DELINKING OF WATER RIGHTS LANDHOLDING SIZE IN A FARMERS' MANAGED IRRIGATION SYSTEM: QUESTION OF EFFICIENCY AND EQUITY

Govinda Basnet[1]

Water rights in terms of allocation in most of the farmers managed irrigation system are closely related and proportional to the landholding size of farmers. Unlike such common cases, water allocation in Chherlung irrigation system in Palpa district in mid hill of Nepal is based on the marketable water share which is proportional to the contribution made during the construction of the canal. This ethnographic research, combining historical and comparative approaches with spatial methods, investigated the efficiency of irrigation system when water rights are delinked from the landholding size. The study investigated how property rights system has evolved over the years in relation to social changes taking place in the village. It was found that prior rights holders, in such property right systems, have incentives to use water more efficiently and trade the surplus water share, thus increasing the command area of the irrigation system. This case study shows that this structure of water rights not only increases the efficiency of the system but also enhances the equity among the farmers.

Key words: Water market; water shares, landholding size, efficiency, equity, Nepal

INTRODUCTION

Generally, in most of the farmers' managed irrigation systems in Nepal, water rights are dependent on and linked with the landholding size in a given irrigation system. Amount of water an irrigator gets and contribution one makes for the operation and maintenance of the system is in proportion to the landholding size. In such systems, no separate market exists for water independent of land market. The irrigation system of Chherlung, a village in Palpa, a mid- hill district in Western Nepal provides a case for studying the issues of efficiency and equity of an irrigation system when the water rights are not exclusively linked with the landholding size. This paper investigates the issues of efficiency and equity in the *Thulo Kulo* irrigation system where people hold water shares irrespective of landholding size and a separate market exists for water.

The study, conducted in 2006, formed a part of a broader study on interrelationship between struggle for water rights and institutional change in upper Mustang region and

[1] Development and Environment Associates-Nepal; PO Box 24043, Kathmandu, Nepal; gbasnet@gmail.com

Palpa district of Nepal. The study applied integration of comparative and historical approaches in combination with spatial methods.

IRRIGATION SYSTEM OF CHHERLUNG

Infrastructure

The irrigation system of Chherlung village has two major canals the *Thulo Kulo* (large canal) and the *Tallo kulo* (lower canal), both of them fed by Barangdi stream, about 8 km in the east from the village. Prior to the construction of these canals, about 80 years ago, agriculture was largely dependent on monsoon rain.

At the end of 1928, under the leadership and encouragement of two men from the village, 27 farmers joined hand together to build a canal from Barangdi Khola. These people hired *Agris*, persons with rock cutting and tunneling skills, from Dammukhkhani, a nearby village in Gulmi district, to layout the alignment and construct the canal. After little over three years of construction work across a difficult terrain small amount of water could be delivered at the top of the village, to the joy of the villagers. The fields of these twenty seven farmers, mostly the Brahmins who had borne the expenses of canal construction, lied at the lower section of the village. When the water was delivered at the top of the village, residents from the upper section of the village, mostly the Magars, requested these twenty seven farmers to construct the remaining canal to the lower section of the village through the upper section of the village as well so that the fields in the upper section of the village also could also be terraced and brought under rice cultivation. As the oral history narrates, these twenty seven farmers did not entertain this request claiming that the volume of the water delivered was too low to bring the upper section of the village under its command. They agreed to give only a small portion of water as a compensation for the right of way through the upper village.

This incident ensued a feeling of competition among the residents of the upper section of the village and they decided to construct a separate canal for their fields. They hired the same group of Agris for an amount of Rs 5,500 to construct the canal. It took almost six years to complete the construction of this canal as they had to settle some legal disputes over the prior rights of the farmers at the upper section and right of way. The Tallo Kulo runs below the Thulo Kulo almost parallel until it reaches the village where it crosses the Thulo Kulo and then runs above the first canal. Water from this canal is shared with head-enders village Taplekh, Pokhariya and has been extended to Artunga village as well. These two irrigation canals share similar kind of water sharing mechanism and management structure with some minor variations. This paper focuses on the Thulo Kulo.

Although construction of these canals has helped in increasing the cropping intensity and the overall total crop production of the area, the driving passion behind the construction of these canals was love for rice. As the rice was the most prized food linked with the issue of social status and could be grown only under irrigation, canals were constructed primarily to grow rice. Water had multiple uses as it was used for drinking and cleaning in addition to irrigating crops. However, over the years with their own contribution and support from the government the diversion and large sections of

the canal were improved greatly increasing the water delivery. In 1981, a mill for grinding grains and dehusking rice was also established in the village.

Water allocation mechanism and the rise of water market
When the water was delivered first to the village the total cost of construction had reached Rs. 5,000. They decided to allocate the water in proportion to the amount of initial investment made to construct the canal by dividing into 50 shares with a value of Rs. 100 each, which remains the par value of a share. There was a less chance for dividing water based on landholding size as the fields would not have been terraced for irrigation without ensuring water would reach there.

The farmers divided the water by installing wooden proportioning structures, locally called *saancho* (key), in a leveled field. One share of water would get water through a one inch wide opening in the proportioning weir. They have now placed such major water proportioning weirs in six places. Water, after being divided through such proportioning structure, is rotated among the share holders within the subdivision in proportion to the amount of share one holds. This system of water allocation is followed only for rice cultivation. For irrigating wheat and other winter crops, when the water flow in the canal is low, an irrigator asks the Chief of the irrigation committee and uses all the water flowing in the canal in his turn.

Water proportioning weir

Initially, with the small amount of water delivered in the village only a small area could be irrigated by each household. After improving the capacity of the canal for a few years some families had more than sufficient water to grow rice in all their fields while others with fewer shares still required more water. Those who did not contribute to the construction of canal and thus did not hold water shares were also keen to purchase water shares (Yoder and Martin 1998). This led to the establishment of a water market

which is more dependent on the amount of initial investment made during the construction of canal than on the size of the landholding.

Irrigation Organization

Developing and operating irrigation system of this nature where the irrigation source is far away from command area required mobilizing sufficient labor, first to construct the canal and then to maintain it. The organization should have the ability to mobilize such a large amount of labor, respond to emergencies and ensure the fairness in distribution of water for effective functioning of the irrigation system. Although only the 27 farmers of the village constructed the canal and owned the initial water shares, more farmers became members of it by buying water shares. Currently, there are 127 households holding water shares of this irrigation system.

They have instituted an irrigation committee headed by a Chairperson. The Chairperson, in addition to leading the committee, has to make decisions on water turns for the winter crops. The Secretary keeps all the records of water shares of individual households, contribution of labor and fines, and buying/selling of water shares. Although the buyer and seller decide the price for the share, the Secretary formalizes such transfer. They have also developed certificates for such a transfer (*Jal Purja*) of water shares. The Secretary also makes necessary arrangement in water proportioning weir for redistribution of water.

These 127 farmers have been grouped into 7 groups, each with the name of a day of week. Each group, called *Thari,* is headed by a leader. During the repair and maintenance of the canal, the work is divided among each Thari proportionately. Different Tharis are assigned the responsibility for the maintenance of different sections of the canal. In addition to division of the regular repair and maintenance work among the Tharis, each Thari leader is responsible to send one farmer in his turn in the week to accompany the canal guard during the rainy season. These seven Thari leaders, Secretary, and the Chairperson form the Irrigation Committee. The Committee has hired a canal guard and a mill operator.

The Committee members are paid a nominal honorarium for their service. In addition to the honorarium, they are also exempted from contribution of labor for regular repair and maintenance. However, such exemption is not made in the case of emergency repair work and for the extension/improvement of canal. Exemption of labor contribution is also considered an honor bestowed by the community on an individual. The villagers had exempted two leaders who led the construction of canal from labor contribution for three shares each in recognition of their contribution in canal construction. However, a legal battle ensued when the villagers decided to discontinue such exemption to the sons/grandsons of those leaders in 2001.

People have clearly defined the conditions requiring compulsory attendance of all the shareholders. Any abstention from such compulsory labor contribution, called *Maha Jhara,* is fined twice the amount. In all of these repair and maintenance work only the male are allowed. Since many households have their male members working outside the village and only the female members are present in the village they have to pay

significant amount of fine each year. The fine is the main source of cash income for the committee to pay the salary to the water guard and honorarium to its members.

The irrigation system forms the pillar around which all the community activities revolve. Most of the community efforts to get the support from the government have focused on irrigation system. Norms for the irrigation management form the backbone of community system (Boelens and Doornbos 2001). Although party politics has polarized the village in other affairs after the people's movement in 1990, people are conscious not to allow party politics interfere the irrigation management.

EFFICIENCY AND EQUITY OF THE SYSTEM

This system of holding water shares based on the initial investment in the canal construction and the ability to transfer such shares offer a different set of incentive structure which has a bearing on the efficiency and equity of the system (Ostrom and Gardner 1993). Since the system requires mobilization of large labor force for maintenance and operation and such labor contribution has to be made in proportion to the water share held, individual households do not want to hold more share than is required. In fact, labor contribution for maintenance has been a driving force in retaining only the minimal required water shares and to sell surplus shares. This mechanism also discourages wealthy farmers to retain more shares.

As farmers are encouraged to sell any water share more than necessary, this system of functioning water market independent of landholding, in principle, will use water efficiently and bring the large area under its command. The trend of transactions of water shares and command area in this irrigation system substantiates this. Because of the ability of buy and sell water shares, now 127 households hold the water shares and have the access to irrigation water. These households have terraced their land and cropping intensity has increased in these irrigated lands.

Although originally there were 50 water shares each of Rs. 100, the number of shares was increased to 55 by around 1970 without proper documentation of the record. Farmers did not contest much in the lack of proper work on the part of the irrigation committee. Around 1979, villagers collectively decided to sell 9 shares of water to an area called *Bote Tole*, an area at the lowest section of the village inhabited largely by Bote, a minority ethnic group, and invest the proceed to improve the canal. With this decision, they have increased the total number of shares to be 64 out of which 9 would be sold for the field of the Bote Tole for an amount of Rs. 72,000[2]. Until then, only one crop of maize used to be grown in this land. With the irrigation made available through this transaction, crops now can be grown three seasons a year, and more importantly, for the people here, rice can be grown. Not only additional area could be brought under the command of the system, but also the cropping intensity has increased. Those farmers who sold the shares also could get more water per unit of share as the improvement in the canal with the additional investment delivered more water and had to contribute less labor in future maintenance work.

[2] Some farmers claim the total price of the share to be different than Rs. 72000.

Farmers sometime could exchange water shares for obtaining rights to other resources. For example, when they had to get rights to the source of water to install drinking water system in the village they offered one share of water in exchange for the drinking water source. This shows that the water shares can be used for the community welfare as well.

The water market has grown steadily and in 2006 one share of water was transacting for about Rs 22,000. Because of the high cost involved, many of the transaction are for only fractions of a share (Yoder and Martin 1998). Although water allocation in this irrigation system is based on water share for rice cultivation, the rights to water for winter crops is mainly land-based. A farmer gets water in turn for irrigating wheat crop based on the area of cultivation irrespective of water share held. However, the area of cultivation (terraced plots) is already determined by the number of shares held for irrigating the main crop rice. In a meeting during the rice planting season farmers were found discussing water schedules up to the minutes of an hour indicating value of water share and transparency of water allocation system.

The market for water shares not only reflects the amount of investment but also the hardship and risks involved in construction and maintenance of the canal. Fairness in distribution of water is ensured by using the water proportioning weir. However, since the width of opening per unit of share in weir is the same at all the locations the tail-enders are likely to get less water because of leakage losses.

In principle, in this system of property rights structure, where the rights to water is not linked to landholding size, a famer can still exercise his rights over water source of the community even if he has minimal landholding. In the irrigation systems, where water rights are linked to landholding, any external support or investment made on the construction/improvement of the irrigation system disproportionately benefits the farmers with larger holding as such investment will add the value to the holding. From the equity perspective, the investment on irrigation system with landholding size determining the water rights will cause inequity as wealthy farmers accrue more benefits from such system.

However, in the system described here, any investment/ support on the irrigation system by external agencies will first add value to the water share, and not directly to the unit of land as in the previous case, and benefit of investment accrues to the water shares and not directly to the landholding. Since wealthy farmers also do not have incentives to hold more shares than required because of the constraints imposed by the requirement to contribute labor in proportion to the shares, benefits of investment/support does not result in inequity. This system of water allocation would prevent land based differentiation confirming to the findings in Peruvian highlands (Guillet 1992). Since rights for two resources are held separately, there is less probability of increasing the differentiation, thus this system leads toward egalitarianism.

The irrigation organization has clearly defined rules and roles and maintains transparency by making public all the transactions within the year in a general assembly

held annually. New officials are either nominated or the tenure of the existing officials is renewed for the next year. Although practicing democratic system in forming and running the irrigation committee, it does not have any women member. This practice does not ensure equity along the gender axis. Neither the women are allowed to participate in the repair and maintenance of the canal, although this was interpreted by some members of the community as a positive discrimination.

CONCLUSION

The Thulo Kulo irrigation system of Chherlung of Palpa district was developed by famers mainly out of their passion to grow rice. Because of the long distance to the water source and the difficult terrain through which the conveyance canal had to be constructed the villagers had to mobilize large labor force to construct and maintain the canal. Initially, only 27 farmers from the village participated in the construction of the canal.

The water was allocated in proportion to the amount of initial investment made to construct the canal by dividing into 50 shares with a value of Rs. 100 each. Farmers were required to contribute labor for maintenance and improvement of the canal in proportion to the water shares held. As some farmers found it expensive to retain the water shares because of the need to contribute labor while others wanted to buy the water shares for rice cultivation, a market for water was established. The water rights here are thus dependent on the investment made, and not directly linked with the landholding size. A well functioning irrigation committee was instituted to govern the operation, maintenance of the canal and buying/selling of water shares. Farmers have designed water proportioning weir to divide the water in proportion to the shares held.

As water shares can be transferred and significant cost in terms of labor contribution is incurred in retaining the share, shareholders have economic incentives to keep only the minimum required share and sell the surplus. This incentive mechanism has made it possible for a large number of farmers to avail of the irrigation facility. Today there are 127 households holding water share. This market system of water has also helped in bringing additional land under cultivation as collective selling of water shares for the additional area allowed prior right holders to make additional investment on the canal to increase the water flow and reduce the labor contribution per unit of share.

Delinking of water rights from landholding size also has consequence on the equity. In the case where water rights are linked with the landholding size, benefits to any investment made on construction/improvement of irrigation system by external agencies accrues disproportionately to large holders as the such investment will add value to the land. However, in this system, where water rights are held independent of landholding size, benefits of investment accrue to water shares thus ensuring equity.

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