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FUNCTIONS OF AN ORGANIZATION IN AN INDIGENOUS IRRIGATION SYSTEM: A Case Study from a Hill Village of Nepal.

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1. Introduction

Agriculture in Nepal contributes about 40 percent of the country's total Gross Domestic Product (GDP). But this agricultural economy, the source of livelihood and employment for 81 percent of the population, largely depends on the erratic rains which come during the period of monsoon from June to September. For this reason, irrigation acquires great importance as a strategy for increasing agricultural efficiency, augmenting agricultural yields and generating larger incomes.

Nepal is very rich in indigenously built irrigation systems. According to the updated Master Plan for Irrigation Development, 1995, the total irrigable agricultural area in Nepal is estimated at 1,766 thousand hectares comprising 1,005 thousand hectares of the existing irrigation. The 75.7% irrigable area is in the Terai and remaining 24.3% in the Hills and Mountains. Out of the existing irrigated area of 1,005 thousand hectares, about 721 thousand hectares or 71.8% is managed by the farmers and the remaining 284 thousand hectares or 28.2% by the Department of Irrigation. About 721 thousand hectares of the farmer-managed irrigation systems consists of 582 thousand hectares under surface irrigation and 139 thousand hectares under groundwater (East Consult, 1995). As such, the indigenous irrigation systems remain the dominant source of irrigation in Nepal. Water and Energy Commission (1981:36) observes:

Farmers more than anyone else are aware of the benefits to be derived from irrigation. As a result, they have developed or been instrumental in

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developing irrigation wherever they have considered it worth their resources and technical capabilities. On the strength of the ingenuity and scale of what has been achieved these capabilities should not be underestimated. Most of the irrigations in Nepal have been developed gradually without direct government involvement over many generations as population growth has led to a need to expand the area under cultivation and to a need to intensify agriculture....

The Commission also points out that in general, the indigenous irrigation systems operate better than government-built systems. A survey conducted by the Commission shows, for example, that government irrigation projects, largely constructed with the assistance of donor agencies irrigate only half of the command areas for which they were originally constructed, and thus fail to achieve the expected cropping intensities. This failure has been attributed to the exclusion of the farmers' involvement in the planning and implementation on stages--an observation similarly noted in existing studies of irrigation development in Third World countries.

The achievement of stable food supplies in poor countries is feasible through the development of irrigation systems. Siy (1982) observes, for instance, that in a water-scarce environment, interaction and coordination between and among water users are highly indispensable. One vehicle to achieve this coordination, he adds, lies in rural organizations such as indigenous irrigation systems which are geared to enhance the involvement in the development process of the masses whose organizations are self reliant in the utilization of indigenous raw materials, energy sources, skills, and other agricultural inputs.

Indigenous irrigation systems have thrived in Nepal for several centuries as an adaptive response to a water-scarce environment. They are located mostly in the Hills of Nepal and demonstrate a very high degree of organizational and managerial inputs, both of which become imperative in view of the shortage of capital for the construction and maintenance of the canals. Over time, the indigenous irrigation organizations have developed their own rules and regulations regarding resource mobilization, water allocation, system maintenance, conflict resolution, property rights in water and the like.

Recently, these indigenous irrigation systems have started to receive assistance from the Department of Irrigation whose main concern is to enable them to cover larger command areas and achieve greater cropping intensities. This assistance program involves prospective beneficiary farmers in the stages of plan formulation, implementation and benefit sharing and strives to incorporate farmers' age-long ideas, experience and self-help attitudes. Laudable as this program is, however, it is still necessary to know how the indigenous irrigation systems are organized and how they function or adapt to water-scarce environments. While sociologists and anthropologists have produced an abundant crop of literature on ethnographies and social changes in Nepal, little has been conducted on irrigation compared to those already done in other Southeast Asian countries such as the Philippines, Thailand, and Indonesia. In discussing the need to carry out research on indigenous irrigation system, Siy (1982:1-2) notes:

There are, however, many irrigation systems throughout the world that were built by the independent groups of farmers. Since many of the groups were formed at the initiative of the farmers themselves, the institutional resources of these groups had relatively much more time to gestate and mature before the actual full-scale operation of their irrigation systems. As such, indigenous associations often develop organizational skills and techniques which are, in a manner of speaking, more effective and appropriate than the administrative procedures of practices in systems that were not indigenously developed or designed. However, there is not much detailed information on how such indigenous irrigation groups function and operate. Such knowledge can definitely contribute towards a clear understanding of how farmers' organizations participate in the critical function of water control and allocation and of system construction and maintenance. This knowledge, in turn, forms the basis of guidelines on how governments can best assist such groups.

This knowledge can also help planners to better appreciate the indigenous irrigation systems. Unfortunately, technocrats trained

under the conventional development model ignore the fact that farmers also have indigenous knowledge for resource management and utilization. As Yoder (1986:17) writes:

Technocrats responsible for irrigation development, however, have generally dismissed farmer-managed systems as viable models because they are "inefficient". Engineers often fail to see or understand that farmers have collectively organized their irrigation activities and can mobilize labor, cash and expertise to make their temporary structures functional.

The Nepalese government cannot continue to build the bureaucratically managed and operated irrigation systems in all extremely mountainous terrain because of the high cost of irrigation canal construction and the lack of trained manpower. A more feasible alternative would be to strengthen existing indigenous irrigation systems through a set of supportive plans and policies, especially those using a people-centered development paradigm. But to formulate better supportive plans and policies, extensive knowledge of the organization and operation of existing indigenous irrigation is needed. The present paper seeks to provide some of this knowledge by presenting the functions of an organization of an indigenous irrigation systems of a hill village of Nepal.

2. The Study Locale and Methodology

In 1988, an empirical research to garner in the data on the functions of organization in the indigenously-developed irrigation system was conducted at Dhaitar village of Kabrepalanchowk district, a hill district in the Central Development Region of Nepal. The village was chosen for the research because it has a predominantly an agrarian economy based on an indigenously-managed irrigation system and farmers have their own irrigation organization which handles matters dealing with water acquisition, resource mobilization, water allocation, system maintenance and conflict resolution. The irrigation system covers 30.45 hectares of land as its command area. Dhaitar grows multiple crops because of irrigation facilities indigenously developed by the farmers themselves. Irrigation is used for paddy, the principal crop, twice a year. It is sown in February and March and harvested in June and July. After harvesting the summer paddy, the winter one is transplanted in June and July and harvested in November and December. After the paddy is harvested in winter,

either potato or wheat depending upon the farmers' choice--is sown in November and December for which canal irrigation is also used. Dhaitar has a multi-ethnic society, consisting of the Brahmins, Chettris, Newars, Tamangs, Kamis and Damais. At the close of field work (October, 1988), a total of 90 households had been enjoying the benefits of indigenously built irrigation system.

Unstructured interview guide questions were used to collect data on the organizational structure and its activities related to resource mobilization, water acquisition, system maintenance and conflict resolution. Key informants were interviewed to generate a vast array of qualitative data. They included 9 executive members of the irrigation organization and other 11 elderly heads of the water using households of the command area. The selection of these key informants were based on these criteria: knowledge about the research subject, length of stay in the village, responsiveness and cooperativeness. The analysis followed two steps: ordering the raw data (classifying the raw data) and immersion in the data (feeling or internalizing the data). Since the study was basically a qualitative one, the data were processed by classifying the information, that is, incorporating the relevant information under different subheadings.

3. Theoretical Notion of Irrigation Organization

Irrigation has to be treated as hydrological, engineering, agricultural, economic, organizational and institutional entity. The human side of both the organization and operation of the irrigation systems must be taken into account in irrigation studies. In this sociological perspective, as Uphoff (1986) points out, irrigation has to be understood as a "socio-technical" process which combines both material resources and people.

Uphoff (1986:6) also holds the notion that four basic sets of activities—decision-making and planning, resource mobilization and management, communication and coordination and conflict resolution—constitute the core of an organization. In other words, an irrigation organization exists to insure that these four sets of activities occur on a regular and predictable basis. Moreover, an irrigation organization is formal if these four sets of activities occur according to explicit, written and possibly legal requirements. But even though they are informal, i.e., based on implicit understanding and social sanctions, there still exists an irrigation organization.

Still focusing on the sociological aspect of irrigation management, Freeman and Lowdermilk (1978) observe that an

irrigation social organization affects the effective utilization of water resources. They (1978:153-4) write:

Irrigation water is of sociological importance because people must organize collectively to secure it, transport it, divide it into usable shares, enforce rules for its application, pay for it and dispose of unused portions. The kinds of social organization, the patterns of power, decision-making, conflict and cooperation which people create and maintain for the social control of water intimately affects the productivity of its use. Attempting to comprehend physical and agronomic problems of irrigation without probing into the surrounding social organization and webs is like attempting to understand deficiencies in plant growth without reference to the conditions of climate. When water moves efficiently from rivers, through network of canals, to plant root zones, it is because people have effectively organized a decision system of enforcing technically sound rules for pursuing the collective interest. Defects in the delivery and application of irrigation water are typically associated with deficiencies in social organization.

Thus, Freeman and Lowdermilk emphasize that it is through people's organized effort that water is acquired and distributed and conflict resolved. They conclude that the success of effective delivery and operation of irrigation water entirely depends upon the effective irrigation organization. Korten (1982:6) shares this observation:

Local associations are capable of mobilizing significant amounts of labor on a long-term basis for maintaining the system; allocating water in close responsiveness to crop needs, resolving local conflicts over water, and coordinating cropping schedules to maximize the productivity of available water. When effective, these local groups have significant advantages over bureaucratic management, their ultimate knowledge of local needs for both water distribution and system maintenance; they can use social pressure to enforce rules and they place the cost of operation and maintenance on those who benefit

from the system, avoiding a perennial drain on government resources.

Similarly, Martin (1986) claims that an organization is essential in irrigation resource management because it is the organization that controls farmers' behavior and physical system. He (1986:15) states:

Farmer-managed irrigation systems, which are dependent for their operation and maintenance on the contribution of resources from many people and which allocate and distribute water to many farmers' fields, require some organization for their management, though it need not be formal. In the Hills of Nepal, farmer-managed irrigation systems, having developed in response to varying local conditions, exhibit a diversity of organizational forms and principles....

Vlachos (1972:14) also holds the view that although water supply and water quality themselves are vital in any discussion of resource mobilization, a key element will be the specific mechanics of organizational structures which will determine and secure volume of water supply, ensure adequate distribution operations and meet local water use demands or goals.

In the present study, irrigation is conceived as an adaptation wherein hydrological, engineering, agricultural, economic and organizational elements are present. In turn, irrigation organization is understood as a local farmer's association capable of mobilizing material and labour resources for irrigation system construction and maintenance, allocating rights to water use and distributing water among the farmers and resolving conflicts arising from water sharing.

4. Irrigation Organization of the Study Locale

The amount of work involved in operating an indigenous irrigation system requires an organization. In the research site, the initial organizational need was strongly felt by the three Brahmin notables from among the then 45 households in 1952 A.D. But the initial irrigation organization was a more or less informal group constituted by the three initiators. Since water was not acquired for irrigation at the very outset, the other 42 households were not initially considered as formal members of the irrigation association. When the canal construction work was fully completed and water was readily available for irrigating the farms, a meeting of the households was called by these three Brahmin notables in order to establish a formal

irrigation organization for the continuous operation of the irrigation system. All 45 households came to attend the meeting.

The main objective of the meeting was to form a formal irrigation organization which involved all the 45 households as its formal general members. Having formed an organization, the initial *ad hoc* irrigation committee constituted by the three Brahmin notables was dissolved. By October 1953, the formal irrigation organization consisted of nine executive members with the following designations: Chairman, Vice-Chairman, Secretary and other six members. Three executive committee members were selected from each upstream, midstream and downstream.

The Chairman presided all organization meetings, played a key role in settling disputes and instructed the Secretary to maintain all the labour contribution and financial records. The Vice-chairman did these tasks in the absence of the Chairman. In turn, the six other members helped these officials in discharging their duties.

At the close of field work (October 1988), the formal irrigation organization had 90 household heads as general members. Landholding was used as the basis for general membership and all members had to be the cultivators or tillers of the land. The irrigation organization, locally known as *Sinchai Sangathan* was governed by the rules and regulations prepared in 1953 by the formal irrigation organization after the canal was duly constructed. The selection criteria of the nine officials were as follows:

- (1) The officials to be selected ought to possess a leadership capacity to mobilize cash, labour and other material resources when needed for construction and system maintenance activities. The leadership capacity was judged by the villagers from the role played by these officials in the village.
- (2) The Secretary had to be capable of maintaining records regarding irrigation fees, fine collection and the attendance of the participants in canal construction and maintenance activities.
- (3) The officials had to be capable of collecting compensation (such as fines) from non-participatory irrigation users during canal construction and system maintenance periods.
- (4) The officials had to be impartial during the conflict resolution process.
- (5) The officials should not be corrupt in the eyes of the general members.

In turn, the selection process of the nine executive members of the formal irrigation organization went as follows: Traditionally, all general members of the irrigation system assembled twice a year for routinary maintenance activities. During this period, the general members assessed the performance of irrigation organization officials in discharging their duties. If an official was found not to comply with the five criteria laid down above, the general members proceeded to discuss ways to reorganize the existing association. A general member stood in front of the assembly and nominated a person as a potential official. This same general member then asked other farmers whether the proposed candidate was acceptable or unacceptable to them. When the majority accepted the nomination, the proposed candidate sat as an official. If any proposed candidate was unanimously opposed, then another person was nominated until the selection process was fully completed. The official's tenure lasted for a period of six months but could continue so long as the official discharged his duties well, an assessment which was made by general members in a separate meeting.

The duties of the officials of the irrigation organization were as follows: (i) effectively mobilize resources such as cash, labour and material resources for the necessary construction and maintenance activities; (ii) properly maintain the organizational records regarding income and expenditures; (iii) strictly collect fines from farmers whose absence during system maintenance activity was intentional (i.e. excused); (iv) effectively resolve conflicts arising from water stealing; (v) actively deal with external agencies who can supply needed resources for the rehabilitation of the existing canal; (vi) promptly communicate information regarding canal damage to all the general members for an emergency maintenance activity; and (vii) appoint the water distributor and instruct him to make regular check-ups of the canal and the rotational distribution of water as fixed by the organization.

The officials of the irrigation organization were not remunerated as their job was voluntary. But when found corrupt, they were dismissed from the position during a general members' assembly. As in the selection process, the majority decision was followed. Almost all key informants reported that the irrigation organization, though sometimes full of minor disagreements, has been successful in fulfilling its responsibilities. The following sections

illustrate, *inter alia*, how the officials and general members contributed to make the organization fulfill its five functions.

5. Functions of Irrigation Organization

The principal functions of the irrigation organization of the study locale as elsewhere, are resource mobilization, water acquisition, water allocation and distribution, system maintenance and conflict resolution. These five functions have been elaborately discussed below along with a brief conceptual exposition of each of them.

5.1 Resource Mobilization

Uphoff (1986) notes that resource mobilization is the most visible organizational activity in irrigation management particularly for canal construction, maintenance and rehabilitation. Labour is the resource most extensively mobilized, though money and materials are also important. Similarly, information can also be used as another major available resource. In discussing the importance of local resource mobilization, U. Pradhan (1988:19) writes:

Resource mobilization is a process by which an individual or a group is able to secure individual or collective control over the resources needed for individual or collective action. Major concerns would therefore be the resources already controlled prior to the mobilization efforts, the process or mechanism of pooling the resources, and supplementary resources provided by outsiders. One can think of resources as being tangible or intangible, for example money, physical materials, leadership or information. For an irrigation system, water, land, money, capital, skilled and unskilled labour, organization, leadership, and information would be mobilized internally and others externally.

U. Pradhan (1988) further points out that labour is usually mobilized for irrigation canal structuring and its subsequent maintenance in most indigenous irrigation systems. In most cases, the basis of labour contribution would be the size of landholding.

Resource mobilization is one of the most important functions of the irrigation organization since it is only through the effective mobilization of cash, labour, and material resources that an irrigation system can develop and be sustained for a long period of time.

Farmers of the research site practiced considerable internal resource mobilization during canal construction. For routine as well as emergency maintenance activities, the following internal resources were mobilized: (i) household labour; (ii) fees representing the service charge for water distribution; (iii) fines imposed on farmers who were absent during system construction and maintenance activities; (iv) fines imposed on water thieves; (v) local construction implements or local technology for canal construction and maintenance activities and (vi) dissemination of information regarding water acquisition, resource mobilization, water distribution, system maintenance and conflict resolution activities.

Every household was expected to contribute labour on the basis of the size of its irrigated land holding. The greater the size of the irrigated land holding, the greater the labour contribution. Usually, the amount of repair work needed to be done was estimated by irrigation organization officials before the start of actual repair. Each household was then asked to contribute labour as fixed by the organization on the basis of the household's command area of irrigation. There was thus a direct relationship between the amount of irrigated landholding and the amount of labour contribution.

The irrigation fees were also collected on the basis of the size of the irrigated land holding. The general formula was: if one *ropani* of land was irrigated by the irrigation system, the beneficiary farmer had to pay one and a half *mana* of wheat and the same amount of rice from the paddy field that was to be given to the water distributor who also worked as a watchman or, in local parlance, the *sepo*.

If the *sepo* was not remunerated after the crop harvest, then the defaulter might be debarred from using water next time. The final decision rested on the consensual decision of the irrigation organization members. This made defaulting a rare occurrence since it resulted in the deprivation of water use which, as a consequence, had adverse effects on the cropping system of the farmers.

Since the start of canal construction, both human and financial resources were actively mobilized twice a year for routine and emergency maintenance. In these activities, the irrigation organization always recorded the members' attendance for construction and repair work.

The irrigation organization also fixed the amount of fines relative to the daily wage rate in the village. The general formula was: if a farmer was absent during the construction or repair work of the

irrigation system, he was asked to pay the equivalent of a day's wage. But if the farmer refused to work or defaulted on the payment of the fines imposed by the irrigation organization, he was denied the right of water use in the field. Water thieves were also fined and the collected amount was given to the damaged party.

The Secretary of the irrigation organization collected or received payments from the water users. He also kept the money of the organization and made records of financial transactions. If he was found to have misused the money, he would be dismissed from his post and publicly pressured to return whatever amount of money was misused. The most commonly used public pressure was the denial of water use in the field.

Uphoff (1986) claims that information can also be considered as a resource in the analysis of an irrigation system. Decisions made about water acquisition, human and financial resource mobilization, system maintenance and conflict occurrence and the like are expected to be immediately conveyed to the general members, i.e., the beneficiary farmers of the organization of the irrigation system. In the research site, communication of information helped to achieve coordination in the various functions of the organization. For instance, if there was an urgent need to mobilize labour or a major repair in the canal, the need was quickly relayed to all the concerned persons by a *sepo* who was ordered to do so by the officials of the irrigation organization.

5.2 Water Acquisition

Uphoff (1986:29) defines water acquisition as "a process of acquiring water from the surface or subsurface sources or by creating and operating physical structures like dams, weirs or by actions to obtain for users some share of an existing supply." To achieve this, beneficiary farmers of the indigenous irrigation system must center their attention on the design, construction, operation and maintenance of water acquisition activities.

Yoder et al. (1986) hold the notion that farmers have to construct a temporary diversion structure in order to capture the available water. During the dry season, they have to capture all the available water to irrigate the farmland and during the wet season, the temporary diversion structure should be such that will allow superfluous water to pass through it. Water acquisition activity is extremely difficult work in the hill side of Nepal as it entails a tremendous amount of both financial and human labour investments.

The fragile and temporary diversion structure of the canal in Dhaita was designed in 1952 and first constructed in 1953 in order to acquire water from the Ashikhola, a local river. The structure was made up of stones, mud, bushes and shrubs collected from the surrounding forest. Since 1953, the local farmers had always been alert to any reconditioning work needed in the diversion structure. As reported by the key informants, the diversion structure was timely repaired when it was damaged by flood during the rainy season to maintain a regular flow of water from the source to the command area. Both head-end and tail-end farmers worked together in the construction and maintenance of both the diversion structure and the canal.

The canal is seven kilometers long and there had been no extension of it since it was constructed in 1953. The canal had to cross twelve non-perennial rivulets locally known as *Kholchas*. Farmers had constructed the water course in these *Kholchas* by building a small stone wall with the use of mud and by amassing large quantities of shrubs and bushes from the neighboring forest. Both the width and depth of the canal, on the average, was three feet.

Once the main canal reached the command area, it was divided by the farmers into several branches to irrigate their crop lands. The branches from the main canal were dug by the farmers themselves so that water could be conveniently divided into different plots of land.

Some farmers were initially hesitant to participate in the water acquisition activity. They initially thought that it was almost impossible to acquire water from the river because the canal had to pass through many cliffs, steep slopes and landslide-prone hill sides. They also thought that investment in canal construction was a waste of resources. But when the canal was half-constructed, the reluctant farmers became optimistic about the possible irrigation system and contributed both labour and financial resource to the construction of irrigation system. Thus, village cooperation, though arriving belatedly, played an instrumental role in the completion of the canal.

5.3 Water Allocation and Distribution

Uphoff (1986:29) defines the allocation of water as "the assignment of rights to users to determine who shall have access to water." Likewise, he defines distribution as "the apportionment of water brought from the source among users at certain places, in certain

amounts and at certain times." In elaborating the notion of water allocation and distribution, Yoder et al. (1986:6) observe:

... The terms "allocation and distribution" are used interchangeably in much of the irrigation literature, but they have different meanings, and the distinction between them is important in the farmer-managed systems... "Allocation" refers to entitlement to water from an irrigation system and principle or basis by which water rights are shared among the irrigators. Water "allocation" identifies the fields or farmers that have access to water from the system and the amount or duration of the water delivery to each. Water "distribution" refers to the physical delivery of water to the fields. The actual distribution may or may not be in accordance with the allocation scheme, depending on the effectiveness of the organization and physical structures.

Water allocation, in the context of the research site, refers to the farmers' entitlement to water from an irrigation system. Water right was given to those farmers who had contributed labour, cash and kind to the construction, operation and maintenance activities of the canal. One did not claim the right to water use unless one had contributed to the irrigation system. Thus, non-members were strictly prohibited to use the water obtained from the irrigation system. In Dhaitar, only the 90 household-members had access to water use.

In Dhaitar, too, water rights could be transferred, i.e., sold and bought under the water allocation principle. Key informants reported, for instance, that if a particular household did not need water when its turn came, it had the option to sell its water share to other households who still needed water for irrigation. When this occurred, both parties sat to discuss the price of selling the water share and later compromised on a particular price. The water share seller would be paid either in cash or kind. And the water share buyer could use water in his field until the turn of water seller ended for that particular rotation. Since the irrigation organization had not fixed the price of the share sale and it was usually decided between share-selling and share-buying parties. Key informants reported, however, that sale of water share took place only occasionally.

Water distribution is the actual physical delivery of water to the fields. In the Dhaitar canal, the irrigation organization followed

the system of employing two water distributors/watchmen, locally known as the *sepoys*, to handle this task. A *sepoys* served the system for six months, that is, one *sepoys* served from January to June and then another *sepoys* from July to December. Each one was appointed and then re-appointed by the irrigation organization on a rotational basis. The duties of the *sepoys* were as follows: (i) be watchful of the water at all times during the day and night to prevent water stealing; (ii) if water is stolen during the turn of another farmer, warn the water thief not to disregard the distributional rules. If the thief refused to obey, the *sepoys* had to inform this incident to the irrigation officials for necessary action; (iii) repair minor holes in the canal; (iv) prevent cattle from walking along the canal and (v) turn water to the users' fields on the rotational schedule fixed by the executive officials of irrigation organization.

The *sepoys* was remunerated after the crop harvest. He was always paid in kind, either in rice or wheat, depending upon the seasonality of crop planted. The amount paid to *sepoys* was fixed by a general formula as follows: if one *ropani* of land was irrigated by the irrigation system, the beneficiary farmer had to pay one and a half *mana* of grains to the *sepoys*.

The *sepoys* was always watchful of the canal in all seasons. Water discipline was strictly maintained during the period of water shortage. For example, planting schedules were maintained during the dry season. Usually the upstream farmers were the first ones to irrigate their crop lands followed by midstream and downstream farmers. Planting schedules were fixed by the irrigation organization.

5.4 System Maintenance

System maintenance is the repairing and cleaning of the canal for regular and efficient water acquisition, distribution and removal. Maintenance activities were usually done before and during the monsoon season. Both routine and emergency maintenance activities were performed by the farmers themselves. Every year, different varieties of grass grew in the canal and obstructed the flow of water. The rainfall during the wet season also broke the canal. Hence, regular upkeep of the canal was done by the farmers who used the irrigation system. Since the irrigation system was built by the farmers who felt a sense of ownership toward it, they did not delay in its maintenance.

In the research site, routine maintenance took place in May and October every year. Maintenance work done in the second week

of May was for paddy plantation. Maintenance activity during the second week of October was for winter crops, particularly wheat and such vegetables as potato, garlic, onions, cabbage and cauliflower. Each maintenance task lasted from 12 to 15 days, depending upon the amount of repair work required. The time and household labour contribution for system maintenance were fixed in 1953 and handed down to the present time; they are referred to as the "local traditions." These "local traditions" were kept by the farmers using the irrigation facility.

Information regarding emergency maintenance was relayed to the irrigation organization by the *sepo*y who served as the watchdog of the canal. Once the *sepo*y passed the information to the association, the Secretary disseminated the message to all irrigation system users along with the fixed times and dates for emergency repair.

Every household using the irrigation facility contributed labour to maintenance activities. Before each maintenance activity began, the organization estimated how much labour was required for routine or emergency repair. Each household was then required to contribute labour on the basis of the amount of land to be irrigated by the canal. Every year, therefore, the amount of labour varied depending upon the nature of maintenance activities. To ensure compliance of labour contribution, the irrigation association checked the farmers' attendance during maintenance work. The association's Secretary, in turn, kept the records of farmers' labour contribution. This local tradition had been practiced since the formation of the irrigation system, and is still followed at present.

If a farmer did not contribute a day's labour for system maintenance, he would pay the prevailing equivalent amount of money to the irrigation organization. The amount was given to farmers who contributed more than the required amount of labour to system maintenance. Sometimes, money was also collected from the farmers in order to buy such tools as spades, hammers, shovels or knives, all of which would belong to the organization. Refusal to contribute labour to system maintenance resulted in the denial of the water use for irrigation.

5.5 Conflict Resolution

Many social science researchers also stress the conflicts inherent in irrigation systems as well as the mechanisms for the resolution of these conflicts. B. Pradhan (1982) claims that water sharing faces problems and disputes because farmers in the head

generally take as much water as they need at the cost of the tail-enders. Though the disputes sometimes get serious and violent, farmers have themselves developed social mechanisms for their resolution. Isles describes the factionalism found in irrigation systems. He (1981:150) observes:

Irrigation systems service people whose interests conflict depending on the location of their farms in relation to the source of water. These groups are "upstream farmers" often times referred to as "problem farmers" and the "downstream farmers" who are sometimes called "farmers with problems." Uniting these two groups in association is not an easy task under such conditions. All upstream, midstream and downstream farmers should create a chance to talk as a group, so that greater appreciation of each other's problem can be generated and factionalism can be minimized.

In turn, De Los Reyes (1980) deals with the causes of irrigation conflict. She claims that many disagreements among farmers in indigenous irrigation system stem from its physical layout when the system depends on a single source. In elaborating the causes of disagreements, she (1980:59) observes:

The head-end farmers usually get adequate irrigation while the tail-end fields frequently receive less water or, because of the poor drainage conditions in the lower section of the system, the downstream farms became flooded when the upstream cultivators release water from the fields. These conditions frequently lead to disagreement between upstream and downstream farmers.

Water sharing is replete with problems and conflicts as every farmer tends to maximize his benefit at the cost of others. The following were among the main causes of conflicts in water sharing among farmers in the research site: (i) the use of more water during the dry season by upstream farmers at the cost of midstream and downstream farmers; (ii) the release of excess water by upstream farmers in the midstream and downstream fields which, in turn, eroded the top fertile soil and destroyed the planted crops; (iii) nocturnal water stealing of other farmers and the use of this water in one's own

field and (iv) non-participation in canal construction and maintenance by potential beneficiaries of irrigation.

Of these, nocturnal water stealing occurring monthly during the dry season was the most common offense despite the watchfulness of the *sepoys*. Though farmers were aware of the theft and tried to be vigilant during the nights, they could not maintain their vigilance regularly.

Water conflicts were resolved by the farmers themselves in several ways as follows: (i) farmers caught stealing water were, at times, physically punished (beaten) by the damaged party; (ii) in general, however, water thieves were fined and the collected amount was given to the damaged party. The amount of the fine depended on the nature of damage caused by water stealing and the compromise reached between the conflicting parties; (iii) frequently, water thieves were denied the use of water for one or several turns (depending upon the nature of the damage of the crops by water theft); the frequency was decided by officials of the irrigation organization; (iv) the upstream farmers who used more water during the dry season at the cost of midstream and downstream farmers were first issued a warning by the irrigation organization.

If they continued to ignore the warning, they were denied the use of water for a period of time specified by the irrigation organization; (v) if the upstream farmers intentionally released excess water in the fields of midstream and downstream farmers and thereby caused crop damage, they were required to pay a fine to the damaged party. The amount of the fine depended on the nature of crop damage, and (vi) farmers who were reluctant to contribute labour and financial resource to irrigation system construction and maintenance were denied water use to irrigate fields.

All these social mechanisms developed by the irrigation organization had so far been successful in resolving water conflicts. The traditional adjudication process appeared more effective and functional than legalistic ones.

The traditional process occurred in the following way. When conflict occurred between or among the farmers using the irrigation facility, the incident was immediately reported by the affected party/ies to the Chairman of the irrigation organization. The Chairman immediately ordered the *sepoys* to communicate this incident to the eight other executive members. All nine executive members then assembled in the house of the chairman and faced the conflicting

parties. In this meeting, the conflicting parties reported their side of the problem. After the hearing, the officials of the irrigation organization met separately to judge the case. The decision was usually a unanimous one. When there were differences of opinion among executive members, the majority view was held as the final decision. The decision was always accepted by the conflicting parties since there would be no other ways to deviate from it. Out-migration would be one way out but is not feasible strategy. Noncompliance with the decision of the organization would be another way out but at the risk of a strict penalty i.e., denial of the right to water use for several turns which would adversely affect the crops in the field.

Sometimes, factions would appear in the irrigation organization particularly between the upstream and downstream farmers. This would usually happen during the dry season when every farmer in the upstream area would want to use more water at the cost of downstream farmers. When this happens, the executive members from the downstream would put more pressure on the executive members from the upstream area and suggest immediate penalties for upstream farmers who would be found violating the water distributional rules.

By the large, the officials of the irrigation organization played an instrumental role in resolving conflict cases. So far, water conflicts had not been forwarded to the formal courts for resolution. This was because the organization members themselves served as effective legislators and enforcers of the rules and regulations.

6. Conclusions

The overall objective of this paper is to gain an understanding of the functions of the organization in the indigenous irrigation system. Based on the data, the following conclusions can be drawn:

- (i) Given the desire to articulate the felt needs of prospective farmer beneficiaries, an irrigation development program can be successfully maintained through the farmer's own initiative. In the system studied, it was the local farmers who felt the need for water to irrigate their farm lands and to augment the regular production of crops. To meet this need, they themselves got organized to acquire water for irrigation.
- (ii) The existence of a rural association is a must in mobilizing village resources for an irrigation development program. In the present study, the irrigation association came into being to mobilize cash, labour and materials for water acquisition and

maintenance activities and by doing so guarantee a regular flow of water.

- (iii) The farmers' sense of ownership towards an irrigation development program, another crucial element in building effective irrigation organizations, arises only if farmers have personally contributed to the irrigation system construction and maintenance. In the present study, farmers could claim the right for water use because they themselves contributed time, labour and money to system construction and devised their own strategies for water use and conflict-resolution.
- (iv) Related to the above, democratic and egalitarian procedures for rural resource management are of paramount importance. This study has shown, for instance, that it was the local farmers themselves who set the selection criteria for choosing irrigation organization officials and the ones who would dismiss officials who failed to perform their duties according to these set criteria. The water resource that the farmers were entitled to use was more or less equitably distributed among the system members. These democratic and egalitarian procedures were possible because the farmers' sense of ownership towards this particular irrigation development program has been duly maintained.
- (v) In a successful irrigation system, organizational social mechanism for conflict management becomes more effective than those set by formal state laws. The irrigation system studied effectively sanctioned defaulters and water thieves through fines or the cancellation of their right to water use for a specified period of time. More importantly, the conflicting parties were brought together to agree on the penalties imposed upon them.

By and large, the present study has shown that the farmers' own initiative in the formation and maintenance of local irrigation organization led to the success of the irrigation development program in Dhaitar. Moreover, given the opportunity to maintain their sense of ownership towards the irrigation system, farmers were able to employ democratic practices in handling organizational matters and work out egalitarian procedures to distribute scarce water resource.

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AN ANALYSIS OF THE RURAL POVERTY FROM PEOPLE'S PERSPECTIVES : A Case Study From Amarpur VDC of Panchthar District

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This article focuses on the rural poverty from the people's perspectives. It emphasises on understanding poverty in the context which usually implies trying to discover how people view their own situations and how they solve their problems. This research article incorporates the views, expressions and analyses of rural poor on poverty in terms of their economic and socio-cultural context. As the research is about the analysis of micro-level situation, methods used in this research are the combination of both participatory and anthropological tools. Participatory tools were used to reflect the situations of the poor people from their own analyses as these tools provide a basis to elicit their situations. Similarly, anthropological tools give better insight into the situation of the people (Bernerd, 1991). This paper is based on the Chambers' (1983) deprivation theory. He defines the causes of rural inequity inter-linking five clusters, i.e. powerlessness, poverty, physical weakness, isolation and vulnerability. Together, they form the deprivation trap. The deprivation trap is valid at household level.

Poverty is a major problem in Nepal. Of the total population, about 49 percent are below poverty line (NPC, 1992). Poverty has affected the large number of people in general and rural people in particular. Number of poor people are increasing due to stagnant growth in the economy, increased population pressure and increased unemployment (Blaikie et.al. 1982).

There is a plenty of literature on poverty and poverty alleviation. Past literatures focused on different aspects of poverty.

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