
Learning From Nepal's FMIS Share Systems

In the hills and the terai plains of Nepal, active, productive and sustainable "water cultures" flourish. A water culture is a traditional pattern of learned behavior centering around the operation and maintenance of an irrigation system. Water cultures are particularly alive in those systems which were constructed and are being managed by farmers. These farmer-managed irrigation systems (FMIS) cover more than two thirds of the irrigated area in Nepal. There is much less of a sense of water culture in agency-constructed and -managed systems, where farmers have not had an opportunity to form organized groups to manage irrigation. It is quite common to find lying adjacent to one another an active FMIS with characteristics of a rich water culture, and an agency-managed system where a water culture is lacking.

A basic characteristic of water cultures is that farmers are organized into water users' associations (WUAs). These WUAs have local autonomy to select their leaders, develop rules and regulations for managing irrigation, administer the distribution of water in their service areas and resolve conflicts. Traditional patterns of behavior develop in time and true water cultures develop, as WUAs adapt to their own specific environments.

At the heart of many water cultures is a share system which is a water delivery and accounting mechanism whereby an association mobilizes resources from beneficiaries in return for a roughly proportional share of the available water supply in the irrigation system. Put another way, a share system is basically an organizational method of allocating water and mobilizing resources in such a way that an individual beneficiary's resource contribution to the association for operation and maintenance (O&M) is roughly proportional to the amount of usable water supply in the system that the association in turn delivers to the beneficiary.

A water share confers legitimate access to the water resource within prearranged rules, and it imposes a specified obligation to share in paying the water management costs (Freeman et al. 1989). The amount of cost for a share of water is roughly proportional to the amount of water to be received by the water. A user who receives two shares of water will have to pay in cash, kind or labor,

roughly twice that a user who uses one share of water has to pay.

One of the challenges of irrigation management in Nepal is to foster the development of water cultures in existing agency-constructed and -managed systems for more productive and sustainable irrigation systems. This means that irrigation systems must be managed by autonomous WUAs. One means of initiating the development of water cultures is to focus on the development of share systems. Necessarily, WUAs must develop representative leadership, rules and regulations for share system administration, a means of resource mobilization to cover the cost of O&M, and agreed-on means of allocating and distributing water.

Nepal's Share Systems

Fortunately, Nepal is amongst the world's best training and learning grounds for water cultures and share systems. Simple and complex share systems exist in large and small irrigation systems both in the terai plains and in the hills. There is no need to go outside of Nepal to find appropriate models of irrigation development. Often, the best teachers for share systems and water cultures are found in FMIS, sometimes only a few kilometers away from agency systems.

One of the striking features of Nepal FMIS is the variation of ways for organizing share systems. Different share systems have developed due to different historical backgrounds and different environments. Briefly, two examples of share systems are presented here, one from the Chattis Mauja Irrigation System in the terai, and another from the irrigation systems in Chherlung, situated in the hills of Nepal. Further descriptions of these systems can be found in Wilkins-Wells et al. (1994) and U. Pradhan (1987).

The share system, as mentioned earlier, is found at the Chattis Mauja Irrigation System serving about 6,000 ha in the terai. The basis for a share is a *kulhara* which is equal to 25 *bigha* of land (1.5 *bighas* is about 1 ha). The WUA levies a flat assessment for the right to receive water from the main canal. In 1992, this assessment was 420 man-

days of labor per kulhara for maintenance of the main canal. If a kulhara does not pay its assessment, a WUA-hired water supervisor may refuse water to an entire branch canal, even refusing water to those farmers on the branch but outside the kulhara. The WUA is organized to leverage the community against those not paying for crucial O&M services.

For paying the share of water, each kulhara receives a proportion of the supply of the main canal. While there are no measuring devices to measure flow rates, farmers are very particular about the amount of water they receive. Simply stated, water is proportionally divided in the system, so that shares receive a fixed proportion of the water flowing into the system.

In Chherlung, there are two major irrigation systems, the Thulo Kulo and Tallo Kulo. In contrast to the Chattis Mauja Irrigation System, these hill systems use the amount of investment originally put into the system as a basis of share.

The construction of the Thulo Kulo Irrigation System at Chherlung was financed by some 27 villagers under the initiative of two village leaders in 1928. The cost of the construction was Rs. 5,000 and water was divided into fifty shares, each share representing one hundred rupees. Each person who contributed to the construction of the canal received shares in proportion to the investment he had made. More water than necessary was delivered to those who had more shares and they were able to sell part of their shares to others and thus divide the shares into smaller parts. Consequently, the number of members in the system has increased.

The original investors had their land and settlement in the lower part of the village. As partial compensation for right-of-way along the upper part of the village, those investing in the construction of the system agreed to sell some water to the upper part. However, they would not sell nearly as much as the upper village wanted. It was not possible for this single canal to irrigate both the upper and the lower villages. Therefore, under the leadership of two *Magar* (an ethnic group in Nepal) leaders, one of them the father of the present *mukhiya* (head of the irrigation system), a second canal was financed and constructed in 1932. Through mobilization of their personal funds and loans from businessmen in Tansen, they raised Rs. 5,500 for the construction of the canal.

The Tallo Kulo builders had to divert water from a point lower on the stream than the Thulo Kulo and Taplek Kulo because they built their canal last (U. Pradhan 1987). The Tallo Kulo followed the same process and basis for allocating water shares amongst themselves.

Developing Share Systems for Management Transfer

How can share systems be established in systems that did not have them before and were built with outside funding? How can management be effectively transferred to local farmers so that these presently agency-managed systems develop water cultures similar to FMIS? The Irrigation Management Division of the HMG/Nepal's Department of Irrigation is in the process of management transfer and is supporting the development of share systems.

Agency-managed systems are characterized by a lack of an organized group of farmers for managing the systems. One of the first tasks is to work with a group of organized farmers for share system development. This initial organization effort is well advanced and is described in Neupane (1991) and Upreti (1994). However, getting a WUA registered with a constitution is by no means a sufficient condition for a self-sustaining WUA.

A WUA can be likened to a non-profit "business house" that provides a service—delivering water, and is able to recover costs for delivering that service. Farmers, through the share system, invest in the business house. For their investment, farmers want to see some kind of return, and that return is better water service. The trick is to get farmers to begin to invest in the business house. The business house must have a sufficient degree of discipline and accountability to attract this investment.

One of the first steps towards building the business house is to define the status of a shareholder. All farmers receiving water from the irrigation systems would be shareholders in the WUA in charge of operating the main canal. Additionally, farmers may be holders in other organizations in charge of O&M of secondary or tertiary canals. The WUA in charge of managing the main canal will need to recover costs from all of its farmer shareholders. Likewise, organizations in charge of managing secondary canals may have their own share systems for distributing water and mobilizing resources.

A newly formed organization needs to define the unit of a share. In existing agency-managed systems of Khageri and West Gandak where management is in the process of being transferred to farmers, the shares have initially been defined on the basis of land area. At Khageri, the WUA initiated 6,000 shares of water, initially assigning one share of land per *bigha*. Provisions have been left open for transfer of shares of water amongst farmers and the ability to add new shares if the water supply increases.

To administer share systems, rules and regulations are required for water distribution and cost recovery. On smaller systems, or for organizations serving relatively few farmers, these can be informal. On larger systems, recordkeeping becomes extremely important for share-system administration. Any viable business house will keep records of inventory, income and expenses. The Chattis Mauja *Meth Muktiar* (water supervisor) is rarely seen without his satchel of record books to record water distribution in the command area.

The Khageri Irrigation System has 9 branch canals and 2 minor canals receiving water from the main canal. Each branch is allocated shares of water. The Khageri Irrigation System is a run-of-the-river system, so that the supply of water varies in time. At full supply, there is a useable supply of 6,000 lps. The useable supply is obtained by subtracting losses in the main canal from the inflow. The Khageri WUA has decided to distribute shares by allocating 1 lps per share. When the supply is less than full the amount of water due to each share is pro-rated. For example, if there is a total useable supply of 3,000 lps in the share, allocation would be 0.5 lps. The Khageri WUA has decided to use rotational water delivery on both the main canal and branch canals. This has the effect of increasing the flow rate the farmers receive but decreasing the time of delivery. For a two-turn rotation on the main canal, if a branch canal has 500 shares, at full supply it will receive 1,000 lps for one week, and then shut off the next week.

Water measurement becomes vital in the administration of the share systems. When farmers pay, based on how much water they are allocated, they become very particular about getting their share of water. In contrast to FMIS, agency-constructed systems typically have gated outlets which could potentially lead to better water control. At the Khageri Irrigation System, a flow control structure calibration program was performed with farmers

to calibrate water so that farmers can measure and deliver water according to their share system.

To recover costs of running the system, farmers must be able to budget for O&M and other administrative costs required to run the system. The fee per share then is determined by dividing the system management costs plus rehabilitation or system improvement costs by the number of shares. In many FMIS in Nepal, the major works are desilting and earthen canal repair, most of which can be done manually. In agency-constructed systems, the situation is often complicated by the fact that modern concrete and steel structures are used so that cash is required to purchase materials for maintenance. For share assessment, farmers must devise a system based on cash, labor or kind.

It is often asked whether some farmers will speculate with system shares. It must be remembered that being a shareholder implies not only a right to use water, but also incurring an obligation to pay for use of the share. Having extra shares beyond what can be beneficially used imposes extra costs on the users. The tendency is for shareholders to want to get rid of excess shares, and use water more efficiently to cut down on costs. Transferring shares to new shareholders can result in an expansion of the command area. The addition of new shareholders can have the effect of decreasing the O&M cost per share of water.

Experiences with Initiating Share Systems

The Irrigation Management Division has a very short experience to date in initiating share systems (about 1 year) in agency systems. The overall approach is to use a learning process (Skogerboe et al. 1993). After WUAs are formed, there is much follow-up work in the form of training and other system management exercises. Training activities focus on maintenance, share system and operation. Maintenance and operation training are intended to identify system maintenance needs and to calibrate irrigation structures and measure seepage losses so that water shares can be delivered.

Share-system training focuses on understanding shares and other organizational concepts, defining shares for the particular irrigation system, developing rules and regulations for O&M, developing recordkeeping formats, defining a water delivery work force and making decisions about mobilizing resources. Farmers from farmer-managed irri-

gation systems are key resource people in the training. Farmers from the agency-managed system are taken around the farmer-managed system as a demonstration of what can happen. Additionally, farmer resource people are brought from FMIS to the agency-managed system to work with farmers on site-specific issues.

We have found that farmers have no difficulties with the concept of share systems. Quite rational sets of rules and regulations have been developed and ratified by a general assembly of the WUO. Farmers are beginning to realize the requirements for resource mobilization. In some cases, farmers are beginning to invest in the WUA by mobilizing resources, especially labor, to carry out system maintenance activities. However, there is a long way to go before true share systems are established. Farmers know about recordkeeping, resource mobilization and hiring a water delivery workforce, but to date, this has not been implemented.

Water cultures in Nepal have developed over many, many years adapting to their own environment. The development of water cultures in presently agency-managed irrigation systems can also be expected to take some time. Our hope is that the process can be accelerated by learning from the existing water cultures in Nepal.

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