The Role of Rural Credit Institutions in Irrigation Management Transfer

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IRRIGATION DEVELOPMENT FINANCED by the major donor agencies since World War II has required focusing on rapid expansion of irrigated lands to dramatically increase food production. This has required the need for large construction projects, initiated sometimes at the expense of parallel institutional development that would support sustainable management in the future. In this process, many local indigenous irrigation institutions have been overlooked in terms of their potential contribution to water management (Coward, 1980).

Nowhere is this more true than in Nepal, where irrigation development in the Terai (plains) bordering India during the last two decades has focused on the construction of large-scale irrigation systems. These systems are built and then turned over to the country's irrigation agency. Yet, only a few miles away in the Siwalik foothills lie some of the most successful and enduring village irrigation institutions in South Asia (Pradhan 1989). Over the last decade or so this indigenous water culture has re-emerged out of the shadow of large projects and is beginning to influence the approach taken toward the management transfer process.

Nepal is clearly at the threshold of a very important transition in the development of its irrigation institutions; in the direction of autonomous, self-governing, non-profit water user cooperatives or associations. This is basically the hill country water culture. This paper is about the transition and what it will require in the form of government assistance and local institutions of credit if it is to succeed.

THE PROBLEM

Resources currently being provided by donor agencies to further expand the irrigation sector in Nepal are clearly strategic to the success of management transfer programs. Some of the problems and constraints associated with these efforts that frequently lead to failure can be identified.

Donor resources often tend to be used in ways which do not promote institutional strengthening in the irrigation sector. An example is when a project does not use the improved water service from a construction program to obtain compliance from farmers to develop or improve their own water user association (WUA). All too often WUA formation is viewed simply as a compliment to construction, rather than as an agency construction planning and execution being driven by measurable success in WUA development.

Farmers benefiting from a rehabilitation-construction project undertaken in support of management transfer are generally not required to form a WUA and demonstrate their ability to operate it as a non-profit "business house" before project construction activities are initiated. Reasons will be given for why this is viewed as a weakness in most rehabilitation programs associated with management transfer. Key factors that can lead to successful WUA formation in this kind of compliance program will be identified.

There appears to be little irrigation agency awareness of designing construction programs in a way that the future maintenance cost of the system can be supported by an irrigation fee collection program managed by a WUA. For instance, construction programs which emphasize expensive canal lining or other major engineering design may not automatically benefit producers in the future. The benefit of any such construction program must be weighed against the ability of a newly formed WUA to finance a routine maintenance program that keeps such engineering design operational in the future.

Often, new WUAs are crushed under the weight of an operation and maintenance (O & M) cost they cannot bear. New project design represents a high "mortgage payment" in terms of O & M costs that irrigation fees generated from local farm income cannot routinely cover. Faced with such a situation, newly formed or reconstituted WUAs turn to the central government for additional assistance which the latter cannot afford. The worst case scenario is when the WUA collapses under the weight of needlessly excessive maintenance costs from over-design, frequently resulting in abandonment of the WUA altogether by the beneficiaries. This leads to continually deferred maintenance and eventually to another round of donor-financed rehabilitation in subsequent years.

This paper will review previous projects in Nepal that were generally designed to provide system rehabilitation and financing to WUAs through direct subsidy and cost-share programs. Many of these programs were designed to strengthen existing WUAs or pave the way for new ones. Generally they did not attempt to link future O & M costs to future average farm income anticipated from the project, and/or the programs were driven by extremely liberal cost-sharing that required only minimal compliance of system beneficiaries to strengthen their WUA.

In addition, adequate rural credit institutions that could make low-interest loans available to such associations in the future to cover unexpected large maintenance costs were not perceived as part of the solution to sustainability. In short, the programs were designed to build irrigation systems like houses that no-one could afford to pay the "O & M mortgage" on; most particularly autonomous, non-profit WUAs that would collect their own O & M fees in the future.

WHAT MAKES A GOOD WUA

If one turns to examples of sustainable water user associations in other parts of the world (Maass and Anderson, 1986; Enge and Whiteford 1989; Hutchins et.al. 1953), one tends to find four key features generally present. The first is some form of local government for the association, based on the principle of voting and adequate checks and balances in the leadership structure. Such associations are independent of any local or central government influence other than legal certification and auditing. This is what is generally meant by self-autonomy in association governance.

The second feature is some form of association record keeping, no matter how rudimentary, designed to maintain records on labor mobilization, donations and/or fees, water delivery scheduling, association membership, and some rules about how water is to be managed and divided among beneficiaries during normal and unusual water supply conditions.

The third key feature is the presence of an association water delivery work force, however small, appointed and supervised by the association leadership to oversee the management of water in the association command area.

The fourth is the allocation of water and collection of irrigation fees by shares, meaning that a beneficiary's water right in the association's collective supply is roughly proportional to the contributions made by that same individual to the cost of operating and maintaining the irrigation system on an annual basis; in cash, produce or labor equivalent (Figure 1).

These four features are found in the traditional irrigation systems of Nepal (Pradhan, 1989), both in the hill country and the Terai. They are now being used to inform the design of larger and more formal non-profit water user associations that are targeted to assume management of large systems currently managed by the irrigation agency.

In 1991, the United States Agency for International Development (USAID) sponsored the Irrigation Management Project (IMP) to begin the process of training Nepali irrigation agency personnel in recognizing the importance of local hill country irrigation traditions. This was followed by the establishment of pilot areas designed to train farmer leaders currently producing crops under agency-managed systems in how to take these four key features and design their own WUA with the encouragement and occasional help of indigenous hill country association leaders. The communication between farmers in agency-managed systems and those in traditional hill country systems has led to a sharing of ideas and has reinforced the need and desire of the former to assume responsibility for system management in the way the latter do.

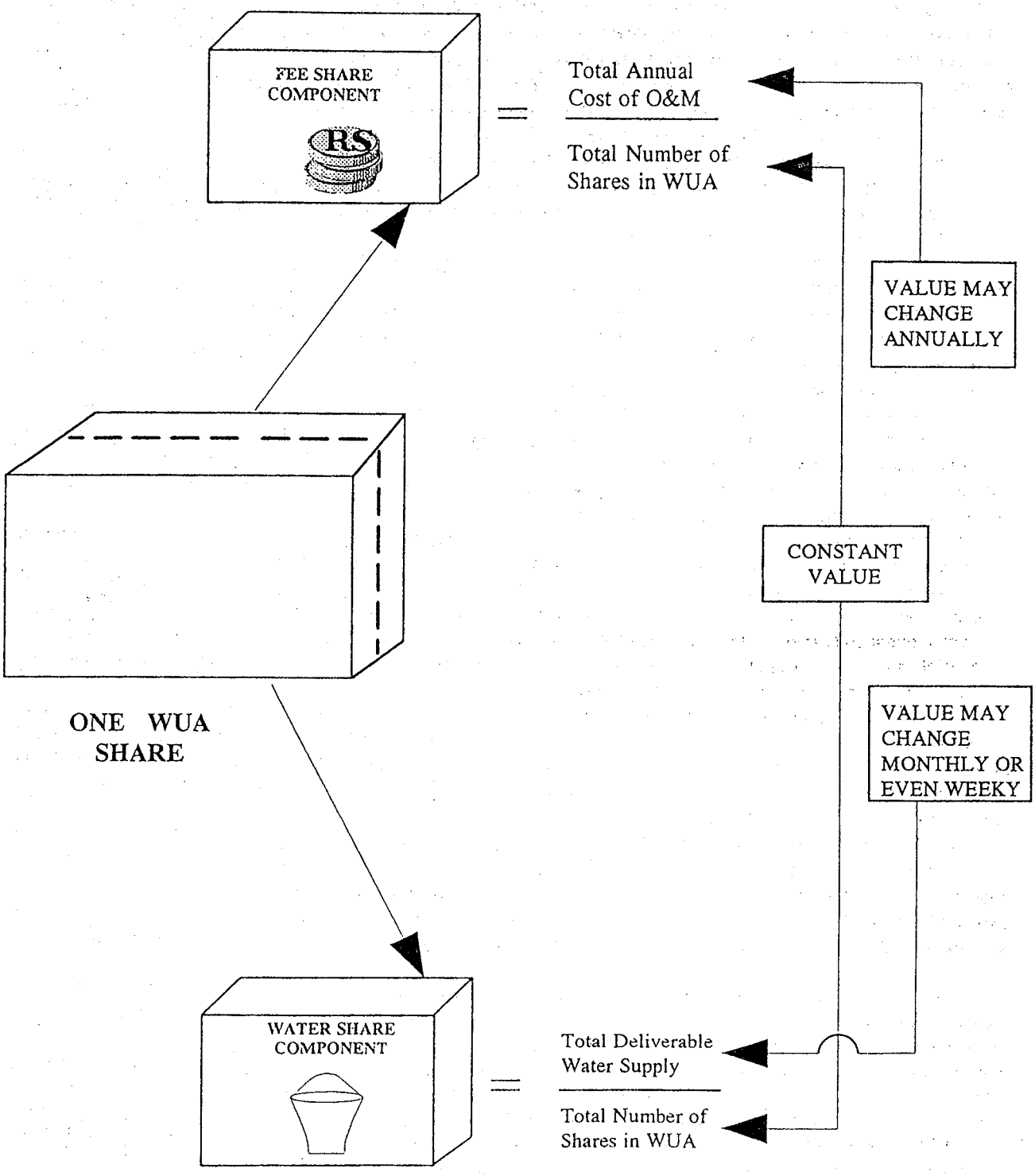
RURAL CREDIT IN THE CONTEXT OF PRIVATIZATION

The need for rural credit to finance autonomous WUAs would suggest privatization of the irrigation sector. This is not entirely accurate because of the nature of WUAs. There is of course much privatization occurring within the irrigation sector in South Asia (Shah 1993; Geoffrey 1990). What is occurring in Nepal is more similar to traditional irrigation in the Mediterranean (Aymard 1864; Maass and Anderson 1986) and the development of non-government financed irrigation in the western United States ([Hutchins, 1929; 1951]). It is more of a cooperative movement leading to non-profit associations.

The non-profit nature of an association of beneficiaries organized into a water cooperative is best explained by the concept of a "share." A share in an association usually conforms to the definition diagrammed in Figure 1. The total number of association shares is more or less constant once they are defined and fixed. What changes from year to year, and even over the course of an irrigation season, is the "floating" fee component and water component of a share.

An O & M fee per share might be set by the association some time prior to the beginning of the irrigation season, to be paid in cash, labor or kind at some specific time during the year. In any event, the association would divide the entire projected O & M cost by the total number of shares in the cooperative to obtain the O & M fee per share. A degree of water measurement and some record keeping is essential for a water cooperative; hence the need of a small WUA-financed water delivery work force.

Figure 1. The "Floating" Components of a share for share systems.



The right to use a portion of the total deliverable supply available to the association (total supply less conveyance and seepage loss), might be re-adjusted during the irrigation season, depending upon local conditions and scheduling needs. In any event, the total deliverable supply of the water cooperative would be divided by the total number of shares to obtain the unit value of water per share.

In Nepal, a share is most often defined by a unit of land, although it could easily be a farmer's initial investment in a newly formed association or the proportional contribution made to a rehabilitation program. This is of no consequence, as long as the elected general assembly of the association agrees on: 1) the tangible entity that defines a share unit; 2) the projected O & M cost of the entire system, and; 3) the rule that one's proportional share of association water is no more and no less than one's proportional share of the O & M cost. Any other formula leads to inequity and a general breakdown in the association (Freeman, et.al. 1989).

We have thus defined an association to be a collection of beneficiaries who share proportionally the O & M cost and water supply of a particular irrigation system. An irrigation system built by donor agency-irrigation agency collaboration, designed to be operated as a hydrologic unit, and managed by an independent association is the basis of the current thinking about management transfer in IMP.

A joint management framework is not really what is being suggested here, but rather a framework where the association manages the system autonomously while the agency provides consulting services, training support and catastrophic emergency services. This is considerably different from recent discussions regarding farmer-financed irrigation systems. In these discussions, the organization responsible for system management is still perceived as an agency of some kind rather than a water cooperative (Small and Carruthers, 1991; [Chambers, 1989]). A water user association, as it is defined in this paper, is clearly not an agency.

It is appropriate for a water cooperative or association to reimburse the central government over an extended period of time, say for ten years or more, for initial construction or rehabilitation. The association merely charges each share an irrigation fee each season sufficient to meet expected O & M costs, with perhaps the maintenance of a small contingency fund, in addition to whatever it may owe the government for cost-sharing new construction or improvements. All these various costs are folded into the fee per share.

Incidently, the more shares a farmer has in the association, the more cost burden he takes on for operating and maintaining the system. This frequently leads to a share transfer or rental market for water within the command area of the association, since shares of water not used by a farmer are nevertheless costing him in fee assessments. This is what is already developing in one of the pilot areas in Nepal, and it has been self-generated by the farmers in the system in question (Table 1). They have developed their own share transfer program to move water around to its most beneficial use, and to relieve those of a portion of their normal share fee assessment. Shares move within an internal rental market in the association command area only.

In summary, the association envisioned in IMP is not a for-profit association or company. It is a non-profit association or water cooperative, much like a marketing cooperative, with a small office, a few employees, a record keeping program, customers who are beneficiaries of the water supply managed by the association, a governing body and a set of rules and regulations ratified by a general assembly of beneficiaries, and registered by the government in some way that recognizes its legal status.

The availability of rural credit is viewed as essential to these cooperatives or associations. When average farm income is not sufficient to meet increasing O & M costs, the association is forced to obtain financing to improve its system in a way that, although momentarily increasing beneficiary financial obligations to the association, will be expected to dramatically increase farm income. An independent association, designed to be self-sufficient, would not undertake such financial liability unless it was sure that the liability could be paid back through increased irrigation fees via improved farm income.

An association not driven by the architecture of a share system has no way of costing such improvement, and is frequently willing to enter into liberal cost-sharing with the government in hopes that the government will simply forgive the already minimal obligation. This is frequently what happens in current cost-share programs, where there is no leverage exerted by the government on the association to strengthen itself by way of the four key features previously mentioned. Local boutique owners in small market towns who seek out and obtain very expensive credit must shake their heads at this irrigation sector practice. In such irrigation development situations, rural credit institutions are of no consequence, and would never service these associations anyway. What tends to be created in such programs are very shaky irrigation sector "business houses" that are not self-sustaining in any true sense of the word.

VARIOUS APPROACHES TO MANAGEMENT TRANSFER

The process of turning over the management responsibility of irrigation systems to farmers has been an important concern for irrigation professionals in Nepal since the 1980s (Laitos et al. 1992a). The idea has repeatedly been addressed in many policy documents ([Action Plan, 1989]; Irrigation Policy, 1992). Specifically, in the [Action Plan for

Turnover Programs (1989)], agency-managed irrigation systems designed to serve less than 2,000 ha in the *Terai*, and less than 500 ha in hill country, were targeted for turnover to farmer associations of an unspecified type. However, although the turnover program implies a full transfer of O & M responsibility and authority from the agency to farmers, there is generally no vision of WUAs as local "business houses" that would make use of rural credit institutions in any way.

The IMP initiated a pilot turnover program in 1988 at the Handetar Irrigation System in Lamjung. At about the same time, the Asian Development Bank's Irrigation Sector Program (ISP) and the World Bank's Irrigation Line of Credit (ILC) program were also initiated in Nepal. However, both the ISP and ILC projects tended to focus on improving existing hill country farmer-managed irrigation systems rather than on the larger agency-managed systems in the Terai in which very few WUAs were found. An exception was the independently managed Chhattis Mauja Irrigation System outside of Butwal, a large, sprawling federation of WUAs with an excellent history of self-financing (Ostrom 1992).

The use of the term "turnover" in all of these programs had more to do with the irrigation agency assuming temporary management of the system during rehabilitation, then effectively turning it back to the association after rehabilitation was completed (Laitos et. al. 1992b). The concept of a WUA integrating rehabilitation costs into their pre-existing share system by dividing the government's liberal cost-share obligation by the number of WUA shares in the system, or borrowing money from local credit institutions to finance the WUA's portion of the cost-share, and then dividing that loan by the number of shares in the WUA, were generally not considered. The existing share system, which in many cases might be more than 100 years old, was simply ignored as a mechanism of equitably financing the WUA's portion of the cost-share.

For the purposes of our paper it is important to briefly review the logic, method, and apparent results of these many efforts at system upgrading. All of them purported to be designed to provide maximum participation of system beneficiaries at all stages of program implementation. All of them purported to strengthen existing associations. Finally, all of them purported to improve irrigated agriculture through better use of water, improved cropping patterns, and self-sustaining canal systems.

It is not the intention of this paper to be over critical of these programs. The final true evaluation of such programs is yet to come. However, initial investigations suggest that they tended to weaken associations rather than strengthen them, and that this weakening came from the general inability of beneficiaries to finance the long-term maintenance of system upgrading through their own association irrigation fees in the future. The systems all carried expensive "O & M mortgages" upon their completion, far surpassing the average local farm income of beneficiary shareholders. They were "cadillac projects" designed for people who could really only afford simple, low-cost modifications in system design if they were at all to finance O & M through their traditional share system of fee collection or labor mobilization program.

IMP Experiences

The Handetar Irrigation System, an agency-managed irrigation system with a command area of about 200 ha, was chosen by the IMP as the first pilot site for actually transferring the responsibility and authority of O & M over to farmers. The stated strategy was as follows. Farmers were organized into a two-tiered organizational structure to participate more effectively in identifying essential structural improvements in cooperation with agency engineers. This was sort of a federation of associations but without any real linkage to the traditional share systems, where rehabilitation and future O & M costs would be assessed against an individual beneficiary based on the number of traditional shares he/she had in the system.

System beneficiaries and their WUA were to be given necessary O & M training to manage the system in the future. The irrigation agency and farmers were to jointly set up a schedule for essential structural improvement works. Technically complex improvement projects were to be given to professional contractors who would follow irrigation agency designs. Relatively easier works were to be given to individuals or group of farmers in the system command area. The idea of giving contracts to farmers was to encourage farmer participation and to help raise funds for the farmer groups that could be used for future operation and maintenance works.

However, this strategy tended to again bypass the traditional share system, by not allowing the WUA to determine its portion of rehabilitation cost, divide this cost by the number of existing shares in the association, then assessing these shares, pooling the assessment, and collectively going out as an association and hiring a local contractor to perform that portion of the rehabilitation given to the WUA, and then supervising this work.

The irrigation agency and farmers were to jointly prepare and implement an operations schedule. The irrigation system was then turned over to farmers with an understanding that the agency would provide technical support whenever needed. The agency also agreed to provide financial support in case of catastrophic damage to the system.

Despite what appeared to be a fairly straight-forward program, farmers of the Handetar Irrigation System declined to assume management of the system. The most important concern appeared to be the inability of the WUA to support future financial costs associated with the O & M of the system. We think it may have been a classic case of a "cadillac

system" whose O & M costs could not be supported by the average farm income that could be generated from improved water service coming from the project: a painful lesson repeated many times in the western United States under Bureau of Reclamation projects (Reisner 1986).

In addition, there was little ability of farmers to enter into an association agreement that would allow them a degree of financial autonomy to collect irrigation fees, award contracts to the private sector for future maintenance works, and to obtain loans from local banks and credit institutions. The legal authority and provisions for engagement in such financial affairs were largely overlooked by the program.

Although not a part of the overall IMP effort, there were additional needs that should have ideally accompanied this institutional development program at Handetar. A farming community assuming new responsibilities for irrigation system management would necessarily require other support services. These services were not to be confused with the activities designed to develop associations, but would certainly address the need for augmented farm income necessary to pay future irrigation fees.

The farming community was in need of agricultural support services and subsidies such as improved seeds, chemical fertilizers, marketing strategies, storage facilities, agri-business loans, etc. There was a need for assured channels of technical support and other services (e.g., training, research, etc.), both private sector and governmental, that farmers could access when needed. The narrow scope of the program precluded the development of these essential support services. It did not view irrigation sector development in all of its complex characteristics and needs, most particularly its financial future.

Though these kinds of supplemental support services were always a matter of discussion, there were no full-fledged programs to incorporate such dimensions into the overall IMP package. The Agricultural Development Bank of Nepal (ADB/N) had provisions for credit lending to organized farmer groups, but the requirements for collateral make it difficult for newly emerging water user associations to obtain any favorable financial support from these sources. The system was handed over to an association, but the association lacked the means of sustaining itself as a "business house" in any way.

In retrospect, the farmers of the Handetar Irrigation System were in need of a reliable sources of income for their newly-formed water user association to fulfill the responsibility of system O & M. This would have come from an equitable fee assessment program based on their traditional share system, or perhaps borrowing the experiences of a neighboring WUA with a good share system. Specific immediate and future needs requiring this financial basis were the procurement of maintenance materials and skilled labor when needed, setting up a contingency fund for catastrophic maintenance, wages for a water delivery work force, and expenses associated with the organizational management activities such as a small association office, book keeping, professional auditing, holding meetings and elections, etc.

To meet these financial needs, a provision would have been required allowing the association to retain 25 percent of the government-mandated water-cess, which itself was not clearly administered (Laitos et al. 1992a). All financial needs for the association were to be met by mobilizing in-kind goods and services, and labor mobilizations and/or cash payments by farmers for seasonal and periodic maintenance. The concept of a cash basis for the association as a "business house" was never really contemplated.

In retrospect, it seemed logical for the program to have conducted and completed the system improvement at a level that could be financed by the association in the future. The Handetar association would then have set its O & M cost each year, divided this cost by the number of shares or land units in the system to get at the fee obligation per unit/share, and then to have developed a record keeping program to collect this fee and to have sanctioned beneficiaries who did not pay their fees on time. The ability to conduct this kind of simple financial management would have created opportunities for fulfilling future credit needs through local financial institutions. Without the ability to manage a fee collection program, there was no way the association could approach lenders. A proven ability as a "business house" over even a few years might have been sufficient to secure credit for further improving and expanding the association command area in the future.

Joint Management Program

The current joint management program, as discussed in the [Action Plan for Joint Management Program (1989),] and the Irrigation Policy of 1992, is based on the idea that the responsibility and authority of O & M of relatively larger irrigation systems would be jointly undertaken by the irrigation agency and organized farmers. This is to be the policy for irrigation systems greater than 2,000 ha in the Terai and 500 ha in the hill country.

This sharing of O & M responsibility of an irrigation system between the agency and farmers suggests three different organizational scenarios. The first is one where the irrigation agency and a water user association jointly conduct all system management activities up and down the entire irrigation system upon completion of rehabilitation. In the second scenario, the irrigation agency and the water user association carefully delineate their spheres of responsibility. Turnover points are then identified in the irrigation system.

A third scenario is where farmers participate in management activities up to, and above, the turnover point in collaboration with the agency. In other words, the association and its beneficiaries are fully responsible for system O & M at one hydraulic level of the system, while being jointly responsible with the agency at another level.

All these joint management situations reflect transfer of O & M responsibility to the farming community, but to a varying extent. The first situation is more akin to the concept of participatory irrigation management based on agency-farmer interactions. The latter two tend to emphasize more the role of an autonomous, or at least semi-autonomous, water user association with its own government, record keeping program, water delivery work force, and water distribution program based on some form of a share system.

In 1987, using the third scenario, IMP adopted a joint management approach to managing the Sirsia Dudhaura Irrigation System (SDIS) of Bara district, Nepal. This agency-managed irrigation system has a command area of about 1,300 ha. In this pilot program, IMP followed a similar strategy to that used in the Handetar Irrigation System. However, a basic difference in the two pilot programs was in the final objectives.

While the Handetar Irrigation System was to be turned over completely to farmers, without any clear specification of the role of an association, the SDIS was to be managed jointly by the irrigation agency and farmers. In other words, the responsibility and authority of O & M in the latter case was to be transferred only partially. It is not clear to what degree this strategy was due to the failure of the Handetar pilot project, but there may have been a connection.

Farmers of SDIS were highly enthusiastic and participated in the joint management program as long as they were individually awarded maintenance contracts. After the completion of the structural improvement program they became reluctant to share the responsibility of system O & M. Instead, the newly formed farmer organization continually stressed the need for more and more government funding. This increased the dependency on the agency, and minimized the need for developing some degree of financial autonomy through a water user association and share system.

Irrigation Sector Project

To encourage a government policy of allowing Nepalese farmers to construct and manage their own traditional irrigation systems as autonomous entities, and indirectly to promote the expansion of a private irrigation sector as we have defined it above, the Asian Development Bank (ADB) provided a loan of SDR 28.132 million in November 1988 for the Irrigation Sector Project (ISP). This has now been succeeded recently by a second phase of the project.

The first phase of the project included 33,000 ha of irrigated land, while the second phase includes 40,000 ha. They are designed to enhance employment opportunities and farm income through rehabilitation and improvement of existing farmer-managed irrigation systems, construction of new small and medium scale surface irrigation schemes, and strengthening WUAs as well as regional and district offices of the irrigation agency which has been, and will continue to be, the executing agency for the project.

The approach adopted under ISP involves the formation of WUAs and construction committees representing the farming community. These committees are supposed to work closely with the irrigation agency staff in the design, execution and supervision of construction. Farmers are required to contribute 5 to 25 percent of the total construction costs, both in cash and labor, depending upon the size of the irrigation system and the cost per hectare. Upon completion of construction, farmers are to assume full responsibility for the system's future O & M.

However, there does not appear to be a specific institutional strengthening program designed to assist WUAs in ensuring their long term sustainability and autonomy. Despite the fact that the program has been said to be successful, the effectiveness of WUAs in assuming O & M responsibilities on a long term basis is yet to be realized in most systems.

During the construction phase, farmers often reported an inability to meet their share of cash and labor contributions. The major reasons for this were: 1) the inability to mobilize the required amount of resources, and; 2) over-estimating project costs. Farmers often made the point that the amount of work estimated by the irrigation agency could be done at a much lower cost if done by farmers themselves, thus greatly reducing their part of the contribution.

In other instances, the contributions required from farmers to fund the project initially were often postponed or negotiated downward in order that government funds could be allocated and the project could move forward. In the early stages of ISP, the level of project funding was a measure of progress of the overall program. This tended to reduce farmer willingness to make fair contributions through their WUA, or to pursue loans from other agencies or the private sector. Foregoing farmer contributions in the interest of moving the construction program forward tended to reinforce the notion that government terms and funding were easy to manipulate. These factors, along with insufficient credit facilities, have greatly suppressed local level initiatives to form or strengthen autonomous and self-sustaining WUA "business houses."

The Proposed Irrigation Management Transfer Project

The ADB has prepared a loan program, also supported by USAID in part, to support management transfer activities of joint management and total system turnover in Nepal. Objectives are to refine and institutionalize the process and strategies for transferring O & M and/or ownership of public irrigation schemes to farmer beneficiaries in accordance with their capacity to mobilize local resources. Ten sub-projects under the program are Khageri (3,900 ha), Panchkanya (600 ha), West Gandak (10,100 ha), Hardinath (2,000 ha), Manusmara (5,200 ha), Kamala (25,000 ha), Chandra Canal (8,700 ha), Banganga (6,100 ha), Pathraiya (2,100 ha), and Mohana (3,500 ha) irrigation systems.

The rationale for this program is to meet the urgent need to rehabilitate and improve publicly managed irrigation systems and to involve farmers in the O & M of the schemes. This approach is viewed to be more cost-effective than building new irrigation systems. Moreover, other expectations are that the Government's financial burden to operate and maintain the schemes will be greatly reduced, and that the performance of the schemes will be more sustainable. Accordingly, the project has been designed to rehabilitate and improve existing public irrigation systems in cooperation with farmers. The objective is to turn over the O & M and ownership of the systems to WUAs, to the extent possible as per their capacity to mobilize local resources. What is currently happening at the Khageri Irrigation System is supposed to be a prototype for this management transfer program.

Approximately 20 percent of the total rehabilitation construction cost is to be contributed by beneficiaries. However, the exact contribution would be determined through negotiations between the agency project manager and the executive committee of the relevant WUA.

Under the component of establishing viable WUAs, the objective is to enable farmer-beneficiaries to work collectively so that they can: (1) operate and maintain the projects through their own resource mobilization program; and; (2) achieve reliable, equitable and timely water supply and distribution through an effective water delivery program formulated by themselves. The project would provide support for the strengthening of the WUAs in all 10 project areas in the form of training courses and farmer-to-farmer training in leadership, WUA administration and financial management, gender awareness, operation and maintenance, quality control, and dispute resolution.

In the project areas, the average farm size ranges from 0.70 ha to 2.2 ha. Most of the beneficiaries are small farmers who live below the poverty line. In this scenario, farmers are expected to need access to external financial resources beyond the capacity of their local WUA to generate irrigation fees, both for their contribution during the rehabilitation program and afterwards to take over the O & M responsibilities fully or in part.

Similarly, these newly formed WUAs in previously agency-managed irrigation systems will most probably have to depend upon the government agencies to some degree for technical assistance in relation to O&M and agricultural extension services. However, there are currently no provisions to include financial assistance to WUAs in the form of credits or loans, technical assistance, and agricultural extension services in the effort to formulate viable, autonomous and self-sustaining WUAs.

IRRIGATION POLICY 1992 IN RELATION TO IRRIGATION MANAGEMENT TRANSFER PROGRAMS

The objectives of the Irrigation Policy of 1992 provide a firm ground to develop local irrigation organizations as autonomous entities in the private sector, ensuring their sustainability from the technical, financial, institutional and environmental perspectives. In this regard, the responsibility for providing required agricultural inputs for intensive agriculture as per the demand of irrigators has been charged to the Agricultural Development Bank of Nepal (ADB/N), the Department of Agriculture, and other related institutions.

Irrigation agency system managers are envisioned as playing a catalytic role in the newly formed water user associations. Though the involvement of irrigation system managers may be helpful in the primary phases of autonomous WUA development, the farmers need not depend upon any external agency for access to agricultural support services. Ideally, farmers should have direct access to any agricultural support services as and when required.

The WUA can also approach the local irrigation agency office at the district level to secure the needed technical assistance in pursuit of irrigation management tasks. However, other alternatives and provisions such as the authority and ability to seek services from the private sector would also be granted.

In relation to financial sustainability, the new policy provides the WUA with the right to fix, realize, and spend their own irrigation service fees. This right is in addition to the full ownership of the irrigation system and its related structures. In case of jointly managed systems, the water charges fixed by the government can be exempted up to 50 percent. This may be viewed as a government subsidy to farmers for partly assuming the O & M responsibility of the irrigation system. Similarly, the arrangement for cost-sharing by the government in different types of irrigation development efforts provides an important way of providing financial assistance to the farming community.

Moreover, the government of Nepal is intending to provide grant-assistance in case of natural calamity or crop difficulties over five year periods. However, provisions for WUAs to access credit in local markets to insure self-

autonomy and financial independence are still not well-defined. Presumably, local banks including the ADB/N, could be sources of credit for WUAs in the near future. Yet the legal status of WUAs in obtaining credit or loans as an autonomous "business house" is not well stipulated in the project.

A provision in the Irrigation Policy of 1992 requires the WUA to deposit an amount of 0.5 percent of estimated cost of any project which is to be operated and maintained by itself in the future. This is to be deposited in a joint bank account held by the local irrigation agency office and the WUA as a security. However, this provision tends to contradict the provision for transfer of full ownership of the irrigation system and related structures from the agency to the WUA.

FINANCING WATER USER AUTONOMY

There are three important points to consider in the long-term financial management of water user associations. The first is the method by which O & M costs are equitably distributed across all beneficiaries in the irrigation system. The second is the need to set irrigation fee rates at a level which the beneficiaries of an irrigation system will be able to pay in the future on a regular basis.

We view these as the issues of equity in payment and rate setting for WUA financial management. They are very closely related to each other in how they are effectively dealt with by an association. They are also greatly impacted by the way the management transfer process is conducted, and the degree of rehabilitation or new construction assistance provided by the donor through the local irrigation agency.

Equity in Payment

Figure 1 presents a method of setting fee assessments for water user associations through what is called a share system. This method is now being experimented with in the Khageri Irrigation System as part of the irrigation management transfer process.

The issue of water cost and fee rate setting is really contingent upon the total O & M cost for the system. This cost is, in turn, a function of the technology designed for the system. Technologies which require high maintenance costs, even if their installation is paid for by the donor, are ones which place a high "O & M mortgage rate" on the system in terms of O & M as well as project cost reimbursement. Even if system beneficiaries are only required to pay back five to ten percent of project costs, the O & M cost of operating the system through an autonomous association might be prohibitive. An example might be where canal lining is not used judiciously in order to make use of the benefits of well-seasoned earthen canals in those places where lining is not really needed.

Equity in payment is achieved by dividing the total O & M cost by the number of shares in the association, as determined by the beneficiaries themselves when their general assembly of users decides upon what constitutes a share in the system (land unit, percentage contributed to system rehabilitation, etc). Of course, it is assumed that each share of cost to cover O & M is equally represented by a proportional share of the usable water supply in the irrigation system (e.g. less conveyance loss or seepage in the main canal and its principal distributaries). We previously defined this as a "share system." It also required a record keeping program, a water delivery work force, and a WUA government for its administration.

Irrigation Fee Rate Setting

The cost of water for autonomous WUAs is basically whatever their beneficiaries are willing to support. However, the lower the irrigation fee, often the lower the service provided to beneficiaries, since the cost of O & M is directly reflected in this fee. For instance, one WUA with 1000 beneficiary shares and an annual O & M cost of Rs 100,000 would have much more expensive water per share than a WUA over the hill with the same number of shares but with an O & M cost of only Rs. 10,000.

In the former, the cost of water per share would be Rs. 100, whereas in the latter the cost would be Rs. 10 per share. However, the amount of water per share in the former might be much greater than in the latter. This fluctuating value of the cost of water and the fee associated with it is a function of the share system as defined in this paper. The important point is that the irrigation fee is set and administered by the WUA to meet its individual needs, not by an irrigation agency.

The Ability to Pay Irrigation Fees

One point that is critical to a donor-financed rehabilitation and management transfer program is the ability of farmers to pay for O & M in the future. A project that is capital intensive in terms of construction, but with the potential of only marginal farm income, will have a potentially high O & M cost and a low ability to pay. A project that involves only

essential construction designed to maximize water conservation and minimize future O & M, and occurring in an area with good commodity markets, will generally result in low O & M costs and better ability to pay irrigation fees.

Any management transfer program designed to maximize the ability and willingness of farmers to assume the financial management of an irrigation system must recognize that whatever is physically done to the irrigation system must be measured by the degree to which it will increase or minimize O & M cost, relative to the average farm income found in the project area. A good management transfer program is one which leaves an "O & M mortgage rate" on the irrigation system commensurate with the ability of the farm producer to pay in the future through his/her WUA O & M fees which are set by the WUA share system.

THE ROLE OF CREDIT IN THE TRANSFER PROCESS

With a well-administered management transfer program that has been careful to leave behind a system with minimal O & M costs and hopefully a reasonably good water supply, the newly formed WUA and its share system are now prepared to sustain the system for some time to come. However, as with any "business house" of this nature, the system may require credit resources to modify or expand the system in the future. This option cannot be made available unless WUA creditworthiness is guaranteed, and unless there are provisions to provide low interest rate financing for such associations.

Water user associations will always have somewhat of a collateral problem, since there are no real property assets of the association other than a few lined or earthen canals, perhaps a storehouse, and a few office items. What constitutes the collateral of the association is its ability to routinely collect irrigation fees, to pay for its normal O & M costs, and to provide a water service to its beneficiaries which result in continuous improvements on the land and increased productivity. A good water user association "business house" is known to potential creditors as a creditworthy risk by the ability it has to perform these tasks, not by the real property it owns.

The need for credit in these newly formed associations will be substantial as they gradually improve their command area and bring better service to their beneficiaries. Expenses for training, the hiring of a reliable water delivery work force, improvement in water monitoring and measurement, improvements in record keeping, and the overall supervision of the irrigation system may be expected to exceed the ability of beneficiaries to pay in any given irrigation season.

We might take an example. Let us say that over a period of several years the general assembly of beneficiaries has continually set their irrigation fee at Rs. 100 per share in the system. This may have been sufficient for these years, but the system now requires some major maintenance. Unfortunately, farm income has declined over the past few years due to over-production of certain crops. The WUA now must consider a loan to cover deferred maintenance. Its ability to obtain a loan will hinge on the success it has had in its fee collection program and the willingness of local credit institutions to give low interest, long-term loans to water cooperatives of this nature.

Even if the association has had a good record with its fee collection program, and can demonstrate this to the credit institution in verification of its being a good risk, there may not be sufficient credit available in the local market place to finance such loans. This is where the central government must provide credit institutions to assist in the financing of this new "privatized" irrigation sector of non-profit water cooperatives.

Rural credit for such associations will be an essential part of the development of this irrigation sector in the future. Local credit institutions ideally would be encouraged by the central government to loan on system improvements, rather than merely on the original repayment program associated with the management transfer rehabilitation construction program. Credit institutions would be encouraged to recognize associations as credit-worthy if they had a good record keeping program and had success in their fee collection program over several years. Credit institutions would recognize achievements for good leadership and water service to their beneficiaries. They would recognize the degree to which farm income in the command area had increased as a result of the performance of the association. In short, the credit-worthiness of the association is to be reflected in the degree to which the command area associated with it is improving crop productivity and resulting in more diversified cropping patterns.

The role of the government would be to design a financial system for the rural sector which would recognize the need to provide such associations with credit, which would partly secure these loans in order that local credit institutions do not bear all of the risk, and which would leverage such loan programs against the need for associations to design share system administration in a way that will sustain the irrigation system over the years.

Water user associations, local credit institutions, the irrigation agency and the central government are involved in a necessary partnership in this endeavor. The association must perform on all of the four key points discussed earlier in the paper. The credit institutions must have the resources and incentive to extend the credit. The local irrigation agency must be prepared to assume the role of a consultant, or at most, supervising the management of large-scale irrigation systems clearly requiring specialized engineering skills. The central government must be willing and able to recognize the need of autonomous water user associations, and be prepared to recognize the need to privatize its irrigation sector through these non-profit cooperatives.

The early IMP, ISP and ILC programs were designed to provide a degree of participation by beneficiaries in rehabilitation construction programs. For this they should be praised in their design. However, they clearly do not go far enough in supporting a financially autonomous sector of water user associations. All of these programs tend to want to continue the strong linkage between association development and irrigation agency system management. Their vision of water user associations is one of appendages to the irrigation agency rather than financially-autonomous "business houses."

On the one hand, WUAs are given the task of contributing funds to rehabilitation, and to a degree participating in the design of the rehabilitation. On the other, their method of financing themselves prior to rehabilitation and the management transfer process is virtually ignored for its success in sustaining these systems for hundreds of years, even if the "fees" collected are in the form of labor rather than in cash. There is a contradiction in the approach taken by the irrigation agency, central government and the donor agencies. They are acting to develop the irrigation sector, but without any real vision of what constitutes a viable private sector for irrigated agriculture. As long as the vision of irrigated agriculture is limited in this way, it is felt that management transfer programs will continue to fall far short of their goals.

At the same time, new associations must be encouraged to perform on all of the four key areas mentioned at the outset of this paper. They must be allowed to develop their own association [government.] However, they must also be encouraged to maintain records, to hire a water delivery work force, and to finance O & M and distribute water through a share system. The central government, and to a lesser extent the donor agency, must leverage their management transfer and rehabilitation programs against compliance on the part of these new associations to fulfill these key points. Water user association leadership can be greatly aided by a program which provides resources from the central government, in return for agreement from all of the beneficiaries of the need to organize and administer a fee collection program and to operate a WUA "business house."

Table 1. Water delivery schedule of Khageri Irrigation System.

Pro Rated Flow: 6000 l/s

Total Land Irrigated: 6000 Bigaha
Total Shares to be Distributed: 120,000
(1 Katha = 1 Share)

S. N.	Section Rotation I				Section Rotation II				Remarks
	Branch/ Minors getting turn for water	Pro Rated 100% Share Value Quantity/ Share L.P.S.	Total Number of Shares	Pro Rated 100% Section Discharge L.P.S.	Branch/ Minors getting turn for water	Pro Rated 100% Share Value Quantity/ Share	Total Number of Shares	Pro Rated 100% Section Discharge L.P.S.	
1	Branch No. 1	0.1	7140	714	Branch No. 0	0.1	870	87	
2	Branch No. 3	0.1	17790	1779	Branch No. 2	0.1	15180	1518	
3	Branch No. 4	0.1	6840	684	Branch No. 6	0.1	15900	1590	
4	Branch No. 5	0.1	8850	885	Branch No. 8	0.1	8640	864	
5	Branch No. 6 West	0.1	13260	1326	Minor No. 1 Minor No. 2	0.1 0.1	6540 7710	654 771	
6	Branch No. 7	0.1	6450	645	Minor No. 3 Minor No. 4	0.1 0.1	3000 1830	300 183	
		Total	60330	6033		Total	59670	5967	

Note:

1. Before each section rotation, water measurement shall be carried out in the head reach of the system. The quantity of water for each share shall comply with the variations in pro rated value of flow in the source.

2. If the discharge in the source becomes less than 5000 liter per second then section rotation shall be imposed and every branch shall receive water according to the shares allocated to it's branch.

Table 2. Annual Budget Report of Khageri Irrigation Water Users Association.

Income				Expenditure			
S.N.	Description	Amount	Remarks	S.N.	Description	Amount	Remarks
1.	Membership Fees			1.	Stationaries		
2.	Share Sell			2.	Salary		
3.	Fines			3.	Allowances		
4.	Membership Renewal			4.	Maintenance		
5.	Grass & Tree Branches			5.	Miscellaneous		
6.	Donation and Aids						
7.	Miscellaneous						
	Total				Total		
					Bank Balance		

Signature: .....
(Secretary)

Table 3. Share Holder Certificate of Khageri Irrigation Water Users Association.

Share Certificate No.:

Branch No.: Pipe No.: Date:

This Certificate is awarded to land owner/tenant Mr. .....

Resident of ..... VDC W.N. ..... on buying shares as mentioned.

S. N.	Description	No. of Shares	Duration	Farm Plot No.	Area	Amount		Remarks
						Rupees	Paisa	

Signature
Share Holder

Signature
Chairman, WUA

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