

How to Turn Over Irrigation Systems to Farmers? Questions and Decisions in Indonesia

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ABSTRACT

THE INDONESIAN GOVERNMENT is turning over small irrigation systems to water user associations. Participatory design and construction of improvements prepare farmers and irrigation systems for turnover. Trained agency field staff facilitate local participation in preparation and implementation of turnover. Water users register their associations. The associations receive management authority and ownership rights for the entire irrigation system including headworks. Questions remain over the appropriate role of the government in assisting systems after turnover.

INTRODUCTION

The continual growth of state intervention has been a prominent part of irrigation development around the world. Dissatisfaction with poor performance of government management in irrigation and abundant examples of irrigation systems well managed by farmers have encouraged consideration of turning over management to farmers. Irrigation turnover in various forms is the subject of increasing interest internationally (Vermillion 1991). This is part of a more general shift towards deregulation, privatization and greater emphasis on the role of markets and other organizations besides the state.

Indonesia's program to turn over small irrigation systems to water user associations is one case of an effort to restructure responsibilities in irrigation management. Through turnover, governments may be able reduce expenditure of scarce resources on activities which farmers are better able to carry out themselves. Governments can focus their efforts on activities which require greater financial capability, technical expertise or political authority. Irrigation agencies can support and work in partnership with more self-reliant local management of irrigation.

By the middle of 1994 the Indonesian Ministry of Public Works had transferred almost 1,500 small irrigation systems, which irrigate more than 115,000 hectares, to water user associations in 10 provinces. Almost a thousand more systems irrigating over 28,000 ha in Central Java had completed preparation and were awaiting formal transfer. This is part of a long-term policy to gradually transfer all irrigation systems smaller than 500 ha to water user associations. This represents a major shift from previous patterns of government intervention in irrigation. Turnover converts government investments into locally owned and locally managed common property.

BACKGROUND

Farmers originally built and managed most small irrigation systems. Over the years various programs assisted these irrigation systems, particularly during the 1970s and early 1980s when Indonesia obtained abundant income from high oil prices. This was part of a relatively successful policy to improve welfare in rural areas and pursue national rice self-sufficiency (Booth 1988).

Regulations decreed that irrigation systems built or improved by the government become government irrigation systems. Over time, government intervention converted more and more of these farmer managed systems (irigasi pedesaan) into government systems, listed in the Inventory of Public Works Irrigation Areas. Systems could be redefined as government systems because they had received specific forms of government assistance, because they were lumped together as part of officially defined irrigation areas with systems which had government involvement or simply as part of government policies to categorize all systems above a certain size as government irrigation systems. At times government assistance meant little more than a bit of money spent to build a few new structures. At other times the government placed staff in systems to take responsibility for operation and maintenance. The area irrigated by government systems forms the basis for calculation of budgets for irrigation operation and maintenance, providing an incentive for agency officials to expand the area of "government" irrigation systems.

During the early and middle eighties a series of projects explored ways to improve participation in irrigation development in Indonesia (Tobing 1989; Dilts, et al. 1988). Pilot projects demonstrated that community organizers could facilitate farmer participation in the design, construction and management of small and large irrigation systems.

Researchers documented the widespread existence and continuing competence of traditional irrigation management institutions. Workshops and seminars brought researchers and government officials together to discuss the need

for policies to better support water user organizations and make use of farmers' competence in irrigation management.

As time went on some government officials and donors were worried that the expansion of government involvement in irrigation was creating a dependency on the government and that the government was taking over tasks which farmers could handle better. Continued takeover would create a tremendous burden on the budget and could lead to a decline in irrigation system performance. The drop in oil prices in the middle eighties created a fiscal crisis for the Indonesian Government. It appeared that the government could not simply continue its previous policies in irrigation. This situation made the government more receptive to discussion of alternatives.

In 1987 the Indonesian Government declared a policy that it would gradually turn over all systems smaller than five hundred hectares to water user associations. Turnover was one of a set of policies designed to improve irrigation operation and maintenance, supported by projects from the World Bank and the Asian Development Bank. Turnover of small systems and institution of an irrigation service fee in systems larger than 500 hectares were both intended to improve O&M through greater farmer participation in management and increased accountability to water users.

The turnover program is managed by the Directorate of Irrigation I (DOI-I) of the Directorate General of Water Resources Development (DGWRD) of the Ministry of Public Works. The Provincial Irrigation Services (PRIS) implement turnover and take part in the testing and refinement of methods. Researchers from the International Irrigation Management Institute, Andalas University and Padjadjaran University studied and helped formulate the turnover process. An Indonesian non-governmental organization, the Institute for Social and Economic Research, Education and Information (LP3ES) helped train government officials and helped develop and institutionalize the participatory methods used to carry out turnover (Bruns and Soelaiman 1992).

The current procedures for turnover are the product of an extensive process of discussion, field testing and revision. The framework for turnover is outlined in the Ordinance of the Minister of Public Works on Implementing Guidelines for Turnover of Small Irrigation Systems and Management Authority to Water User Associations. The methods for turnover have been further elaborated in training materials, manuals and guidelines. The following discussion examines some of the key aspects of the turnover process as developed in the Indonesian context. It focuses on questions which were particularly difficult to resolve and decisions which were crucial to shaping the turnover process.

PARTICIPATORY DESIGN AND CONSTRUCTION

A working group, composed of representatives from Public Works, IIMI, the Ford Foundation and LP3ES, outlined the turnover process. They believed that systematic preparation would lead to farmers being more willing and better prepared to take over responsibility for the irrigation systems. The hope was that participation in design and construction of improvements would provide a concrete activity to use for strengthening water user associations. If farmers participated in deciding what improvements to build they would feel a greater sense of ownership.

Public Works prepares for turnover through a linked sequence of activities: field inventory, preparation of a profile with social and technical information, design, and construction of improvements. These activities also lead irrigation field staff to learn about both technical and social conditions in the field and gain a greater ability to work with farmers in a participatory way.

Inventorying Irrigation Systems

Which irrigation systems are suitable candidates for turnover? What preparations are necessary before turnover? Existing government records usually contain little useful information. The inventory gathers basic information on irrigation system conditions and management.

Farmers fully manage many systems with little or no government involvement even though the Inventory Book of Public Works Irrigation Areas lists them as government systems. The initial plan was simply to administratively reclassify such systems as non-Public Works irrigation systems, without making improvements or formalizing water user associations.

As the project evolved there were strong pressures from within Public Works to make all systems eligible for physical assistance and to register water user associations for all sites before turnover. Officials argued that it was unfair not to help all farmers, that the government should improve systems so they were in good condition. They argued that systems which had not previously received government help were in worse condition and had more need for improvement. These arguments fit both good intentions towards farmers and Public Works' self-interest in increasing construction budgets.

DOI-1 officials suggested that it would be too confusing to have some systems turned over without any formal water user association in place. Subsequently the Director General of Water Resources Development officially established policies to make all systems eligible for construction and require formal WUA at all sites. The inventory still provides an opportunity to screen out sites which are not suitable for turnover. This may be because they require improvements which are too expensive to fund from the budget available for turnover. The complexity of hydrological interconnections between irrigation systems or multiple usage of water for non-irrigation activities may make turnover to a WUA inappropriate.

In many cases the Public Works Inventory of Irrigation Areas records several distinct systems with separate diversion structures as a single irrigation area. If systems have not been disaggregated previously then the PRIS can disaggregate them as part of the inventory process. PRIS officials may have lumped systems together for administrative convenience and to increase the area used as a basis for O&M budgets. The consequence is that the area covered by small irrigation systems is much larger than it initially appeared. According to 1985 records, systems under 500 hectares covered about 900,000 hectares. However, the provinces of Central and East Java disaggregated irrigation areas and, based on their results, it seems likely that small government systems in Indonesia cover a total of more than 1.5 million ha. Irrigation systems already recognized as farmer managed irrigate more than a million ha. In total, systems smaller than 500 ha serve at least 40%, and perhaps over half the total irrigated area in Indonesia.

After the inventory, PRIS officials categorize irrigation systems as to whether they are eligible for construction of improvements, as Figure 1 shows. There are many sites in which farmers are not actually aware that their system has been classified as a government irrigation system. In such cases making improvements and requiring organizational activities at all sites before turnover has the potentially counterproductive effect of increasing government intervention and causing changes in existing farmer management. In theory, if systems are in good condition, have no government involvement in O&M and contain no government built structures (Group A) the PRIS can directly reclassify them as farmer managed irrigation systems after a WUA has been registered. However, the PRIS have included very few systems in this category and have not turned over any such systems.

Systems which are in good condition but which have government-built structures or government involvement in O&M (Group B) require WUA formation or development. Most of the systems placed in this category have been sites improved by the Provincial Irrigation Projects in West Java and Central Java. However, after more thorough consultation with farmers it has often turned out that farmers are unwilling to accept turnover without further improvements. Often designers did not consult farmers in planning earlier improvements and improvements did not assist all parts of the systems equitably. Because of this, some provinces have obtained funds for additional improvements.

PRIS officials categorize the vast majority of systems as eligible for construction of improvements (Group C). The systems then enter the process of participatory design and construction discussed below. The new policy, which in effect means all systems must first be improved, means that the budget demands are higher and the process will take longer, than expected when the policy was first established.

Agency Field Staff as Organizers

Public Works officials chose to use agency staff, rather than recruiting new community organizers, e.g., recent university graduates. In earlier projects it had not been possible to provide funds to retain community organizers once special donor funding ended. The scale and rapid expansion of turnover would have made the recruitment of new staff difficult. If existing staff learn to work with farmers in a participatory way this should prepare them to better guide and assist WUA after turnover. These skills should also help in working with water user associations in other government systems. The PRIS recruits irrigation inspectors and other staff to work with farmers as Farmer Water Manager Guides (abbreviated as TP4 in Indonesian). TP4 need special training concerning the skills needed to approach and work with local communities. Their previous work as irrigation inspectors is primarily technical, so they may lack capacity to communicate with farmers and develop WUA. Experience in the turnover project has been that most TP4 carry out their work satisfactorily. This is true even though some have only a primary school education. Given sufficient training and support, they are capable of carrying out their duties (Murray-Rust and Vermillion 1989: 130-131; Helmi and Vermillion 1990). Other factors including travel distances and personal motivation are much more important than educational background.

There are still problems concerning the frequency of visits to sites, if they are far from where the TP4 live. In carrying out their duties the TP4 lack facilities, such as motorcycles, with the consequence that visits are less frequent than hoped and they lose much time traveling to sites. At times the money received by TP4 to cover travel costs has not been adequate. Some TP4 still tend to take a very top-down approach to working with farmers. Supervisory visits to TP4 are very important for strengthening the capacity of TP4 to implement a participatory

approach. Some TP4 also need support for specific activities such as organizing and holding meetings. A participatory approach improves job satisfaction for agency staff as well as helping farmers. Many TP4 state that working with farmers in a participatory approach is much more enjoyable than their previous working style.

Farmer Design Requests

Because farmers will be managing the systems after turnover, the government needs to tailor improvements to their wishes. TP4 assist the farmers in preparing design requests. The farmers suggest improvements and discuss the location and form of proposed structures. Based on the results of discussion with the farmers the TP4 makes sketches. Designers should use these sketches as a basis for drafting preliminary designs for improvements. The farmer requests include a list of priorities to help in choosing which improvements the government should fund.

After farmers prepare the design requests, farmer representatives and the designers hold design integration meetings to discuss the improvements. They usually hold the meeting at a site close to the irrigation system. PRIS officials held some meetings at subdistrict or irrigation section offices. This did not support a participatory process of communication because farmers usually did not dare to say much at a government office. The farmer design requests and design integration meetings provide explicit mechanisms for giving farmers input into the design process. If carried out well they enable designers to base improvements on farmers' aspirations and experience.

Design Guidelines

Small irrigation systems have specific characteristics which often differ from larger systems. Structures are usually simpler; flows are highly variable; they often lie in mountainous areas. After turnover farmers will have full responsibility for operating and maintaining the systems. Public Works had no existing manual for design of small irrigation systems. After completion of the first improvements it was clear that some consultants did not have a good basis for designing improvements to small irrigation systems. Many structures were larger or more expensive than necessary. Sometimes designers inappropriately scaled down versions of structures used in large irrigation systems. To address this problem a team from DOI-I, PRIS, LP3ES and consulting engineers formulated a manual for design of improvements to small irrigation systems.

Confusion also seemed to occur in the process of preparing designs, especially in communication with farmers. The design manual clarifies the sequence of activities through which farmers participate in preparing the design. The manual does not replace existing government manuals concerning design and construction of irrigation systems, but it does supplement them, giving specific guidelines for participatory design of improvements to small farmer-managed irrigation systems. Appropriate designs and design procedures for small irrigation systems continue to need further development.

How Much to Spend

The turnover process uses participatory design and construction as key activities to strengthen water user associations and improve the condition of systems. In theory the possible levels of funding range from purely token amounts up to the cost of totally rehabilitating or upgrading the entire irrigation system. The loan from the World Bank provided a somewhat arbitrary average level of about US\$100 per hectare for design and construction. The most contentious issue was that of improving headworks.

The level of US\$100 per hectare reflected in part the lack of detailed information about actual needs. The World Bank wanted a clear and easily implemented limit on the level of cost. The per hectare rate matched initial levels of funding for "special maintenance" repairs and improvements in large irrigation systems, although the actual works were significantly different.

Once implementation began the farmer design requests usually totaled more than the budget available. Agency officials argued that this showed that the per hectare level of funding was inadequate. One response to complaints from PRIS officials about the budget was that the PRIS should better allocate according to need, with more funding for sites in poorer condition and less money for those already in relatively good condition.

The most expensive improvements are for headworks, building or making major improvements to permanent or gabion weirs. Farmers at many sites hope to save the time spent rebuilding temporary weirs frequently damaged by floods. Construction of permanent weirs is a familiar activity for agency officials, and one where their expertise is clearly relevant. Their greater experience with irrigation in relatively flat areas accustoms them to irrigation systems where diversion and division of irrigation water are the principal irrigation tasks.

However, many of the systems lie in the upper parts of watersheds, with relatively abundant supplies of water. Simple, cheap structures are often sufficient to divert water. The economic value of the time spent rebuilding the

weir each year is low, compared to the cost of building a permanent structure. Unstable hilly environments with fluctuating river flows mean that seemingly permanent structures may actually be quite impermanent. Long-term sustainability comes not from permanent structures but from local capability to perform routine maintenance and periodic repair (Murray-Rust and Vermillion 1989:80, 84).

In many areas the main problem is not diverting water into canals or dividing scarce flows but instead conveying water along steep and unstable slopes to reach paddy fields. Rather than new headworks, farmers request construction of canal lining, flumes, siphons and overflow structures to divert excess run-off away from canals.

The need for lining is itself difficult to assess accurately. There is a large range of conditions. At some sites lining is obviously essential to prevent erosion and reduce water losses. At others lining yields few real benefits, only simplifying maintenance and making the canal look prettier or more orderly.

In practice it is difficult to conduct a benefit-cost analysis of the small improvements built by the turnover project, especially in advance. Public Works engineers prefer to concentrate on technical criteria in deciding which improvements to build, rather than incorporating economic criteria. However, after construction was complete, it became clear that many improvements were much more expensive than necessary or had no possible way of providing enough benefits to justify their cost. Construction of inappropriate and expensive structures created a strong argument against raising the levels of per hectare funding. Many farmers stated that even with a lower level of funding per hectare they would still have been satisfied to accept turnover. On the other hand it would have been easy to generate longer wish lists of requested improvements if more funds had been available.

The funding level has been increased under some more recent projects and now averages about US\$150 per hectare, for World Bank funded projects. Sites needing expensive construction should be improved using other sources of funding before entering the turnover project.

Contributions to Construction

Participation in construction was another way to involve farmers and strengthen their sense of ownership of the irrigation system. Ways to realize this included the hiring of local labor for construction work, purchase of local materials and unpaid local contributions. As the project evolved, IIMI and the World Bank strongly suggested requiring unpaid local contributions to construction, to complement government-funded improvements. These efforts to increase participation in construction, however, encountered several obstacles.

Construction began at turnover sites during the 1989/1990 fiscal year (April to March). In August 1989 the Director General of Water Resources Development declared a policy forbidding mixing government-funded improvements with those built through local self help. This policy still allowed voluntary contributions, but required making them separately, to avoid problems concerning accountability and inspection. Similarly, the policy required paying labor and purchasing materials at full prices.

This was in contrast to the arrangements often established where the water user association would provide labor and take a percentage of the payments to fund its activities. Similarly WUA sometimes supplied local materials or labor at a lower price to enable a greater volume to be purchased. These mechanisms could encourage local participation and increase productivity. However, DOI-I officials worried about the danger of misunderstanding and other problems.

Even though WUA leaders and TP4 tried to obtain a consensus concerning arrangements for WUA to receive a percentage of labor payments, they could not always ensure that everyone understood and agreed with the arrangements. This created the danger that later someone could raise questions about not receiving full payment. There was also concern that incorporating local contributions could delay completion of construction. These concerns about possible problems and administrative complications were a major factor behind the decision that WUA should not mix their voluntary contributions with government-funded improvements.

One suggestion was that government could provide materials only while farmers would provide all the labor. This could simplify accountability and inspection. DGWRD officials claimed that this approach was not feasible under existing regulations. More recently, as part of the development of methods for assisting farmer managed irrigation systems, mechanisms have been identified which make it feasible to combine selective government material assistance and technical guidance with materials provided by farmers and with construction done by farmers. At present, this approach is not part of the procedures used for turnover.

World Bank officials repeatedly suggested requiring a specific percentage contribution from farmers. They hoped this would help to control costs, by making farmers more aware of and responsible for costs. Public Works officials strongly opposed this idea for several reasons. They were worried that requiring contributions would delay completion of the activities within a specific budget year. Having farmers contribute a percentage would have required much greater transparency on the part of the agency concerning budget allocation and expenditures. Needs and local capability to contribute vary widely, which make a uniform rate inappropriate.

Another aspect of this issue concerned the degree to which contributions would be voluntary. Inclusion in the turnover program is the result of the government's decision as to which systems to turn over first. Agency officials did not want to be in the position of having to force farmers to follow through on externally imposed requirements for their contributions.

One alternative would have been to require farmer contributions towards any improvements funded by the government, but allow farmers to choose to receive the system without improvements if they did not want to pay. This would allow farmers to decide whether or not to contribute to construction. Public Works officials rejected this alternative as unfeasible, saying that all systems which needed improvements should be improved before turnover.

Farmers did contribute to construction. However, the value of their contributions was usually less than 5% of government funding. Farmers, in the Philippines, Thailand, Nepal and in some other projects in Indonesia, contributed much higher levels in similar irrigation projects. Farmer contributions in turnover mostly took the form of earthworks, such as cleaning and straightening canals (normalization), lining canals and building additional division structures.

The result of extensive discussions among DGWRD, the World Bank and others was that future projects would in principle encourage contributions, but not require a specific percentage. Contractors or agency officials did make extensive use of locally hired labor and locally purchased materials. The requirement to keep such self-help contributions physically separate from government-funded improvements greatly constrained the scope for additional voluntary contributions from farmers.

Redesign during Construction

When construction began, it frequently turned out that farmers felt the designs were not appropriate. Sometimes this was due to physical changes such as landslides and erosion after the design phase. Sometimes designers did not follow through on the agreements made with farmers. Sometimes farmers had participated in design on a somewhat speculative basis. Once it was certain that construction would take place, they then might ask for additional changes, in part because more people became involved in discussing the improvements. One of the consequences of farmer participation in Indonesia and elsewhere seems to be the need to allow for many changes or even total redesign during construction (e.g., Acharya 1990).

Overall it was possible to incorporate many of the changes requested by farmers. This was particularly easy if, as at most sites, the construction budget was specified on a unit price basis. This meant that the contractor (or agency, for force account) was responsible for providing the specified level of inputs. As long as inspectors could confirm that the contractor had completed the specified volume of works, there was significant flexibility about what form these took. Mostly farmers asked for minor changes in location or shape of structures. Some larger changes were made, including shifting materials originally planned for structures into increased lining.

Contractors or Agency Force Account

The PRIS can tender construction to contractors or build directly by force account. LP3ES staff and many farmers were suspicious about whether contractors would be able to work in a participatory way. In response to this there were many attempts to encourage the use of agency force account, *swakelola*. Agency officials objected that force account was more complex to administer. This was particularly a problem for provinces outside Java which usually had fewer and less qualified agency staff. The choice between the two methods had implications for arrangements within the agency. Provincial officials usually handled contracting, except in larger provinces where a sub-provincial unit handled it for several sections. Section level officials implemented force account construction. Thus the potential benefits and burdens of the two methods differed for officials at different levels.

As implementation continued, it became clear that high levels of farmer participation were possible even with contractors, if there was sufficient preparation. Public Works had to orient contractors to a participatory approach. The most crucial element was holding preparatory meetings among the contractor, WUA leaders and agency staff to discuss arrangements for hiring local labor and purchasing local materials.

Improvement for O&M

Government-funded improvements have lined canals and replaced wood or bamboo structures with permanent structures. It is less clear how much impact these improvements have on reducing the burden of O&M or increasing agricultural production and farmer welfare. There is still much scope for improving the technical quality of the infrastructure built by the project (Duve, Fleischer, Krimmel and others 1991).

Some sites clearly show increased production. At others, little seems changed, except that the system functions more smoothly and looks more orderly. The potential for increasing the impact of improvements lies in focusing the design and construction process more clearly on improving not just overall irrigation system "condition" but specifically on overcoming constraints to increased agricultural production (Murray-Rust and Vermillion 1989:148). The current process does improve conditions and, except in extreme cases of overdesign or poor construction, does reduce the O&M burden transferred to farmers.

WATER USER ASSOCIATION DEVELOPMENT

The government turns over systems to water user associations. This means there must be some organization to accept responsibility for the system. Government policies concerning formal water user associations have shaped efforts to develop WUAs. However, these efforts take place in the context of Indonesia's long heritage of diverse local irrigation institutions. There are still large gaps between existing local practices which are often informal and episodic, and the framework for water user associations prescribed by national policy (Korten 1987; Bruns 1990).

Formal registration of the association is a necessary requirement, but the most important aspect of strengthening water user associations is through substantive involvement in the process of design, construction and preparation for turnover. The inventory and profile activities help the TP4 learn about existing irrigation management: who the leaders are, what irrigation tasks are done and how often, how activities are organized and the history of efforts to develop formal water user associations in the area.

Farmers request improvements and farmer representatives meet with technicians to discuss and agree on the design of improvements. WUA leaders, village officials, the contractor (or agency official administering force account) and Public Works staff attend a meeting to decide on the roles for farmers in construction. WUA members supply materials and work on construction. WUA leaders coordinate the participation of WUA members. After construction the TP4 works with WUA leaders to help them plan how they will manage the irrigation system after turnover. Planning for O&M is based on current management practices, the tasks conducted by Public Works to be taken over by farmers and written guidelines on operation and maintenance.

TP4 are taught a bottom-up process for organizing farmers and forming water user associations. To simplify their task, a manual outlines this process. However, there is wide variation in what happens in the field. Farmers in water scarce areas tend to be more interested in improving irrigation management. By contrast, farmers in water abundant systems tend to be comfortable with continuing existing less formal management patterns.

Where farmers already organize themselves in a relatively formal way, the TP4 may not make much additional effort at organizing. The level of support and supervision TP4 receive for organizing activities also strongly influences whether they will make frequent visits and undertake a thorough process or only concentrate on talking with existing local leaders and holding a few meetings. A top-down approach to WUA formation which only involves a few unrepresentative leaders, which clearly has occurred in some cases, may mean that turnover does not lead to improvements in irrigation management ([Judawinata 1990]).

Turnover requires that the district or municipality head register the WUA in accordance with existing government regulations. This gives the WUA some formal legal status, so that it can receive management responsibility and government assets.

A 1984 Presidential Instruction gives basic guidelines concerning formation and responsibilities of WUA. It specifies the officers of the organization and their duties and allocates responsibility for WUA guidance among the ministries of Home Affairs, Public Works and Agriculture. A 1987 government regulation divides responsibility concerning water resources development between national and provincial governments assigning responsibility for registration of WUA to district heads. Most provincial governors have issued decrees concerning WUA development and some provincial legislatures have passed laws concerning irrigation. A recent Ordinance from the Minister of Home Affairs has more clearly spelled out how WUA can obtain status as legal bodies by registering with the district court, and provides guidance to districts on passing legislation to make this possible.

The TP4 help the WUA prepare a constitution and by-laws. The WUA must inform village and district heads when it has drafted these. Then the WUA submits them to the district head for formal registration. In theory the WUA should base its constitution and by-laws on existing customs and rules employed by farmers. This would make it easy for the WUA to implement them. However, there is a tendency to make constitutions and by-laws identical to standard examples, with little or no adjustment for local conditions. This leads to constitutions and by-laws which are not based on the needs of the WUA and not functional for the organization.

It is not clear how long the formal organizations registered as part of the turnover project will persist. A restudy (Aziz et al. 1991) of WUA formed nearly ten years ago by the Sederhana Irrigation Systems Project showed that almost none had survived as formal organizations. Instead farmers continued to use traditional institutions to operate and maintain the irrigation systems.

If the government provides little continuing support for WUA, then it is likely that the prospects of the formal WUA registered during turnover will be poor. If working through the formal organizational structure offers few advantages, then farmers are likely to continue their existing more informal methods for organizing irrigation activities. If government staff continue to visit and if the WUA is a useful channel for receiving government assistance, then farmers may be willing to invest the effort needed to continue working within the formal organizational structure.

For purposes of analysis the turnover program can be described as attempting to synthesize two conflicting approaches to the issue of farmer organization. One approach would stress that in general farmers already effectively organize themselves for irrigation management even though their organization may be informal or "traditional." This approach would emphasize that farmers are already quite competent and that turnover largely amounts to a process of recognizing and legitimizing existing farmer management.

In the Indonesian case, high cropping intensities are perhaps the clearest physical indicator of the effective performance of many farmer-managed systems. As the turnover program progressed it became clearer that actual dependence on government in irrigation O&M, if it existed at all, was only a problem in a very small number of systems. Even in systems with government gatekeepers, farmers still played the primary role in distributing water and maintaining canals.

The other approach is to assume that farmers usually need government assistance in improving irrigation management. This may be due to the need for support from outside authority in order to enforce sanctions. Previously effective local institutions may have been weakened by commercialization, disrupted by previous government intervention in irrigation or undermined by other social changes. Growing competition for water may require more intensive management. Farmers may be able to benefit from exposure to new ideas concerning irrigation management. Government efforts might encourage more equitable distribution of the benefits of irrigation and counteract the attempts by local elites to gain an unfair share of benefits. Government may be able to facilitate local collective action which would otherwise be unlikely to occur. This approach would stress the need to train farmers and strengthen water user associations as part of the turnover process.

Indonesian government policy is framed in terms of the importance of state control and guidance. Official policies and guidelines for turnover mostly reflect this paradigm, assuming that farmers need to be guided and trained to behave in ways determined by the government. Thus written policies and statements concerning turnover suggest a highly interventionist approach to developing water user associations.

However, the rapid expansion of the project and the limited resources available for organizational efforts have meant that in practice the program assumes farmers are already quite competent in managing irrigation. The principal thrust of the program has been one of providing a modest amount of assistance for physical improvements to accompany the formal turnover of management authority and assets to farmers. The formal requirements of WUA registration are satisfied. Efforts are made to strengthen WUA organization, particularly through participation in design and construction. If particular WUA have problems, then they are supposed to receive extra attention. However, all systems go through the turnover process at roughly the same rate and are turned over according to the same schedule.

TURNOVER

Water user association development, and participatory design and construction prepare for turnover. In addition to decisions about how to prepare for turnover there were choices as to what to actually turn over, how to carry out turnover and what the government's role should be after turnover.

Headworks

According to Indonesian Government policy, farmers were already officially responsible for management of tertiary irrigation systems. The government formally took responsibility for primary and secondary canals and the first fifty meters beyond the outlet. A simplistic approach to turnover might have been to maintain this classification, with the government maintaining responsibility for diversion structures and the first fifty meters of canal. Headworks are more complicated to operate than canal structures. There are greater risks if something goes wrong. Poor operation of gates can lead to damage during floods. If farmers neglect maintenance then erosion could lead to major damage.

In practice, farmers already operate many weirs. Many sites do not have government caretakers. At other sites the Public Works employees who are formally responsible for operation have informally given farmers the keys needed to operate gates. This is not just a matter of lack of interest or the very low wages paid to such staff. There is also the practical issue of who can best operate the system, especially if heavy rains, perhaps during the night,

require a rapid response and the irrigation staff do not live nearby. Farmers already fully manage many irrigation systems of similar or even larger size and complexity.

The government spends little on maintenance of small irrigation systems. In the two irrigation sections studied by IIMI, total O&M costs per hectare for systems under 500 hectares averaged approximately US\$4 per hectare (Murray-Rust and Vermillion 1989:45). About half this amount is spent on contractual repairs rather than on routine operation and maintenance. In any given year much of the work is concentrated in a few systems.

So, in practice, reliance on government is low. The designs commonly used require relatively little maintenance and tolerate a certain amount of neglect. For most operation and maintenance activities, farmers already play the major role, for example, in cutting weeds and removing sediment from canals. IIMI researchers found that greasing of gates was the only task always done by the Public Works (Murray-Rust and Vermillion 1989:32).

If farmers did not receive responsibility for headworks, then turnover would probably mean relatively little change. Keeping headworks under government control could even become a basis for requesting placement of additional staff to manage headworks at those sites which did not already have caretakers. It would maintain substantial ambiguity over the division of responsibility between the government and the farmers. It could leave the government responsible for headworks even in very small systems irrigating 10 hectares or less.

The final decision was to turn the entire system, including headworks, over to farmers. DOI-I officials hoped that this would make WUA more fully responsible and avoid confusion and overlap. In systems over 150 hectares with more complicated headworks, staff responsible for headworks are being transferred in a phased manner. This is intended to give farmers time to develop their capacity to maintain and operate such larger weirs. The emphasis in the turnover program has so far been on transferring systems under 150 hectares.

Assets or Only Management Authority

Another question was whether to transfer ownership of the assets to WUA or only management authority. If the assets continued to belong to the government then the government would continue to be ultimately responsible for them. Authority and responsibility would not match. It would be hard to make a turnover of only management authority meaningful, and it would not represent a significant change from existing policies. Transfer of the assets would also help to make clear that WUA were fully responsible for the systems.

There were questions about whether water user associations had status as legal bodies able to receive ownership of assets such as irrigation systems (Soediro 1989). The final decision within DGWRD was that existing laws did provide an adequate basis for WUA to receive irrigation system assets, if the WUA had first been registered with the district level government. The ownership right transferred to the WUA is a temporary one. The Minister of Public Works has the authority to make such a transfer with temporary status. Final change of status and deletion of the irrigation system from the inventory of government property requires approval by the Finance Minister and a longer process. The intention is to eventually complete this. However, DGWRD regards the current turnover process as adequate to give WUA full control of the systems and considers subsequent changes to be an internal matter within the government.

Ceremonies

For each province the Director General of Water Resources Development symbolically turns over irrigation systems in ceremonies attended by Provincial Governors and other senior officials as well as WUA representatives. District Heads or their representatives and leaders from at least one WUA per district attended the ceremonies. The ceremonies confirmed that turnover actually was occurring. They publicized the project. They also required a substantial amount of time and money for preparation. Government O&M funding is no longer available for systems awaiting turnover, but farmers have not yet officially received responsibility. In some cases there have been long delays waiting for ceremonial turnover, with consequent confusion and problems concerning O&M responsibilities. While ceremonies may have served an important role at the beginning of the program it is not clear how much they contribute now.

Guidance and Assistance after Turnover

The Ministerial Ordinance on Turnover outlines the principles regarding the government's role after turnover, based on existing policies. The government retains authority over water resources, meaning it can determine how much water an irrigation system can divert. The government should provide guidance to water user associations and may provide physical and technical assistance for work beyond the capacity of farmers.

After turnover, systems have the same status as farmer managed irrigation systems. The government has a mandate to provide guidance to all irrigation systems. In practice, Public Works has primarily concerned itself with government systems and paid less attention to farmer managed irrigation systems. Public Works officials are currently discussing the need for an irrigation extension position, whose duties might concern farmer managed irrigation systems as well as government-managed systems. Funding for guidance activities has been very low.

Given the performance of existing farmer-managed schemes and the large role farmers played in managing schemes to be turned over, there seems little reason to doubt that, on average, farmers will be able to at least maintain existing levels of performance after turnover. Government guidance may be useful in ensuring that farmers pay adequate attention to maintenance, which is often neglected under either government or farmer management (Moore 1988).

The goal of turnover is not to abandon small irrigation systems but to make efficient use of scarce government resources and encourage local self-reliance. The government is currently strengthening procedures and programs for assistance to farmer managed irrigation systems, which includes systems which have been turned over.

Staff Readjustments

One of the more difficult problems is what to do with staff who currently take care of irrigation O&M. This varies greatly between provinces. Central Java has relatively few staff placed in specific systems while Yogyakarta has a very high level of gatekeepers and canal guards even in small irrigation systems. IIMI researchers found that 40% of pilot systems in Sumedang Section of West Java had staff placed in them while in Solok, West Sumatra the level was only 5% (Murray-Rust and Vermillion 1989:29).

Irrigation inspectors and even many system-level staff are responsible for several irrigation systems, and so can shift their attention to systems which have not been turned over. In some cases they can transfer to nearby larger irrigation systems. Others may be old enough that they can retire early. However, often they are local residents who cannot easily move, and who rely on other work to supplement their low pay. Sometimes the WUA is willing to pay them to continue working, but usually cannot afford to pay even as much as they are currently receiving.

Many system-level staff are daily workers who have no official right to continuing employment. However, moral commitments are felt to exist. In terms of the Public Works bureaucracy, reducing staff is threatening. In some areas, turnover implies that the PRIS may have to redefine the boundaries of subsection or even section offices. Even if irrigation inspectors continue in the same locations their duties will change dramatically.

The differences between provinces in staffing intensity and in area irrigated by small systems seem to be a major factor behind the differences in levels of support or opposition to the policy of turnover. Provinces with a high proportion of systems smaller than 500 hectares are more reluctant to carry out turnover. Provinces with fewer staff placed in small systems as gatekeepers and canal guards, and with large areas of medium and large scale irrigation systems, tend to agree more with the idea of concentrating on improving government O&M in larger systems and transferring small systems to farmer management.

Staff readjustments are being carried out, using the methods discussed above. However, the difficulty of such changes has been one factor leading to a slower pace of implementation or spreading the project across a larger number of areas so that the impact is more gradual for any specific section or subsection.

CONCLUSIONS

The turnover program shows that it is possible to shift responsibility for irrigation systems from the government to the farmers. In the Indonesian case there were specific factors which made a change in policy possible. These included a fiscal crisis, encouragement from the World Bank and other donors and a series of research and action projects showing farmer capacity in irrigation management.

From a national point of view, turnover offers the prospect of reducing government expenditures on O&M of small systems and establishing a better division of labor between the government and the local communities. However, for the agency this may create problems concerning transferring and releasing staff. Turnover reverses the process of takeover of farmer-managed irrigation systems, blocking one route for bureaucratic growth. Thus, unless there is strong backing from policymakers and donors, it is unlikely that the policy will be able to overcome bureaucratic interests in maintaining the status quo and seeking growth in budgets and staff.

For farmers, the most immediate benefits from turnover come in the form of the improvements made to irrigation systems. Turnover recognizes and legitimizes water users' roles in managing irrigation systems. It gives them more explicit authority over the irrigation system.

Farmers may have to pay for operations and maintenance if they take over work that government staff did previously or if the WUA undertakes additional O&M activities. In most systems farmers already do most of the work

of maintenance and distribution, so the additional expenses in time and money accompanying turnover should not create a great burden.

The existing high level of farmer management in government and farmer managed irrigation systems strongly suggests that in general WUA should at least be able to maintain current levels of performance concerning water distribution and routine cleaning of canals. The actual level of performance will depend on many factors. Farmers in water scarce systems will be much more active than those with abundant water supplies. Government technical help in identifying and solving maintenance problems can play a crucial role in helping farmers to maintain the physical infrastructure of irrigation systems.

It is not yet clear to what extent staff or other resources freed up by turnover will shift to other activities such as river basin management or improved O&M in larger irrigation systems. One tendency on the part of agency officials is to suggest that irrigation inspectors and other staff above the system level should stay in the same area but provide more guidance and assistance to farmer managed irrigation systems.

Indonesian experience suggests that turnover is most likely to succeed if begun by involving farmers in design and construction of irrigation system improvements. In countries where government involvement is relatively small it may be worth considering whether the government can simply turn over systems by administrative reclassification. If the irrigation bureaucracy is powerful, as in Indonesia, it may be more feasible to accept the principle of making some improvements to all systems. The priority would then be to match investment to needs and potential benefits, with only token amounts for systems which are already performing well compared to nearby systems.

The Indonesian experience is more ambiguous concerning the role of formal water user associations. Formation and official registration of such associations is clearly possible. However, as long as such formal organizations offer few practical benefits for farmers it is unclear whether or to what extent they will actually improve on existing irrigation management institutions. If the government can legally transfer ownership and management authority to existing indigenous organizations, then this might be preferable. Policy should ensure that such organizations can take on additional responsibilities, if and as needed, for example to make contracts or borrow money (Korten 1987).

Specific procedures helped enable and facilitate local participation in making decisions during design, construction and preparation for turnover. Agency field staff, even some with only primary school education, learned to work with farmers in a participatory approach as part of a large routine program. Adequate support in terms of training, guidelines and procedures, coaching, backstopping from other staff and logistic support (e.g., travel funds) is essential. The specific mechanisms used to facilitate participation in design and construction are similar to those now applied in many countries. Clearly, many ideas from the Philippines (Korten and Siy 1989) can be adapted to other circumstances. In Indonesia turnover is the first large routine program to include such methods, which were adapted and refined in earlier pilot projects.

Turnover should allow a better division of labor between the government and the local organizations. The government can focus its scarce resources on those activities where it has the strongest comparative advantage, particularly tasks requiring a high level of technical skill, funding or political authority. The turnover project shows that government intervention need not result in a one way loss of local control. Turnover can restructure the balance between the government and the local roles to restore a greater role for local ownership and management of resources.

NOTES

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Figure 1. Sequence of Turnover Activities.

