

## \* **Irrigation in the Hills: Need for Some Corrective Steps**

In the state of Uttar Pradesh the eight hill districts lying in the central Himalayas are parts of the revenue divisions of Garhwal and Kumaun which until the beginning of the nineteenth century were two separate principalities. Less than 10% of the 55,000 sq. km. of the hill areas in these districts is being cultivated; this includes even marginal lands under some kind of agricultural activity. The best class of cultivation and crop is found in villages of moderate altitude between 3000 ft. and 5000 ft. having access to good forest and grazing ground and to riparian fields in the depths of a river valley.

Irrigation has traditionally been brought into the field from rivers/rivulets by means of channels called guls cut along the contour line of the hills. Diversion weirs consist of rocks and brushwood. Capture, conveyance and allocation of water is usually confined to one village or a cluster of hamlets often having a majority of members from the same clan.

Water mills on falls in irrigation systems or parent streams are found throughout the hills and these are often a constraint to irrigation development, since mill owners have acquired water rights. There were no state owned irrigation systems before

1947 (India's Independence); privately owned 'guls' were subsequently registered with the government as property and the owner's right to it was accepted both in respect of the system and its water source. These rules were modified in 1975.

Since 1947 the state irrigation agency has slowly but definitively made its presence felt while privately owned systems have become indigent and decrepit. Rs. 120 million (approx. \$ 10 million) were earmarked for minor irrigation under the state budget in 1986-87 which shows a quantum jump from the provision of ten years ago. The cost of channels works out to an average of Rs. 150,000 (\$12,000) per kilometer and on an area basis, to over Rs. 25,000 (\$ 2,000) per hectare of gross command. Individual schemes may cost between Rs. 250,000 to Rs. 1,000,000 (\$ 20,000 to \$ 80,000). These bank costs do not include field channels. The guls are lined with stone masonry almost in their entire length. The schemes usually have commands larger than 20 hectares.

It is estimated that more than half the total irrigated area in the hills is under privately held minor irrigation systems (FMIS). Loan and subsidy (at the rate of 50%) are available to individual farmers as well as to village panchayats wishing to develop an irrigation source on their own. The schemes generally undertaken are small masonry lined tanks which are used by individual farmers, and community guls. These farmer owned and managed systems cover small areas between 0.8 to 4 hectares (2 to 10 acres) and, therefore, they far outnumber state irrigation works. A survey carried out by the author in 1977-78 (in Nainital District) revealed that most of these systems were sorely in need of rehabilitation. While a gul even in a state of disrepair continued to serve a farming community, most of the irrigation tanks had a life span of less than six years, a period which re-

presents the duration in which loan money has to be repaid. Some tanks even went out of commission within three years due to a variety of reasons. The larger and more viable gul systems have been taken over by the state while most of the others have fallen into disrepair due to a variety of reasons.

Within a family, property rights usually rest with the male head who may be away as a temporary migrant. Loans are sanctioned by the lending agency against property. The amount of the loan is not based on the market value of the property, which in any case is difficult to assess in remote hill areas, but is fixed within a monetary limit calculated as a multiple of land rent. However, the official land rent rates have remained unrevised for the past many decades. Another factor limiting the loan amount is the admissible per acre rate for determining the cost of a project (and therefore the loan amount). This rate is determined by an executive order of the government which is currently fixed at less than 50% of the actual cost of work at site. Thus the amount available to the farmer as a loan falls short of his requirements, resulting in inferior construction quality. Institutional finance is not available to irrigation projects as they usually do not satisfy the tough bank requirements, and in any case banking facilities are not available in remote areas. Rehabilitation of old privately owned projects do not attract any kind of finance. In spite of these odds, farmers honor their loan payments and recovery is almost total.

The state Irrigation Department has a widely spread out network of functionaries at field level. They are employed in construction of new systems and maintenance and operation of existing ones, distribution of water, and collection of irrigation revenue. By contrast, private minor irrigation works suffer from complete

lack of technical input in their construction because of logistical constraints, lack of identification of the state extension workers with developmental objectives.

Larger farmer managed systems in major river valleys were among the first to be 'adopted' by the state irrigation agency, usually with little protest from owner-users. Yet the state agency was not equipped to handle these apparently primitive systems. Steps were taken to 'modernize' them by introducing design and maintenance concepts that had been developed for the much bigger systems of the Gangetic plains. The wrong choice of model introduced aberrations when applied to the previously farmer-managed systems of the hills.

It is now well recognised that state-financed hill irrigation projects after execution differ substantially from the original project provisions. Operation and maintenance costs are increasing annually; annual O&M costs now represent 8-12% of capital investment in some systems. It may be worthwhile to examine the feasibility of handing back to farmers some of the systems which have become stable. Strong water-users' associations would first have to be developed on the lines of similar organizations in other countries (e.g. Philippines). In a sense, even the state owned irrigation systems are almost wholly managed and operated by the users themselves. The Irrigation Department employee responsible for distribution of water is often a resident of the village. Minor repairs in the system are carried out by the farmers on their own, while major maintenance and operation expenses are on government account.

Out migration of men in the age group 18-45 has added another decisive dimension to the situation in the hills. These able bodied men, literate and semi-skilled, leave their villages in search of jobs elsewhere in the

country. In the Kumaun area there are more women workers than men in the residual labor force as a result of migration. It is quite likely that migration will continue to occur at an increasing rate due to the pressure of accelerated population growth. The best-case scenario is a "stabilized disequilibrium" by which the Hills would continue to export some labor, but with a resident population based on more productive agricultural technologies. New ideas in managing hill irrigation systems will be critical to the further agricultural development of the region. A first step would be the preparation of inventories of existing hill irrigation systems. A vast number of small farmer owned and managed irrigation systems are scattered all over the Hills, yet little information is available. Some state owned irrigation systems have become non-functional due to drying up of the water source or subsidence of the hill side, yet continue to be recorded as live systems. Thus, there is duplicacy in reported area under irrigation.

There is a persistent demand for new irrigation schemes in the state sector. This is indicated by the steady growth in irrigation investment in the Hills. Simultaneously, villages are surrendering their systems to the state for rehabilitation and many of these systems have once again become viable, albeit at great investment cost. The dynamics of farmer-owned and managed systems, identification of key ingredients for sustained generation, and mobilization of resources for their operation and maintenance, are fields of inquiry of some importance. Studies of failed systems and the examination of factors responsible for the success of schemes where state intervention has taken place, are also needed.

Improved technical input into farmer managed systems is clearly required. Energy based lift schemes in an environment of energy shortage can

be dismissed as unrealistic. Hydram pumps in their present crude form and the high cost of schemes based on their use are powerful deterrents, yet any significant addition to irrigated area in the Hills can come from lift schemes only. A bold departure from the present design concepts of hydrams might open the way for accelerated development of hydram based lift schemes.

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