (1979, 1982) has demonstrated, in some countries O&M funds are used by the irrigation system managers for private rent collection. In the light of these hard realities, many irrigation economists now argue that taxation of agricultural output or a tax on agricultural land value are more efficient methods of cost recovery since farmers are not asked to pay for ineffective or unreliable irrigation services that fail to produce a net gain in value of production, or equivalently in land values. Of course, taxation of

agricultural commodities inevitably means taxation of marketed agricultural surplus since farm or village level transactions are virtually impossible to tax in the sense of yielding positive net revenue.

To the extent that the conditions of the fiscal autonomy model of irrigation service provision are met, the linkage of O&M with collection of irrigation service fees is real. Farmers will understand that their fees finance O&M, and irrigation managers will seek to efficiently collect service fees since they finance their own salaries and perquisites. In such an institutional context, the participation of farmers in tertiary and quarternary level O&M is more natural, though not without problems of the free-rider sort. Bank experience with water user associations is still quite limited, and the results are quite mixed. However, given an institutional context of fiscal autonomy, farmers will quite naturally monitor the activities of the irrigation system managers; and in such cases, it seems sensible to formalize the monitoring role by electing farmer representatives to boards of directors who oversee irrigation system management.

Government Commitment

In the final analysis, unless the government of the country is committed to a policy and stands ready to implement it, the policy is null and void. Thus, any and all failures in compliance with covenants to loan agreements can be regarded as due to a lack of government commitment. Equivalently, it can be said that such failure also reflects a lack of commitment on the part of the lending institution when it asks for a covenant that experience and good judgement suggest will not be honored in practice. Certainly, the Bank has been guilty of insisting on cost recovery policies that clearly are inconsistent with the policies of borrowing government, especially when the implied charge is for a particular project. A continuing dialogue with such a government, through special studies

and policy-based lending, may be a more efficacious approach to sustainability and replicability of infrastructure investments than covenants inserted in loan agreements on a project by project basis. A case in point is the government of India which has stated in writing more than once that its policy is different and that it does not expect irrigation projects to generate revenues or recover costs to ensure sustainability after completion.

VII. A FRAMEWORK FOR DESIGN OF SUSTAINABLE IRRIGATION INVESTMENTS

The previous discussion, by reviewing the Bank's experience with conditionality on irrigation project lending and considering the major reasons for noncompliance with irrigation lending covenants, has highlighted the growing dissatisfaction with past practice. In particular, the record of substantial noncompliance with covenants requiring adequate funding of operations and maintenance implies there exists a real hazard of physical nonsustainability of irrigation investments. It remains to synthesize the hard lessons from experience into a better framework for irrigation lending. We believe that the lessons from experience and straightforward application of economic understanding can be boiled down to a set of propositions that do indeed comprise the better framework that is needed. These propositions are presented and discussed in sequence.

1. Accept the diversity of cultures and institutional arrangements in borrowing countries and substitute flexibility and ingenuity in place of rigidity in designing feasible irrigation institutions sufficiently robust to meet the demanding operational and maintenance requirements of contemporary irrigation. In the past, zeal for the fiscal autonomy model has led the Bank to insist on cost recovery covenants that are not acceptable to some borrowing countries. This is not to deny the evident virtues of the

fiscal autonomy model of irrigation finance, but simply to recognize that some countries have objections to it that are deep-seated. In general, countries that find the fiscal dependence model of irrigation finance more acceptable, i.e., virtually all former British colonies, will have some problems with the fiscal autonomy model. Moreover, they are correct in their concerns for the narrow focus of the fiscal autonomy model. It does not take into account other government interventions that impact on farmers.

The fiscal autonomy model is optimal for a first-best world in which other interventions by government are neutral with respect to resource allocation and distributional policy is handled by lump-sum taxes. However, its single-minded application to a second-best world offers no assurance that such application would lead to an improvement in either efficiency or equity. Of course, where fiscal autonomy is acceptable to the borrower, design of project sustainability should recognize and build on the opportunity for greater autonomy and professionalism in irrigation system management. Second-best issues can be accommodated within the institutional context of the fiscal autonomy model.

2. Focus the dialogue concerning irrigation upon the physical sustainability of irrigation investments and the associated natural resources. We have seen that irrigation staff have identified a growing trend toward loss of quality control in both the construction and O&M stages of irrigation systems that threatens the physical sustainability of irrigation investments. Unlike the discussion of finance and cost recovery in irrigation which needs to be approached at the sectoral and fiscal levels, physical sustainability is most naturally discussed at the project level. Here it is important to distinguish between the finance of and the implementation of irrigation investments. Technical irrigation staff assign significant emphasis to decisions during

planning, design and construction as major determinants of project sustainability. It should be noted that these activities occur during the period of active Bank involvement, i.e., the stages of appraisal and project supervision. For this reason, some may argue that existing policy properly interpreted is sufficient to deal with problems of quality control. On the other hand, the comments and proposed policy changes by Asia technical staff (in section III) imply that existing practice has been inadequate; and a need exists for detailed policy instructions that prescribe a sequence of steps designed to correct the problem. It is probably premature to take that step, but the evidence from Asia (where most of Bank irrigation lending has been centered) is highly cautionary. More active Bank involvement at the planning, design and construction stages is clearly indicated. In particular, active testing of construction quality should be initiated. Supervision of public construction has always been a problem in both developed and developing countries since the responsible officials and the contractor agents are exposed to moral hazard in the absence of active monitoring.

Unlike the earlier phases that end with construction, operations and maintenance commence after the period of active Bank involvement. Yet adequate funding of O&M though important is only one component of an "O&M Plan" that technical staff insist should be in place at the time of appraisal. This step forces the borrower to identify financial requirements for O&M early in the project cycle and opens the door for influential inputs from Bank appraisal teams in tailoring the level of effort to what is reasonably required. Once Bank staff close a project, any further impact depends on monitoring of borrower performance with respect to loan covenants. The existence of a detailed O&M plan greatly facilitates monitoring of compliance and removes ambiguities that may cloud the issue. Disregard of an O&M covenant should set off an alarm requiring a strong response

by the Bank. Continued noncompliance would require cessation of all irrigation lending if the Bank is to retain credibility with respect to its irrigation portfolio. While very rarely circumstances might exist which would justify an exception to this rule, the open-ended application of an exceptions clause would render the rule useless. A viable compromise would require that all exceptions be approved by senior management in the operations committee.

Quite clearly, sustainability as applied to irrigation projects must be interpreted broadly to include the environment as well as physical irrigation investments (with the sole exception of nonrenewable groundwater resources). It makes little sense to insure that investments in physical structures are sustained and then neglect environmental impacts which affect the economic productivity of the investments or the productivity of the natural environment within which the investments are embedded. For a discussion of sustainability as applied to irrigation, see O'Mara (1988).

The environmental issue that is typically encountered in surface irrigation projects is that of waterlogging and salinization due to inadequate drainage. Project planning and specification should make provision for adequate drainage in all projects. This does not mean that drainage investments need to be constructed prior to a realized need, but rather that a foreseeable future drainage requirement should be treated as integral to the project. That is, discounted costs and benefits due to future drainage investments should be included in the calculation of the overall project rate of return. However, drainage investment costs would not be included in the project loan. Rather, they would be treated as a necessary future time slice investment.

3. Approach the finance of irrigation operations, maintenance and replacement as a policy adjustment issue rather than an issue of project design. Most of the irrigation

projects financed in countries with major irrigation infrastructure, i.e., most of the Bank-financed irrigation projects, are ultimately managed by large, existing bureaucracies for which the additional capacity from the project is small in relation to the total capacity managed. They are most unlikely to change existing practices simply to accommodate a small increment to total capacity. If they do seem to accept a covenant in a project lending document that would appear to require such change, the result may simply be that some other canals of the system will temporarily receive less O&M funding. It is not clear that anything has been gained by the transfer of funds induced by such a project loan covenant. On the other hand, conditionality attached to policy-based lending could and should apply to the entire system. Such considerations apply with particular force to countries that operate according to the fiscal dependence model since there is no linkage between direct cost recovery and financing of O&M. Even in countries that operate according to a modified fiscal autonomy model, the setting of irrigation service fees will almost always involve some element of subsidy. The level of this subsidy should take into account other government interventions, and it is therefore more easily handled as a policy adjustment issue.

4. Base policy on an analysis of the totality of government interventions. The basic problem with a second-best world is that there is no assurance that any single intervention will provide an improvement in either efficiency or equity without conducting an analysis of the impact of all government interventions. This is a daunting requirement and causes analysts to seek approximate answers which require less information and lead to a more transparent analysis. However, the choice of the right approximation and its interpretation for policy purposes is skill intensive. In this sense, the proposed policy guideline remains essentially true. In one way or another, the analyst must take account

of the totality of government intervention in assessing the impact on a given sector or group of people. The previous discussion of the indirect impact on agriculture of macroeconomic and trade policy as quantified by Krueger, Schiff and Valdes has shown that anything less will be inadequate. This does not mean that agricultural, natural resource and irrigation economists concerned with irrigation lending must be retrained to acquire macroeconomic skills. It does mean that the macroeconomists working on country policy problems must be part of the team reviewing both project and policy lending related to irrigation; and that on occasion it will be necessary to bring in consultants with the specialized skills needed to assess overall policy impacts. As a first approximation, it would seem desirable that country macroeconomists use the Krueger-Schiff-Valdes methodology to determine indirect commodity-specific impacts of macroeconomic and trade policy.

5. Assign tax policy instruments only to appropriate policy objectives. The need for this proposition should be evident from the problems generated by the failure of efforts to overload irrigation service fees with multiple objectives. As Tinbergen demonstrated decades ago, only one policy target can be assigned to a policy instrument if unequivocal results are to be obtained. Given the multiplicity of government interventions in all countries, the problem is not a lack of instruments but their appropriate assignment and the determination of instrument levels that best achieve overall welfare. Of course, the decisions that tradeoff gains and losses for various policy objectives are set at the highest political level, and these are typically resolved through the budgetary process. Budget requests from various elements of government are assessed by budgeting offices or treasuries, and revised allocations are returned in a multi-stage, iterative process. When playing a role in the budgetary game, no finance minister or budget office director

with his wits about him is going to look on irrigation service fees as an instrument of achieving income distributional objectives. In the first place, farmers receiving irrigation services are not the poorest of the poor. These are landless laborers and rainfed small farmers. Secondly, to attempt to collect a tax by discriminating between irrigation recipients on the basis of income is unworkable. There are better instruments for achieving income distributional targets.

At first glance, it is not clear whether economic efficiency or cost recovery is the proper assignment of irrigation service fees. However, when irrigation services are not priced volumetrically and available to irrigators on demand, then irrigation fees are properly perceived as lump-sum taxes. Since these restrictive conditions obtain for only a tiny minority of irrigators in developing countries, for the vast majority of farmers irrigation fees are irrelevant to their water allocation decisions. They do the best they can with the amount of water they expect to get from the irrigation system by assigning a personal scarcity price to water and allocating what they expect to get on their land in such a way as to maximize their private welfare. Thus, we are left with cost recovery to achieve resource and project sustainability as the appropriate assignment of irrigation service fees (except where water is priced volumetrically and available on demand). Some analysts have argued that the transfer of large irrigation rents induces a political demand for irrigation services that results in excessive investment in irrigation (cf. Newbery (1987)). However, this is not an argument over the marginal conditions for Pareto efficiency, but rather is concerned with the political economy of large irrigation subsidies. The optimal setting of irrigation service fees for cost recovery should certainly be sufficient to avoid excessive political demand for irrigation subsidies.

6. Accept indirect cost recovery as valid where it exists, but insist on a rigorous accounting of the equity issues of irrigation rent transfer. Funds are fungible. If government is recovering costs indirectly, this is sufficient in principle to assure sustainability. However, the equity issues need to be confronted. These can be discussed in terms of tradeoffs of distributional benefits between three pairs of groups: (I) farmers vs. nonfarmers, (II) rainfed vs. irrigated farmers and (III) poorer vs. richer irrigated farmers. The farmers vs. nonfarmers tradeoff occurs via indirect cost recovery. Where significant indirect cost recovery exists, farmers are being taxed in preference to taxing nonfarmers; and the case for further taxation of farmers is very weak. Rather nonfarmers should be asked to assume more of the tax burden. If rainfed farmers are carrying a significant part of the incidence of indirect taxation, then a strong case exists for direct taxation of irrigated farmers via irrigation service fees in order to recover the costs of irrigation. In addition, a reduction of the indirect tax burden on rainfed farmers is recommended since irrigation costs can be recovered directly from irrigated farmers and rainfed farmers should not be taxed when the benefits go to others. Note, however, that rainfed farmers are burdened by the incidence of indirect taxes only to the extent that they purchase non-labor inputs and market indirectly taxed agricultural outputs. Finally, as we have seen, the attempt to discriminate between richer and poorer irrigated farmers via differential irrigation service fees uses the wrong tax instrument and is to be avoided. In addition, to the extent that irrigation investments result in lower prices for nontradeable foods, the irrigation benefit is transferred to consumers of these goods.

Clearly, the equity issues of irrigation rent transfers require analysis of the distributional effects of government interventions on both the demand and supply sides.

This can be done, but it requires skilled analysts and usually some data collection. General principles and some applications to agriculture are discussed in the volume edited by Newbery and Stern (1987), especially Chapter 13 (by Newbery) and Chapter 16 (by Sah and Stiglitz).

To deal with countries, such as India, which reject direct irrigation service fees and claim that irrigation rent transfers are part of a distributional policy, would seem to require a complex analysis of distributional effects. Moreover, the results might indicate the need for extensive tax adjustments. For less refractory borrowers who accept the principle of irrigation service fees, a less complex analysis should be adequate in many cases. In general, one would expect that significant irrigation service fees would be indicated. If direct cost recovery is to be meaningful, these fees must be indexed, either to an index of prices received by farmers or to a cost of living index. The analytical work required to confront the equity issues of irrigation rent transfer is best carried out in connection with policy-based lending. Repetition of this specialized work for each irrigation project would be unnecessary and wasteful.

VIII. SUMMARY

Up to 1976, Bank policy emphasized recovery of all costs, or at a minimum complete recovery of operations and maintenance costs. Subsequently, policy specified three pricing objectives for design of irrigation service fees: economic efficiency, income distribution and public savings. The economic efficiency objective was framed in irrelevant terms, while the quite detailed income distribution objective instructions were unworkable. This leaves the public savings objective for which there were not any clear-cut,

unambiguous instructions. Thus, for the past 12 years, effective formal policy guidelines for irrigation cost recovery have been nonexistent. Of course, Bank lending for irrigation has been active over the 1976-88 period, which leaves the clear inference that informal rules of thumb for designing cost recovery covenants have existed. Unfortunately, an OED review of loan conditionality concerning irrigation cost recovery for this period has not yet been produced. However, the 1986 OED review of this topic covering the period up to 1976 disclosed that the record was not good in that earlier period. In at least two-thirds of the projects reviewed, the covenant requiring that cost recovery at least cover O&M costs had not been complied with. In many cases, the covenants concerning cost recovery were so vague that it was difficult to determine whether there had been compliance or not. O&M of the irrigation systems concerned was considered satisfactory at audit in only about half of the projects.

Given the demonstrated inadequacy of existing guidelines concerning irrigation finance and the growing concern with quality control on Bank-financed irrigation investments, a synthesis of the hard lessons from Bank lending experience into a better framework for irrigation lending is needed. This paper suggests that six basic propositions distilled from Bank experience can serve as the basis for such a framework:

- i. Accept the diversity of cultures and institutional arrangements in borrowing countries and substitute flexibility and ingenuity in designing feasible irrigation institutions.
- ii. Focus the dialogue upon the physical sustainability of irrigation investments and associated natural resources.
- iii. Approach the finance of irrigation as a policy adjustment issue.
- iv. Base cost recovery policy on an analysis of the totality of government interventions.
- v. Assign tax policy instruments to appropriate policy objectives.

- vi. Accept indirect cost recovery where it exists, but insist on an accounting of the equity issues of irrigation rent transfer.

These propositions yield a number of implications for irrigation lending that should improve existing practice. The first two imply that the Bank would be more flexible concerning institutional preferences but would insist more strongly on arrangements that preserve the sustainability of irrigation investments and associated natural resources. A key feature of the emphasis on sustainability requires the development of an "O&M Plan" with the borrower at the time of appraisal. This plan would go beyond the provision of adequate O&M funding to specify the level of effort required to sustain the investment. Covenants requiring compliance with the O&M Plan would be part of loan agreements and their violation would initiate a mandatory Bank response. Repeated violation would usually end in cessation of irrigation lending.

The third and fourth propositions address issues of irrigation finance and cost recovery. The clear lesson from the Krunger-Schiff-Valdes study is that most countries prefer to impose direct and indirect taxes on agricultural commodity outputs. This taxation is usually massive and further taxes on farmers can only be imposed on cost recovery or equity grounds. Often additional taxation will not be justified. This determination requires, however, a thorough-going economic analysis that goes beyond direct taxation. Replication of the KSV methodology (where necessary) would seem to be an obvious first step in such an analysis. An obvious corollary of the KSV study is that irrigation finance is most appropriately addressed as a policy adjustment issue.

The last two propositions deal specifically with issues of efficiency and equity that arise in connection with the analysis of irrigation service fees. They are complementary to the third and fourth propositions in that they are concerned with the issues of tax

efficiency and equity that emerge in irrigation cost recovery. In particular, it is urged that the analysis take into account the welfare effects on the major groups that are involved; and the appropriate objective for irrigation service fees (in the absence of equity issues) is the public savings or cost recovery objective.

VIII. EPILOGUE

This paper is a modest effort to clear away the confusion surrounding irrigation policy both inside and outside of the Bank. That there is a need for a policy dialogue within the institution on this topic is increasingly apparent. In its present form, the paper reflects the comments and criticism of many Bank staff concerned with irrigation; and while some of them may not yet find it entirely to their liking, it has significantly benefited from their inputs. Certainly, this paper represents the first and not the last shot in the latest controversy over irrigation policy within the Bank. Also, lest we forget, the outside world is also observing and commenting on our actions. Thus, Steinberg (1983) observed in an USAID conference volume: "It is significant that to date the World Bank has no policy paper on irrigation, as there are internal disputes on such matters as water-user fees and technological issues such as the lining of canals."

REFERENCES

- Krueger, Anne O., Maurice Schiff & Alberto Valdes, 1988, "Agricultural Incentives in Developing Countries: Measuring the Effect of Sectoral & Economywide Policies", World Bank Economic Review, 2(3):255-271.
- Newbery, David & Nicholas Stern, editors, 1978, The Theory of Taxation for Developing Countries, New York: Oxford University Press (for The World Bank), July.
- Newbery, David, 1987, "Agricultural Taxation: The Main Issues", Chapter 13, in Newbery & Stern, eds.
- O'Mara, Gerald T., editor, 1988, Efficiency in Irrigation, Washington DC: The World Bank, March.
- O'Mara, Gerald T., 1988, "The Efficient Use of Surface Water & Groundwater in Irrigation: An Overview of the Issues", Chapter 1 in O'Mara, ed.
- Radosevich, George, 1988, "Legal Considerations for Coping with Externalities in Irrigated Agriculture", Chapter 3 in O'Mara ed.
- Sah, Raaj Kumar & Joseph Stiglitz, 1987, "The Taxation & Pricing of Agricultural & Industrial Goods in Developing Economies", Chapter 16 in Newbery & Stern, eds.
- Steinberg, David I., 1983, Irrigation & AID's Experience: A Consideration Based on Evaluations, Program Evaluation Report No.8, USAgency for International Development, August.
- Wade, Robert, 1979, "The Social Response to Irrigation: An Indian Case Study", Journal of Development Studies 16(1):3-26.
- Wade, Robert, 1982, "The System of Administrative and Political Corruption: Canal Irrigation in South India", Journal of Development Studies 18(3):287-328.

World Bank, Projects Staff, 1980, "Irrigation Water Charges, Benefit Taxes and Cost Recovery Policies," Central Projects Note No. 2.10, June 6.

World Bank, Agriculture and Rural Development Department, 1984, "Financing Operations and Maintenance in Irrigation", March.

World Bank, Operations Evaluation Department, 1986, "World Bank Lending Conditionality: A Review of Cost Recovery in Irrigation Projects", Report No. 6283, June 25.

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