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O&M COSTS IN IRRIGATION:
REAPPRAISING GOVERNMENT AND FARMER RESPONSIBILITIES AND RIGHTS

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the frequently cited experiences of Taiwan, more recent evidence is accumulating for other parts of Asia such as India (Wade, 1979; Ramamurthy, 1984; Meinzen-Dick, 1984).

Third, there are several innovative programs underway in Asia which increase farmer involvement in O&M activities—both in large, government-managed systems (for example, the Gal Oya project in Sri Lanka, the Buhi-Lala project in the Philippines, and the Madiun project in Indonesia) as well as in smaller irrigation works (the Communal Irrigation program in the Philippines, the High Performance Sederhana Irrigation Systems (HPSIS) program in Indonesia, and the Khon Kaen-New Zealand Small-Scale Irrigation Program in Thailand. While not without limitations, these programs are highly suggestive of policy and program possibilities for increasing farmer involvement in selected O&M activities.³

INTRODUCTION¹

The amount of money governments spend on irrigation development, both the costs of construction and subsequent costs of operating and maintaining the facilities, continues to be a matter of major policy concern, the more so as "the fiscal crisis" confronts governments not only in the developing world but in the US as well (Carruthers, 1981; Dickey, 1977). The most common response has been to offset government expenditures through various measures for "cost recovery"—user charges for water delivered, taxes on improved land or on irrigated products, or whatever. The assumption underlying this approach is that government will continue to make all major expenditures for irrigation development but should recoup all, or some part of those costs from producers, as if they are the major or the only beneficiaries of irrigated production. A discussion of the state of the art in this policy area is presented in the paper prepared for this meeting by Professor Easter.²

The discussion here treats another alternative—reducing certain direct costs to government by collaborative arrangements with water users so that the latter mobilize more of their own resources to implement specified O&M activities. There is reason to believe that greater farmer involvement in O&M activities through user organizations would not only reduce direct government costs but might also produce more appropriate and better quality O&M results.

It seems plausible to consider this alternative for three reasons:

First, there are many irrigation systems in the Asian region that farmers successfully manage and maintain with little or no government assistance. These are local systems, usually with small commands (but known to serve several thousand hectares in some cases), and using a variety of irrigation technologies: from stream and spring diversions, to small reservoirs, to groundwater (Coward, 1980).

Second, there also are examples in Asia of farmer groups assuming a substantial role in O&M activities within large irrigation systems whose overall administration rests with a government agency. In addition to

It is important to acknowledge that the extent and kind of O&M activities farmers perform in either small, local systems or bigger government-managed systems are, in large part, a function of the irrigation agency's policies and procedures. That is, farmer O&M activities are largely a response to the "environment" created by the agency. It also is the case that the farmers, organized or unorganized, are an important part of the agency's environment. Agency actions can be explained, in part, by the activities and attitudes of the farmers to whom they deliver water.

This mutual influence of agency and user orientations is a fact in any situation, but it is not necessarily a given. Its effects can be changed. We would highlight three areas from which more positive relationships could be initiated:

Reconsidering or redefining what O&M activities need to be performed, to what standard, and by what means, and considering what benefits users could derive from implementing these activities;

Increasing the capacity of user groups to implement these activities—their ability to mobilize resources, manage labor, enforce contributions, etc.; and

Recasting policies and procedures of the irrigation agency (and perhaps of other government agencies) to be more supportive of users carrying out O&M responsibilities, e.g. judging maintenance by standards of adequacy not hours of labor performed, or curbing extra-legal extractions by government staff.

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In the following pages we identify what we believe are the required conditions for altering the current unsatisfactory situation of carrying out and financing irrigation O&M, not by instituting measures of "cost recovery" (though this is a policy area to be explored) or by transferring O&M responsibilities unilaterally to farmers, but by developing mutually agreeable divisions of labor between agency and users—an appropriate and sustainable mix of agency and farmer rights and responsibilities. In particular, this requires identifying selected O&M activities in which farmers can most often be effectively involved.

Two O&M Scenarios

We would like to state succinctly two O&M scenarios which appear to be desirable "models" toward which policies and programs would be directed. Although we are of the opinion that there is considerable scope for farmer involvement in O&M activities in irrigation systems over a wide range of sizes, nonetheless we also believe there is some utility for this discussion in making a distinction between so-called small-scale and large-scale systems. If one is concerned with medium-scale systems, some arrangement intermediate would seem to apply. Government and donor efforts should aim to achieve the following:

For small-scale systems: irrigation works that are owned by the water users themselves and whose day-to-day O&M activities are farmer responsibilities. For these systems, the government irrigation agency (or other relevant agency) will act as a service unit to these scattered, small works—providing technical advice as required and rapid financial and other assistance in times of emergency. Procedures may be required to provide these irrigation-owning groups with legal status to allow them to enter into formal relations with government agencies and with other financial and technical entities.

For large, government-administered systems: a public agency accountable to the water users and which operates the main system facilities, in consultation with representatives of the users' groups, so that an adequate water supply is delivered predictably and reliably to channel headworks throughout the command area of the system. Below these headworks, the relevant water users' group would be responsible for day-to-day O&M activities, in addition to working with the agency to ensure good O&M at higher levels of the system. The concept behind

this division of responsibility is that the agency "wholesales" water to user groups which in turn "retail" it. Beyond operating and maintaining the main systems facilities, the agency also has a service role to provide technical assistance and occasional financial and other aid for emergency repairs or significant modernization programs.

Defining Selected O&M Activities

In these scenarios we have referred to farmers taking on responsibilities for "day-to-day" O&M activities. Let us be more explicit about the range of tasks that might be included in such O&M, after making two initial points:

First, farmer O&M activities should go beyond those that the agency typically "assigns" to irrigator groups—maintaining the tertiary facilities, settling disputes among themselves about the distribution of water they receive at the head of the channel, and in some cases, collecting the agency's irrigation fees.

Second, the level at which these O&M activities are performed is something to be determined empirically, based on what users can effectively manage. Typically, farmer responsibility is accepted, or expected, only "below the outlet," below the turnout which delivers water to the field channel (or tertiary) level. Whether users have an O&M role "above the outlet" (Chambers, 1984), and if so, how far above, will have a major effect on how much the government's O&M costs can be reduced. So no a priori assumptions restricting the farmer role "below the outlet" should be made. But this issue needs to be treated as a matter of working out a new shared division of labor, not of "shifting burdens onto users." Otherwise one cannot expect effective O&M to result.

Farmer involvement in maintenance activities is relatively straightforward. Given the typical delivery systems in most of Asia, canal cleaning and reshaping is a recurring need. Also, where structures are made of local materials (wood, stone, etc.), farmers are expected to repair and replace these artifacts as necessary. Farmers may also be made responsible for the upkeep and repair of certain structures that are built of nonlocal materials—concrete distribution boxes, for example.

Farmer involvement in systems' operations has been less clear. Typically, irrigation agencies have preferred to restrict farmer participation in operational activities to selected activities below some "turnout" point—which in some

systems seems to have been moving lower and lower as agency attempts to expand control have increased. Moreover, farmer involvement often has been limited to implementing the pattern of water distribution that has been established by the agency, for example, the rotational distribution patterns currently popular with many irrigation departments in Asia. Such limited operational responsibility does not necessarily produce the best distribution of water, being often inflexible or poorly adapted to local conditions, but it also reduces the incentive for users to take on responsibility for maintenance activities.

We suggest that farmer involvement in system operations should include the activities of acquiring, allocating, and distributing water. By acquiring water, we mean those activities involved in moving water from some source point to the outlet serving the group involved. In a small-scale system, these activities would involve building or repairing the weir (in a diversion system) or bund (in a storage system) and conveying the water captured to the command area. In a large-scale system, acquiring water would include activities above the outlet that direct more water to the command area of the group concerned—coordination and decision making with other groups or with the government agency, opening and closing various control structures, etc. Allocating water refers to the process of deciding how the water acquired will be apportioned to the users—utilizing information about water rights, crop requirements, and water supplies, for example, to determine what crops will be permitted in what areas. Distribution of water refers to activities through which water allocation decisions are implemented—opening and closing gates, monitoring water flows, observing field needs, etc.⁴

Active farmer involvement in these several operational processes, which get at the heart of irrigation activities, will provide a reason for water user organization to function and an incentive for giving attention to maintenance

responsibilities—better maintained systems will allow for more effective acquisition, allocation, and distribution activities.

PROPOSITIONS FOR ACTION

We note that much of what has been happening in most current irrigation development programs has moved toward a state of affairs quite unlike the scenarios described above.

Many government projects assisting small-scale systems have, in effect, taken them over and attempted to replace local O&M responsibility with an agency role. Rather than acting as a service agency to the local O&M entity, the agency has tried to become the operator and direct maintainer of the systems.

In many large, publicly administered commands, governments have concentrated on elaborating the physical apparatus of these systems. The effect has been to extend agency involvement and control farther down into the system as the size of commands below the outlet has been reduced. Little attention has been given to the more urgent need, to operate the main system apparatus more effectively.

If the ideal scenarios described above represent desirable arrangements for irrigation system O&M, not only because of their fiscal advantages to governments but also because resources can be used more efficiently with more tailored and motivated management, new policies and programs need to be put in place. While one cannot provide a blueprint of those policies and programs for the varied conditions in the Asian region, it is possible to suggest several basic propositions for developing such policies and programs. Based on our familiarity with the literature and a variety of field experiences with farmer-managed systems and with significant action experiments to improve government activities in irrigation development in the Philippines, Indonesia, and Sri Lanka, we suggest the following five propositions.

1. The Rao Proposition

Any effort to reallocate the mix of O&M responsibilities between the irrigation agency and farmer groups must include reexamination of the processes currently being used to design and construct irrigation works. We agree with Rao (1984) that the current processes result in many irrigation facilities that are "unproductive, irrelevant, and extravagant." Getting farmers to take an O&M responsibilities for facilities with these characteristics may be futile—ditches that are wrongly located, distribution boxes that are unnecessary, or control gates that are overly elaborate. The reasons that such facilities are designed and built include: professional bias toward complex structures, a lack of agency and/or contractor accountability to the farmers who will use the facilities, and the significant financial "leakages" that often arise during the design and construction activities.

Many of these problems can be ameliorated through greater farmer involvement in both design and construction phases. Program experiences in the Philippines, Indonesia, and Sri Lanka demonstrate that farmer participation in the early stages of project planning and system layout and design can improve the decisions that are made and help avoid erecting "unproductive, irrelevant, and extravagant" facilities. Moreover, heavy farmer involvement in the construction phase, not only as suppliers of labor but as overseers of the construction activities, can have direct O&M payoffs. Farmer involvement in these initial project activities can have direct O&M payoffs. Farmer involvement in these initial project activities can help insure a physical infrastructure that fits the local situation, structures that are well built, and a farmer group committed to using and maintaining properly the new infrastructure.

The basic point of the Rao proposition is to remind us that successful farmer involvement in O&M activities should begin with designing and constructing

facilities that are appropriate to the locale and that are acknowledged by farmers as being useful and worth using and repairing.

2. Bureaucratic Reorientation (BRO)

As mentioned above, the current state of affairs with regard to farmer involvement in O&M activities is, in part, the result of the existing policies and procedures of the State and its technical agencies. Beyond this, the willingness and ability of users to take responsibility is affected by the activities and attitudes of government personnel—how prepared they are to work cooperatively with farmers, how much credit they give farmers for skill and intelligence, how flexible they are willing to be in accommodating a variety of tempos, approaches, etc., in getting O&M tasks done. Thus, one of the requirements for increasing farmer involvement in O&M activities is what has been called "bureaucratic reorientation" (BRO) (Korten and Uphoff, 1981).

In furtherance of the scenarios stated above, bureaucratic reorientation would include a redefinition of agency and farmer group rights and responsibilities toward O&M. Such reorientation would involve, among other things, a greater focus on main system management in large schemes and less on O&M in either small-scale systems or the tertiary units of larger systems. In addition, the agency would reorient itself to act as a service organization to irrigator groups either operating their own small system or operating portions of the larger commands.

Program experience suggests that such agency reorientation is more likely to occur not as a separate "transformation" but as a consequence of interactions where farmers are themselves in a process of "change" through new modes of organization and action. For example, Uphoff (1985) has noted how the actions of informal groups of farmers in cleaning field channels, rotating water deliveries within field channels, and if possible saving water for downstream users in the Gal

Oya system in Sri Lanka served to influence the attitudes of irrigation department staff. With a more positive opinion of the farmers, agency staff were more willing to enter into cooperative activity with farmers regarding O&M activities. In turn, this willingness on the part of officials to treat farmers as responsible persons encouraged them to take on more responsibility.

While agency reorientation will be supported by changes among farmers, these changes alone will not get all the reorientation needed. There will need to be policy dialogues with staff that redefine the agency's mission and what constitutes "professional" roles. Training and perhaps recruitment of new types of staff will be needed to develop new skills within the agency for working with farmers. And existing policies and procedures should be examined to see which if any are impediments to increasing farmer O&M involvement, so that changes can be introduced. This can be a complex set of activities. One means of managing such reorientation is the establishment of a working group composed of support organizations such as research groups and management institutes (D. Kortzen, 1982).

The basic point of the BRO proposition is that increasing farmer involvement in O&M activities will depend upon some changes occurring in the style and manner of the agency's actions—and that those agency changes will be interactive with farmer changes.

3. Farmer Involvement in Operations

Without an ability to implement some and influence other key operational activities, such as the allocation and distribution of water, farmers are unlikely to sustain an interest in system maintenance activities. For one thing, farmers' involvement in the actual operation of the irrigation works helps them to identify critical maintenance requirements. Also, linking involvement in operations with

responsibility for maintenance enhances the possibility that maintenance activities will be "rewarded" with water delivery.

In small-scale systems, farmer involvement in operations can be complete—or nearly so. In these small commands, there usually is little need for agency involvement in day-to-day system operations, and thus there is good opportunity for joining farmer responsibilities for operations and maintenance.

In the large-scale systems, farmer involvement in operations means more than being responsible for allocating and distributing the water supply that arrives at the field channel turnout. While this may be better than no involvement at all, in our judgment, it will not likely be sufficient to sustain O&M activities by farmers. They need to be involved also in the processes that determine when and in what quantity water will arrive at those turnouts, that is, they need a role in decision making regarding main system operations. This is not to say they will control such decisions, but that they will have some input. Technical judgments cannot be overridden, and in our experience, such judgments made with a view to enhancing the twin objectives of water use efficiency and equity will be accepted by farmers' representatives.

This proposition reminds us that just being caretakers of the irrigation works will not be sufficient incentive for farmers to organize and implement maintenance activities. Farmer involvement in O&M must have an O (operations) component as well as an M (maintenance) component. Moreover, this operational involvement cannot be limited to below-the-turnout activities. Determining which turnouts get how much water when should benefit from farmer input and can serve as the basis for getting more responsibility for maintenance work.

4. Local Organizational Capacity

In each of the prior propositions there is reference to farmers doing things in an organized way—providing information and experience to base design decisions, influencing agency reorientation or being involved in system operations. None of this can happen unless farmers have an organizational vehicle for ordering these activities. Local organization is a prerequisite for farmer involvement in O&M activities. It also is necessary for effective interaction between the irrigation agency and the water users—since it is quite unrewarding for the agency to try to deal with a clamorous group of unorganized farmers. The local organization for achieving this may be formal or informal, built on traditional social relations or new principles, and follow any of a spectrum of organizational formats (at least those that do not violate the basic need for a fit between the organizational pattern and the configuration of the hydraulic apparatus).

Innovative programs in the Philippines, Indonesia, and Sri Lanka are demonstrating two important lessons regarding means to create local organizational capacity. First, the task of assisting farmers to form new, or strengthen existing irrigator groups is not an activity that can simply be added to the responsibilities of the agricultural extension staff or the field staff of the irrigation agency. These staff people typically are already overloaded with responsibilities. Furthermore, they lack the basic skills and orientation needed by an organization facilitator. There may even be a legacy of tension or hostility between them and the farming community which impedes gaining confidence and cooperation. Innovative projects, working in both large- and small-scale irrigation situations are demonstrating the usefulness of a "catalyst" role (called "community organizations" in the Philippines, and "institutional organizers" in Sri Lanka), performed by specially trained personnel who live in rural areas, assist farmers to organize, and act as facilitators between the irrigation agency and the irrigator groups.

Second, where the project to increase farmer responsibility for O&M is accompanied by some improvements in the physical works (and this is commonly the case), attention to farmer organization should begin before the design and construction activities are initiated, rather than following their completion. In this way, farmer knowledge and experience are mobilized as input for design and construction activities, and these activities serve as a *raison d'être* for farmer organization. Waiting until after the key design and construction decisions have been made before assisting farmers to organize may mean that facilities have been put in place that are unworkable or misunderstood, and that farmers already have been alienated from the project. Conversely, consultation in the early stages can promote among farmers a sense of responsibility for the new or upgraded facilities which encourages O&M performance.

This proposition draws attention to the central importance of strong local organizational capacity as a necessary component for achieving farmer involvement in O&M activities. If new construction is part of the project, actions to assist farmers in organizing need to begin early in the project cycle. Assisting farmer organization is a specialized and time-consuming task. Some type of catalyst role is proving an effective means for promoting farmer organization.

One inference which should not be drawn from this proposition is that the work of farmer organization can or should proceed quite separately and independently from more "technical" activities of the irrigation agency. The process of group organization should lead toward cooperative relations between farmers and agency personnel, something which the catalysts should and can promote. The various decisions and actions of the agency provide occasions for experience in collaboration to be built up. Farmer organizations are not to be conceived or introduced as "turnkey" operations, but rather as part of a new approach to irrigation management.

5. New Financial Procedures

Very often, farmers are adverse to paying irrigation fees and/or directly participating in O&M activities because they see little relationship between these actions and the resultant state of the irrigation facilities or the performance of the system. It is not clear to them that paying the costs of O&M done by the agency results in better irrigation services. One difficulty is that irrigation agency fees usually are general and unconditional in nature—fees are collected from farmers not to repair some specific structure or correct an identified problem, but for some more general O&M purpose. Moreover, typically, funds collected from farmers in one system are placed in a general fund that may be used outside their project area—or even outside of irrigation. This point has been noted by Small (1982) and expanded by Rao (1984), who suggests the need for a strategy of local collection and utilization of these revenues—keeping funds closer to their source and demonstrating better services as the result of monies collected.

This, of course, is what usually occurs in farmer-managed systems. Funds are collected, for example, to pay those who provide leadership and management for the system—and who may be replaced if they do not perform these tasks satisfactorily. Also, funds are collected when some specific repair or improvement is required—and the amount paid by any individual is a reflection of the cost involved and of that individual's share in the system (measured by land owned, water rights held, or some other criterion). Specific payments rather than general payments are the modus operandi. It also is the case that this pattern of collecting and disbursing monies helps avoid the frequent problems that arise when local groups (e.g., so-called cooperatives) begin routinely collecting funds that are then held "on deposit" for future uses.

Of course, if progress is made in inducing more farmer involvement in O&M activities, as discussed above, there will be less need for the agency to collect

routine O&M fees—in fact, it may not be possible to do both. However, the agency may wish to recover all, or part, of the costs of physical improvements that are made. That is the approach that the National Irrigation Administration in the Philippines has taken in its assistance to communal (small-scale) systems. In these projects, farmers are required to repay, over an extended period of time, a portion of the construction costs. Thus, farmers are not making "general" payments but rather payments directly related to the costs of improving their systems. Moreover, following the participatory approach that has been used in implementing these projects, farmers are able to carefully monitor project expenditures (thus reducing some "leakages") and, for some activities to substitute their own labor or materials for purchased services or items. Farmers in such a situation of paying back capital costs have a stake in insuring both proper quantity and quality in construction.

Within large systems, it would be advantageous to establish the equivalent of special benefit districts (in the terminology of public finance), a part of the total command area, such as that served by a branch canal, where the resources raised would be devoted to improvement of O&M in that area. The representatives of water users in that area would have a voice in the operational decisions and in setting maintenance schedules and priorities. To the extent that farmers were willing and able to discharge a greater share of O&M responsibilities through contributions of their own labor and materials, they could reduce their financial responsibilities to the district. Each district could have a reserve fund for O&M costs, to be replenished before each season up to some target level. If O&M costs were reduced by farmer efforts and cooperation, their liability would be accordingly lowered. Both farmers and government should gain from such an arrangement.

CONCLUSIONS

We think that policies to reduce certain of the direct costs of O&M to government by creating conditions that induce farmers to mobilize their own resources to carry out many of these activities are plausible. Such policies would be aimed at creating situations in both small- and large-scale systems in which farmers have considerable involvement in system operations and responsibility for system maintenance. This to be complemented by an irrigation agency providing various services to the small systems and focused on effectively on operating and maintaining the main system facilities of large systems.

To realize these scenarios, we suggest that more attention must be directed toward design and construction of appropriate physical facilities, a reorientation of agency policies and procedures, greater farmer involvement in system operational decisions and management, enhancing the capacity of local irrigation organizations, and creating new financial arrangements for O&M fees and expenditures.

Finally, this discussion should make it clear that while it may be plausible to aim toward more farmer involvement in O&M activities, this cannot be achieved by simply adding this requirement to project documentation. Making this a "condition precedent" will not accomplish the complex changes in behavior and attitudes on the part of engineers, administrators, and farmers that are needed to make such participation effective, even if the recipient government agrees in writing. The changes that are required to realize this state of affairs are much more fundamental and have to do with the manner in which project facilities are designed and constructed as well as with the basic mandates of the agencies involved.

NOTES

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²We refer to the paper prepared by Professor Easter for this conference: "Recurring cost of irrigation in Asia: operation and maintenance (O&M)."

³On the Gal Oya project, see Uphoff (1985); and the Buhi-Lalo project is discussed by Illo and Chiong-Javier (1983). The communal irrigation program in the Philippines is reviewed in F. Korten (1982), the HPSIS program in Indonesia by Morfit and Poffenberger (1984), and the Khon Kaen-New Zealand project by Mayson (1984).

⁴These three water-focused activities may need to be complemented by a fourth, dealing with drainage, if this is not naturally occurring. These activities and others in which farmers may be involved in irrigation management are analyzed in Uphoff, Meinzen-Dick, and St. Julien (1985, forthcoming).

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