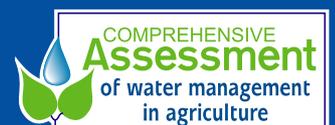


Integrated Management of Water, Forest and Land Resources in Nepal: Opportunities for Improved Livelihood

Dhruba Pant, Sabita Thapa, Ashok Singh,
Madhusudhan Bhattarai and David Molden



CA Discussion Paper 2

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Land Resources in Nepal:
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Acronyms

| | | |
|------|---|--------------------------------------------|
| CARE | - | Cooperative for American Relief Everywhere |
| CF | - | Community Forest |
| DDC | - | District Development Committee |
| DFO | - | District Forest Office |
| DIO | - | District Irrigation Office |
| DOI | - | Department of Irrigation |
| DWRC | - | District Water Resources Committee |
| FMIS | - | Farmer Managed Irrigation System |
| FUG | - | Forest User Group |
| HH | - | Household |
| INGO | - | International Nongovernmental Organization |
| INRM | - | Integrated Natural Resources Management |
| IP | - | Irrigation Project |
| IWMI | - | International Water Management Institute |
| IWRM | - | Integrated Water Resources Management |
| LPG | - | Liquid Petroleum Gas |
| NGO | - | Nongovernmental Organization |
| NTFP | - | Non-Timber Forest Product |
| RBC | - | River Basin Committee |
| UG | - | User Group |
| VDC | - | Village Development Committee |
| WECS | - | Water Energy Commission Secretariat |
| WUA | - | Water Users Association |
| WUG | - | Water User Group |

Summary

This paper is aimed at furthering understanding of if and how communities co-manage forest and irrigation activities with a view to gain insights about integrated natural resource management. The main question addressed is whether the management of these two resources can be better integrated for enhanced livelihood opportunities and for reduced vulnerability of the rural poor. It uses case studies from the hills of Nepal, where both water and forest resources are integral to poor people's lives.

The results of the case studies show that water and forest resources are managed separately. The decision-making processes for the management of these two resources are independent from each other. Importantly though, informal interaction between management groups does exist. The reasons for the separation of the two management groups are that the boundaries and people involved in managing forest and irrigation water resources overlap but do not coincide, and problems and issues in management of both resources are distinctly different. Furthermore, government policy and programs support these different groups separately.

Programs to support the forest users group and the irrigation users group have met with a degree of success. For forestry, while there are no infrastructure interventions, there are strong policy and legal interventions providing support for the management of forest resources. Community forest programs directly benefit poor users through improved access and use of forest products, and indirectly through investment of forest user funds in community activities that generate income. Benefit sharing was found to be more equitable in the forest users group than in the irrigation users group. However, women's participation in formal activities of both forestry and irrigation groups was negligible. The supported irrigation systems showed marked gains in yields, income and employment. Support to irrigation systems include physical infrastructure combined with financial and technical assistance, but there is weaker enforcement of policy and legal provisions. Thus there appears to be ample opportunity to learn and share experiences from one another.

The study indicates that there are opportunities for the integration of both activities. Because changes in land use impact the water source for irrigation, a starting point could be resolution of conflicts around water and land, and managing forests to protect catchments. The existing informal contacts, especially where there is an overlap of membership, could serve as a platform for future integration. While the two groups do not need to be combined, better interaction can only be constructive. This is an area for future research and action.

1. INTRODUCTION

1.1. Background

More than half of world's poor depend heavily on natural resources for their livelihoods, thus there is a need to find new natural resource management approaches for secured and enhanced livelihood. Both Integrated Natural Resource Management (INRM) and Integrated Water Resources Management (IWRM) provide new paradigms for development approaches. But, there has been very little literature that provides an adequate knowledge base in understanding the integration process at the catchment level in developing countries. Natural resources development and management, and development efforts, are typically compartmentalized along distinct political and administrative lines and implementation typically remains at the sectoral level.

An example has been the efforts in Nepal over the last 20 years placed on development of Water Users Group (WUG) for managing irrigation systems, and Forest Users Group (FUG) in Nepal (Pradhan 2003). Both irrigation and forestry sectors have claimed at least partial success in these approaches for community-based management approaches. In many cases, irrigation and forest management are very much dependent on each other, and many communities have both FUGs and WUGs. Yet we know very little about whether or not these are integrated, and whether there is potential for taking a more integrated approach in developing these community-based natural resource management entities. We know that the different group development was facilitated by outside agencies like the forest department or irrigation department, and suspect that there is very little interaction at the government department level. What we don't know is whether communities themselves play more of an integrative role.

There is a consensus at the national policymaking bodies and within the international development community for the need of an IWRM framework. But institutional fragmentation remains a key barrier to integrated approaches on the ground in Nepal, India, and probably in most countries worldwide. Water Users Group (WUG), Forest Users Group (FUG) in Nepal (Pradhan 2003) and Watershed *samithis* (committees) and joint forest management committees in India are increasingly managing natural resources as well, providing critical links between users and state agencies (Farrington et al. 1999; Joshi et al. 2003; and Chopra 2003) but without any linkages to their activities at the catchment level. Uttaranchal Government in India recently created a Watershed Directorate to coordinate actions of government agencies for forest, water supply and irrigation management.¹ Likewise, the District Water Resources Committee (DWRC) in Nepal is supposed to coordinate water-related activities at the district level, but it is not effective (Pant and Bhattarai 2000). Nepalese Government's recent policies have emphasized integrated resource management at the subbasin and basin levels through the formulation of the Water Resources Strategy (WECS 2002) and the preparation of a National Water Plan is underway.² This all indicates government's realization of the need for institutional mechanism for integrated natural resource management.

The objective of the research is to shed light on how integrated these forests and water management actually are in practice. Based on this better understanding, a further objective is to suggest whether or not management of the two resources can be better integrated. Our hypothesis is that communities themselves, because they are often the same group of stakeholders, integrate

¹ Personal communication from Dr. Christopher Scott, Regional Director, IWMI, Regional Office, Hyderabad.

² Stakeholder Consultation Workshop on National Water Plan—Nepal was organized by the Water and Energy Commission Secretariat, His Majesty's Government of Nepal from August 20–22, 2003 in Kathmandu.

forest and irrigation management activities, even though initial development efforts are highly segregated along sectoral lines. With the case studies, we explore the following questions:

- In the case study area, what has been the process and impact of FUG and WUG development?
- Are there lessons to be learned from the experience of FUG and WUG that can be transferred across the sectors?
- What are the interaction patterns between the WUG and FUG for integrated management of natural resources?
- Is there a potential to link the activities of WUG and FUG?

1.2 Research Approach

The research used a case study approach to understand the interaction process existing between FUGs and WUGs and to explore opportunities for integrating their activities at the catchment level. Two catchments within the Gandaki River Basin in western Nepal (Kaski and Tanahu District-see annex 1 for district characteristics)³ were selected in consultation with District Irrigation Office (DIO). Begnas Irrigation Project in Kaski District and Bhanu Shera Irrigation Project in Tanahu District were selected. FUGs near and around these irrigation systems were further selected in consultation with District Forest Offices (DFO) in the respective districts.

Both quantitative and qualitative data at catchment and household levels were collected during the field visit. The units of analyses were the irrigation and forest users group in the catchment. A questionnaire consisting of inquiries on household livelihood status and their relationship with FUGs and WUGs was used to survey 30 households by two local facilitators in the Begnas Irrigation Project area. Indirect questions were asked to ascertain the economic status of the households. The information on Bhanu Shera Irrigation Project was collected through group discussions and secondary sources. Qualitative data mainly focused on collecting information from concerned community stakeholders during group discussions. Direct observation of local conditions of resources that entailed visiting forest and irrigation canals also formed the part of qualitative assessment. Participatory Rural Appraisal (PRA) methods such as resource mapping, oral histories on resource use pattern and land use changes, were utilized to better understand resource condition, use and management.

2. GOVERNMENT POLICY AND INSTITUTIONS FOR INRM

2.1. Government Policies

This section highlights Government policies related to the management of natural resources relevant to water and forest management. Conflicting and contradictory provisions in various acts and rules signifies the lack of coordination at the policy level thereby creating confusions and problems in integrated management of natural resources at the local level. Of the recent policy developments, the Water Resources Strategy (WECS 2002) has identified the need of a committee to integrate and coordinate all the uses of natural resources within the catchment basin and has laid emphasis on the formation of River Basin Committee (RBC) at the River basin. The RBC is expected to

³ District is a politico-administrative unit and the focal unit for the implementation of development programs. The county is divided into 5 Development Regions, 14 Zones, 75 Districts and 3,915 Village Developments Committees.

formulate policies, coordinate, and supervise natural resources use and management within the river basin. At present, the District Water Resources Committee (DWRC) is supposed to perform this activity in coordination with other line agencies. This is against the provision of Local Governance Act (1998), which recognizes District Development Committee as the planning agency at the district level. It has been observed that the DWRC is not functioning as designed at present (Pant and Bhattarai 2000).

Handing over the management of national forests to local communities is the major highlight of forest policies. Forest policies, however, are also highly ambiguous and inconsistent with respect to the integrated management of natural resources. The Forest Act (1993) has completely excluded water resources while defining “forest products.” Moreover, a recent amendment to the Forest Act (1998) has outlined that community will not possess rights over water resources within community forests. However, the civil code of 1963 recognizes the customary right of the water users. In this context the FUGs are not entitled to use and manage water resources flowing through a forest. Thus, the Forest Act, Rules and Regulations in this respect are silent on concept of an integrated management of water resources that originate or pass through forests.

Devolution of power to local government (DDC and VDC) under the decentralization policy has helped in strengthening their roles. An interesting feature of the decentralization policy is that it has made provisions for integration of developmental activities including resource management at the district level. However, user groups and concerned institutions sometimes share conflicting relations with local governments. For example, Forest Regulation regards FUGs as autonomous legal organizations while, the Local Governance Act requires forestry plans to be approved by the concerned District Development Committee (DDC), and also any financial matters to be channeled through the concerned DDC. This may result in creating an institutional conflict, if both the institutions begin to assert their role for the management of natural resources. Similarly, institutional conflict arises especially when resources fall into jurisdiction of more than one ward (hamlet), VDC or DDC. Likewise, lack of authority delegation to the district offices from the ministry and also lack of coordination among the sectoral agencies has rendered the provisions futile. Besides, concerns could also rise over the party politics that is embedded in every local government.

2.2. Water and Forest Management Institutions

In Nepal, forest and water management can be seen as two large sectors wherein people’s initiatives have taken long strides for livelihood enhancement. An important consideration, in this respect, is that though rural poor continue to heavily depend on these resources, the resources have not been subjected to overexploitation. Instead, utilization of resources has contributed to an evolution of systematic institutions that lie central to resource conservation and utilization in the country.

WUGs have traditionally utilized and managed water resources at the local level by mobilizing local and external resources, thereby they are considered as more important institutions concerned with management of water. Farmer Managed Irrigation System (FMIS) can be viewed as such an instance wherein local communities have proven their capacities in establishing a successful institution for collective benefits (Pradhan and Bandaragoda 1997). Many local level water management groups have been given institutional recognition by the Government, but many WUGs still continue to operate in various parts of country without any such formal recognition. Both formal and informal WUGs have greatly contributed in managing water for irrigation and other purposes. Similarly, management of forests by local communities in the hills of Nepal can be cited as another successful example of resource management. After the legal provision to decentralize forest

management in 1980s, Forest User Groups (FUGs) have evolved (Soussan et al. 1995; Soussan 1998) as strong and formal local level institutions that account not only for the protection of forests but also for various developmental activities in the villages (Springate-Baginski 2000).

FUGs and WUGs have evolved into local level democratic institutions; their potential in bringing about harmonious development of both nature and people has been widely realized and accepted. Sectoral management regimes have achieved a certain degree of success, but problems and conflicts that are beyond the resolution by any single institution are also on the rise. People in rural watersheds are increasingly vulnerable due to the effects of land and water use changes as more natural resources are being exploited.

3. PROFILE OF THE STUDY SITES

3.1. The Irrigation System

Begnas Irrigation Project (IP) was initiated in the year 1984 and was completed in 1988 by the Department of Irrigation (DOI) under the loan assistance from Asian Development Bank. The total command area of the project is 580 ha. Two tier WUGs were formed to manage this irrigation system and the handover process to the user groups is underway whereby the government and the WUG will jointly manage the project. The canal system of this irrigation system excluded 157 ha of land at the tail end, which has continued to be the most controversial issue in the catchment.

Bhanu Shera IP on the other hand, is a small, traditional and Farmer Managed Irrigation system (FMIS) with a total command area of 40 ha. With the request from users, 2 years ago the Department of Irrigation assisted in renovating and extending the canal system, after which it was formally registered as a Water User Group. The community now manages the entire system and there are no major management controversies among the users.

3.2. The Forest Users Group

Altogether seven FUGs, five in Begnas IP and two in Bhanu Sera IP, respectively, were studied (table 1). These FUGs were close to the irrigation systems (map 1).

The profile of the FUGs indicates that some of the FUGs were as old as 12 years and some were recently formed. The FUGs are registered with the District Forest Office and it keeps records of all FUGs. They have to renew every 5 years to be legally recognized and FUG membership is open to everybody, even temporary members. In this respect the FUGs are more structured and formalized compared to the WUGs. In essence, the policy and legal provisions regulate the activities of the FUG. This has helped in devising rules and regulations for their functioning, which is lacking in the case of WUGs.

3.3. Existing Land Use Pattern

Both the studied catchments are undergoing rapid land use changes enforced by new market pressures in the region. The construction of irrigation systems and delineation of community forest area has also brought change in land use pattern in both catchments. The existing land use pattern in Begnas and Bhanu Shera catchment is presented in table 2. The total area in Begnas catchment is 1,130 ha

Table 1: List of FUGs studied in the two catchments.

| Catchment | Name of FUG | District | Location | Date of Formation | Area (ha) | Total Member Households | Forest dependent population (%) | Main Forest Species |
|-------------|-----------------------|----------|--------------------------|-------------------|-----------|-------------------------|---------------------------------|-----------------------|
| Begnas | Saune Pani Bareli | Kaski | Lekhnath Municipality-9 | 1990 | 16 | NA | 50 | Sal, Chilaune, Katush |
| | Syankhudi Simle | Kaski | Majthana-6 | 1990 | 30 | 52 | 50 | Sal, Chilaune, Katush |
| | Panch Bhaiya | Kaski | Lekhnath Municipality-11 | 1997 | 235 | 378 | 75 | Sal, Chilaune, Katush |
| | Saune Pani Thantdanda | Kaski | Lekhnath Municipality-8 | 2001 | NA | NA | 20 | Sal, Chilaune |
| | Malmul | Kaski | Lekhnath Municipality-13 | 1996 | 115 | 170 | 25 | Sal, Chilaune |
| Bahnu Shera | Ahal Danda | Tanahu | Bandipur VDC-4 | 1994 | 157 | 150 | 90 | Sal, Chilaune, Katush |
| | Chandisthan | Tanahu | Bhanu VDC-5 | 2002 | 36 | 135 | 100 | Sal. Chilaune |

Source: Field Survey 2002

Note: *Castanopsis indica* (katus), *Schima walichii* (chilaune), *Artocarpus intergra* *Shorea robusta* (sal)

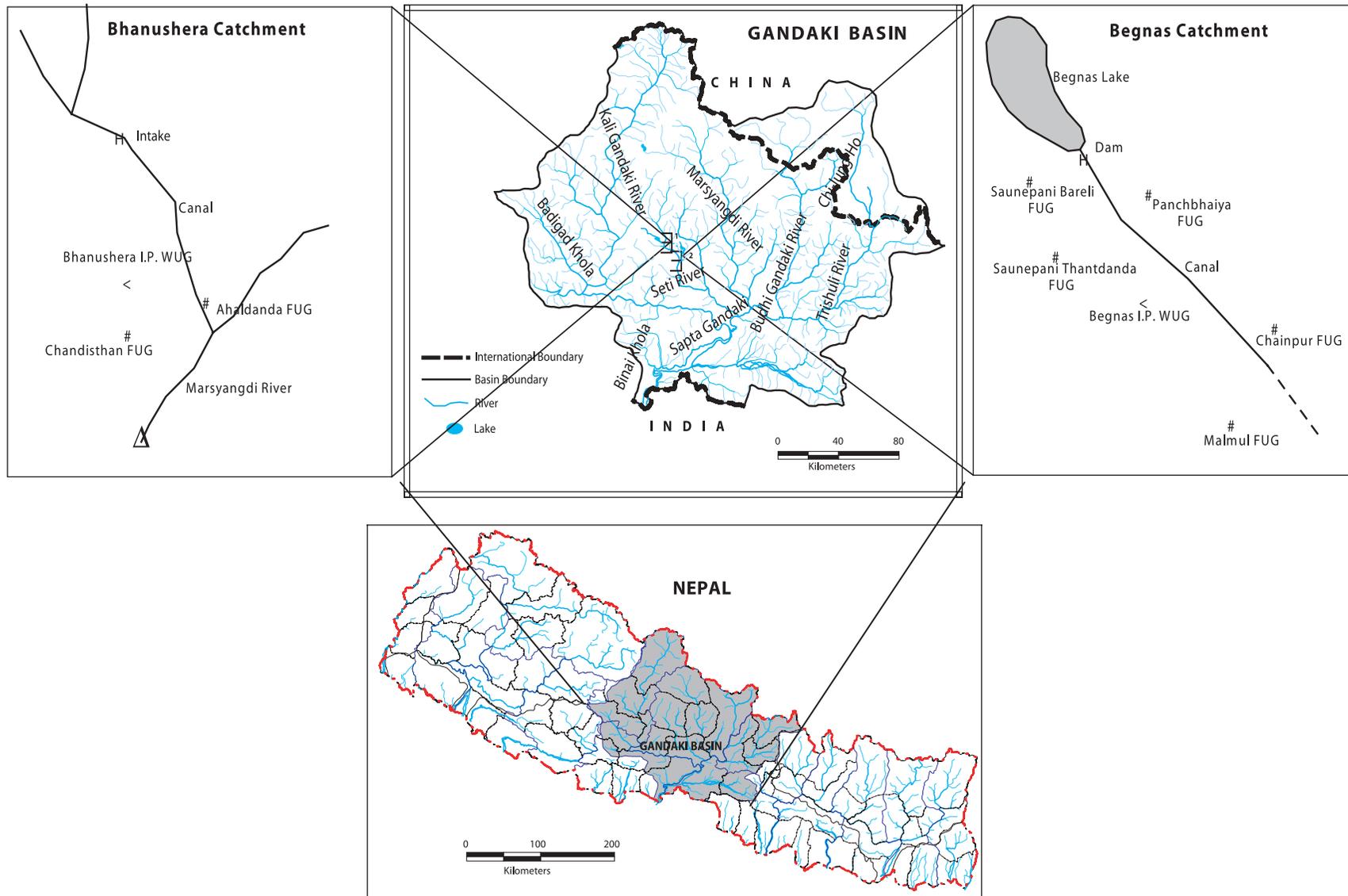
Table 2: Land use pattern in the study sites.

| Land Use Type | Area (ha) | | Land use in percent (%) | |
|----------------|-----------|-------------|-------------------------|-------------|
| | Begnas | Bhanu Shera | Begnas | Bhanu Shera |
| Irrigated Land | 580 | 40 | 51 | 57 |
| Rain-fed land | 154 | - | 14 | - |
| Forest/Shrubs | 315 | 20 | 28 | 29 |
| Grazing Land | 81 | 15 | 7 | 14 |
| Gross Area | 1,130 | 75 | 100 | 100 |

Source: DIO, Kaski and Tanahu District

while that of Bhanu Shera Catchment is comparatively smaller with an area of 75 ha. The irrigated land in both the areas is more than 50 percent (580 ha and 40 ha, respectively) of the total cultivated land indicating higher irrigation intensity. Interestingly, all the irrigable area in Bhanu Shera catchment is irrigated. The forest area, however, is almost the same with 27.87 percent and 28.5 percent area in Begnas (315 ha) and Bhanu Shera (20 ha) catchment, respectively. The fact that more than 25 percent of the land area is covered by the forest shows users' awareness of conservation activities that could have wider implications in the availability and use of natural resources.

Map 1: Location Area of Study Sites.



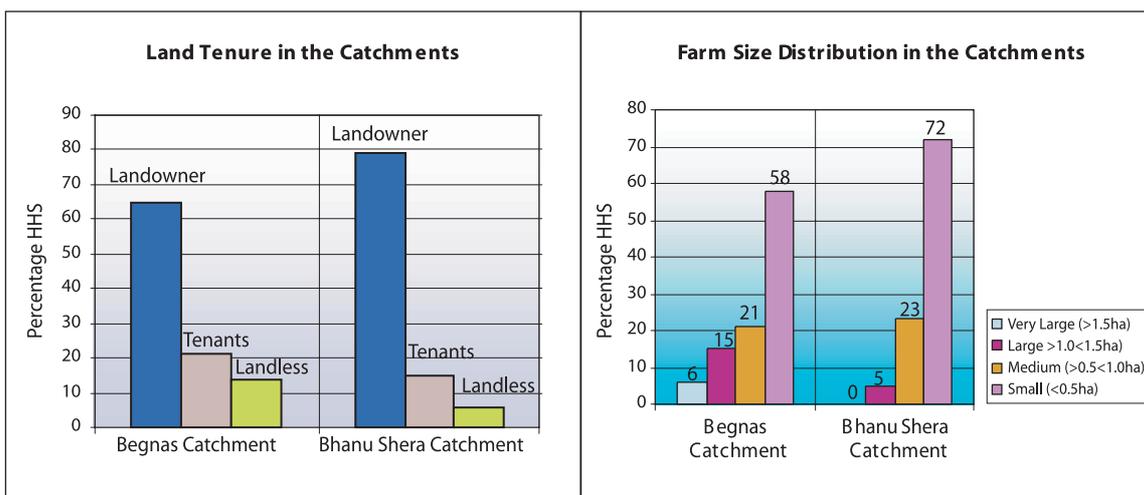
Source: Ashok Singh, Water and Energy Commission Secretariat 2003, Kathmandu, Nepal

3.4. Land Tenure and Farm Size

In the catchments, land tenure and farm size distribution (figure 1) among farmers denotes the composition of farmers of differing wealth groups. This is because landholding is the principal criterion that determines the well-being of a farmer in the hills. A farmer with no land or small size of land is often the poorest. Households having less than 0.5 ha of land are considered poorest according to the government classification. Though large landholding is not always the representative of the rich, it certainly indicates that the farmer is socially and economically better positioned in the community than the others. The following figure 1 depicts the land tenure and farm size distribution in the two catchments.

Among the total of 550 households (hh) in Begnas catchment, majority (357 hh), which is 65 percent of the total own the land. Likewise a significant number of households (115 hh) are tenants, which is 21 percent of the total and landless household numbers 77, which is 14 percent of the total. The percentage of landless households would have increased considerably if the survey was taken from the distant areas within the catchment. Among the landholders, 319 hh (58%) of farmers own small farmlands of less than 0.5 ha. The percentage of large (1.0–1.5 ha) and medium landholders (0.5–1.0 ha) is also significant with 115 hh (21%) and 82 (15%), respectively.

Figure 1: Land tenure and farm size distribution.



Source: DIO, Kaski and Tanahu District

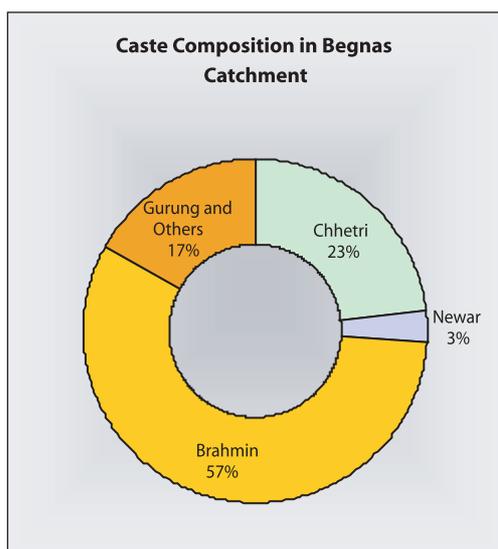
Nevertheless, the percentage of large owner is very small with 33 households (6%). Tenure pattern and farm size in the Begnas catchment suggests that there are large numbers of farmers who are poor or have small landholdings within the catchment. The data of 53 households in Bhanu Shera catchment show that there is large number of landowners (41 hh) in this catchment, which is 79 percent of the total and a majority (38 hh) of these are small land-owners (72%) with no farmer owning more than 1.5 ha of land. This indicates a more equitable access to land resources than in Begnas.

The presence of a large number of small landholders in both catchments explains that majority of the households have low food sufficiency level. The small landholders in the catchments either share the crop or rent the farmlands from large landholders for additional supply of food to their families. A large percentage of small landholders is, hence, also indicative of the poverty level of the catchments and their dependence on natural resources. Livelihood impacts of natural resources on the poorer households, especially of forest and water, are further explained in other sections.

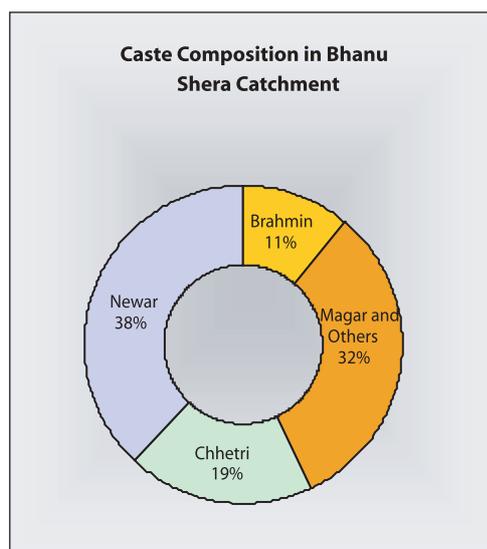
3.5. Ethnicity

The community in Begnas catchment is more homogenous (figure 2) with one upper caste (*Brahmin*) group with 313 households (57%) dominating and is followed by other upper caste groups. Our interviews indicate that other caste groups do not feel sidelined when major decisions are to be made in the community affairs. In contrast the community in Bhanu Shera catchment is more heterogeneous (figure 2) and other caste groups are in the majority in comparison to the two upper caste groups. Thus, there is no dominance of one group in decision making.

Figure 2: Ethnic distribution of households.



Source: Field Survey 2002



Source: DIO, Tanahu District

4. IMPACTS OF FUGS AND WUGS

The livelihood approach emphasizes the understanding of stakeholders' participation in the management and benefit sharing of the resources. This is important in knowing how the benefits are distributed among them and its differential impact at the household and community level (Nicol 2000). The successful institutionalization of FUGs and WUGs depends on how effectively equity issues, mainly usufruct rights and benefit sharing among users are addressed by them. The participation of women, poor and landless in decision making is crucial in this respect, as they are the vulnerable and important resource users in the community. Poor people's involvement in common property resource management is crucial as it is linked to their coping and adaptive strategies (Beck and Nesmith 2001) and provides to an understanding of their perceptions of poverty. This is important for building on their capacities. Equity between diverse sets of users who have differing social and economic positions in the community is the most critical issue in FUGs and WUGs. It is argued that the landless and marginal farmers do not get equal opportunity in the common property resource management and, therefore, the interest of the large farmers are served through it, as most of the common property resource management does not address the immediate need of the poor and landless (Kumar 2002; Ghimire 1992). The main issue in this respect is that the poor and the landless do not have a say in the decision making and as such their interests are not addressed. This lends support to the argument that increasing access to the management of common property and its use

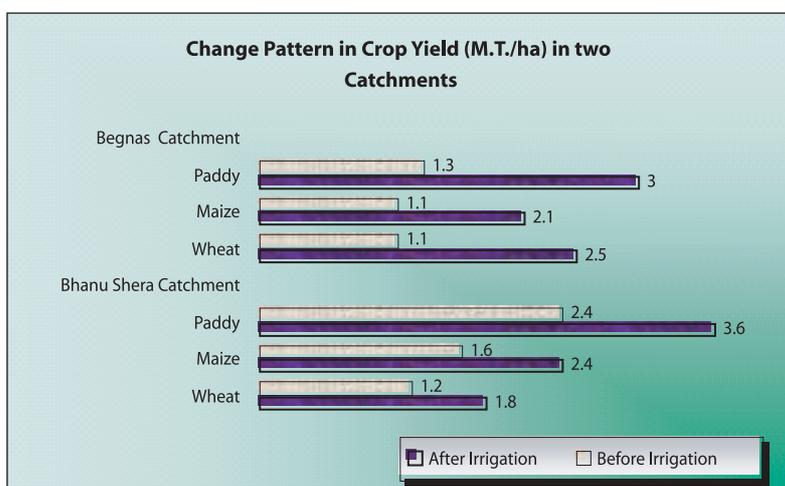
for the poor and landless could have a positive effect on their livelihood, as they are more dependent on these resources. The impacts of FUGs and WUGs on livelihoods, social and ecological conditions and changes in the community were assessed keeping in view of their management in the community.

4.1. Livelihood Impact

At both catchments, agriculture is the predominant income generating activity for majority of households. In Begnas Catchment, 473 (86%) of households had agriculture as the main income source. Besides agriculture, 128 (23.3%) and 91 (16.6%) households have small-scale businesses and services as an auxiliary income source. In Bhanu Shera Catchment, 27 (90%) of the respondents (from group discussion, where 30 households had representation) reported agriculture as the main source of income and 7 (25%) households had other auxiliary sources of income like small-scale businesses and private/government services.

Agricultural production shows a significant difference before and after the development of the irrigation system (figure 3) according to the District Irrigation Office. Before the construction of an irrigation canal in Begnas area, paddy production was only 1.3 M.T./ha, but soon after the construction of the irrigation canal the production increased to 3.0 M.T./ha. Correspondingly, production of maize and wheat also increased. The increase, however, is not uniform across the households, as the availability of irrigation water at the middle- and tail-end of the canal system is less according to the farmers. The results are similar for Bhanu Shera Catchment where renovation of the traditional irrigation system helped to increase the production of paddy and other crops significantly. Members of WUGs in both catchments told that improved irrigation systems have resulted in good agricultural productivity. Cropping pattern of rice, wheat and maize as main crops, however, has not changed but cropping intensity has increased after irrigation scheme was constructed. Cropping intensity in Begnas Catchment has increased to 200 percent from 129 percent after the completion of the irrigation scheme (DIO and Kaski District). This is evidenced from the increase in the use of chemical fertilizers, as reported by the respondent households in Begnas Catchment. From the 30 surveyed households, it was found that as an average a household uses chemical fertilizer in the ratio of 0.4 kg per doko (equivalent to 25 kg) of animal manure. Few farmers have initiated large-scale coffee production and fruit farming. Various NGOs and INGOs are active in promoting and improving the farming system in the catchments.

Figure 3: Change in cropping pattern and crop yield before and after irrigation.



Source: DIO, Kaski and Tanahu District

All the poorer families in both catchments told that after improvement in the irrigation system in their village, opportunity for wage employment (mainly in big landholder's farmlands) has increased. Renting land from the big landholders by the poor and small farmers has increased due to decreasing involvement of people from upper class in agricultural activities. Due to the increased opportunity of waged employment, they have been able to buy more food. However, general living conditions for them has not changed significantly due to the lack of access to the productive assets of their own. The users at the tail end who did not receive irrigation feel deprived of the benefit from the government investment.

The requirement of fodder, firewood, litter and timber determines the household's dependence on forest resources. In Begnas Catchment, 38 percent of the FUG member households told that they are very much dependent on forest products. They make frequent visits to the forest for bringing firewood and fodder. Respondents also told us that they could bring firewood as much as they need, without any restrictions for household consumption, but they are prohibited from selling the firewood in the market. Forty-two percent of households were partially dependent on forest products. They mostly bring fodder for livestock and occasionally (once in a year) make an application to the FUG committee for timber. The rest (20%) of the member households expressed that they are not dependent on forest products at all. They use Liquified Petroleum Gas (LPG) or biogas for cooking, do not keep livestock and live in modern houses made of bricks and cement. They have taken membership in the FUG for unforeseen benefits that may arise in the future. Table 3 shows the households dependency on the forest resources.

Table 3: Dependency on forest products.

| Type of dependency | Landholding Size | | | Total |
|-----------------------------|------------------|-------------------|---------------|-------|
| | Small (<0.5 ha) | Medium (0.5-1 ha) | Large (>1 ha) | |
| Firewood only | 3 | 2 | 1 | 6 |
| Firewood and Fodder | 6 | 4 | 1 | 11 |
| Fodder, Firewood and Timber | 4 | 0 | 0 | 4 |
| Firewood, Timber and Herbs | 2 | 1 | 0 | 3 |
| Not dependent | 3 | 3 | 0 | 6 |
| Total | 18 | 10 | 2 | 30 |

Source: Field Survey 2002

The table shows that it is mostly the poor households who are more dependent on the forest products for their livelihood along with the medium-size landholding households. The study carried out in the Mid-Hills of the Eastern part of Nepal also found that poor households with less private land are more dependent on the forest resources (Dougill et.al. 2001). There is an inverse relationship between the size of the landholding and the dependence of households on forest products. The type of dependency also indicates that poor households become more vulnerable due to the loss of the forest reserve than the large landholding households.

The negligible dependence on forest products is also due to the tree plantation, as 18 households (60%), out of a total of 30 household respondents reported to have more than 10 trees on their own land. Presence of a large number of trees can be attributed to the large size of the landholding. This further shows that large farmers tend to be less dependent on the forest resources compared to the small farmers and the landless. *Alnus nepalensis (utis)*, *Castanopsis indica (katus)*, *Schima*

walichii (chilaune), *Artocarpus intergra* (katahar), *Shorea robusta* (sal), are the type of trees chiefly planted by the households, and they are used mainly for fodder and timber.

At the study sites, all the households including those that had switched over to using liquefied petroleum gas (LPG) for cooking were still bringing firewood from the forest for cooking livestock feeds. Income generation for the poor family from non-timber forest products (NTFP) in forests has also not been achieved at the study sites. Consultations with FUG members during group discussions revealed that there is high potential in generating income from NTFPs in the forests of both catchments. Different kinds of herbs and *sal* leaves (*Shorea robusta*) could be a very good income source for the poor. However, the FUG members cannot identify important and useful herbs in the forest and they also do not know the extractable limits for the ones they can identify. In some cases, they are unaware of the market values of the NTFPs they extract. This has led to the underutilization of the NTFPs and, hence, a potential income source for improving the livelihood of the poor is being lost.

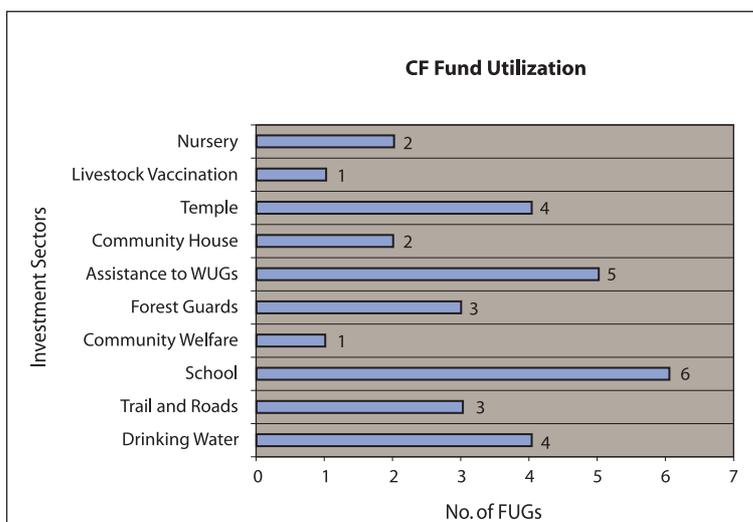
4.2. Community Impact

Of the total seven FUGs studied in the two catchments, six FUGs had invested some amount of their fund for upgrading and building infrastructures of local schools. Another major investment of Community Forest (CF) fund (five FUGs in total) was found to go into assisting WUGs. FUGs either contributed cash or supplied timber from forests for maintenance of irrigation canals in the village. Providing drinking water and constructing temples were the other main sectors in which four FUGs had already made investments. CF fund was utilized either in maintaining the already existing drinking water scheme or launching a new one. Most of the drinking water sources that originated inside the community forests were protected by FUGs. Similarly, the community also prioritized trail and road construction and appointment of forest guards where considerable CF funds were utilized by the three FUGs. One of the FUGs was well ahead of others in investing in community welfare and livestock vaccination programs in the village. Community welfare program targeted at assisting poor households who could not go to health posts during illnesses or spend even on death rituals.

The biggest portion of the collective funds of WUGs was utilized for regular operation and maintenance of the irrigation system. The irrigation system needs maintenance throughout the year and, hence, it leaves very little resources available for the WUGs to invest in various other developmental programs in their village. Two contrasting features in FUGs and WUGs are that the benefits from the forest resources are accrued to the community, whereas the benefits from irrigation go to the individual households although both are considered common property.

The discussion above indicates that FUG's role in income generation through investment in various community activities has been beneficial for the poor households in the community, as they could get employment opportunities as wage laborers. Further, their contribution in the maintenance of irrigation systems has a direct bearing on the livelihoods of the people dependent on agriculture. The investment in other social and economic activities (figure 4) has promoted in bringing cohesion between various groups and social integration in the community. This is important in terms of coordination and integration of WUG and FUG activities in future that would have a direct impact on the livelihood of the people.

Figure 4: Distribution of Community Forest Fund Utilization.



Source: Field Study 2002

4.3. Environmental Impact

Environmental impact was measured in terms of changes in resource quantity and quality before and after the emergence of FUGs and WUGs. Oral histories on changes in resource use pattern and conditions as obtained from elderly persons at the study sites formed the basis for assessing the ecological impacts. With agricultural intensification at study sites, management of small irrigation systems by communities began increasing. Correspondingly, informal WUGs are also increasing. Khanaswara WUG and Deurali Kholo WUG in Begnas Catchment are examples of such newly formed user groups for irrigation systems. In Begnas and Bhanu Shera Catchments, users affiliated to WUGs and FUGs told that the availability of water and forest conditions have improved over the years. The respective user groups in their villages have started regular operation and management of canal systems and regulation of forest products. Overharvesting of grass and fodder, irregular and illegal felling of trees has reduced in both catchments according to the recollection of the users. The users told that after handing over of the forest to them, the forest has become thick and, the availability of firewood, fodder and leaf litter has increased therein. According to the users, the increase in forest cover has helped in checking landslides, which could have occurred due to unrestricted access and protection of water sources in the community forest, which has increased the availability of water. Farmers' perception of the aforesaid is similar to some of the studies conducted in Nepal. Branney and Yadav (1998) in their study on changes in community forestry conditions carried out between 1994–1997 in the eastern part of Nepal, reported that there has been an increase in basal area of forest in the most degraded condition and 51 percent increase in stems/per ha. Also, the study reported less grazing in the community forest (71%) compared to the national forest (94%), which could have severe implication for land degradation. However, the study recorded no significant changes in the leaf litter condition as 57 percent of the plots showed no variations. Poudel (2003) reported positive changes in the forest structure, ecological and protection functions in community forests in the recent past. According to him the depletion rate of 14 percent during the 1970s and 1980s, has fallen to less than 7 percent, due to community forest programs.

In Malmul FUG of Begnas catchment, due to increased demand for grass, a separate committee was formed within the FUG to regulate distribution of grass among users. Many of the users have

now started planting fodder and timber trees in their farmland and, hence it has reduced pressure on the community forests.

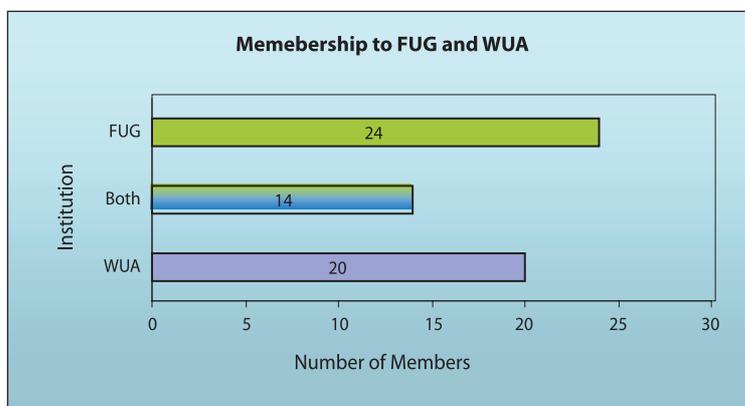
4.4. Socio-Institutional Impact

The participation of each of the stakeholders is governed by the opportunity available to them in the decision making process and the benefits they derive from their involvement in such a process. Participation involves a person's commitment of individual resources and this could be in various forms. Stakeholders' role and degree of their involvement in the management of the common property resources determines the impact on the institutionalization process of the management activities of WUGs and FUGs.

4.4.1. Membership in WUG and FUG

At the study sites, taking the irrigation system as the reference of the catchment, the community consisted of members who were affiliated to a single or both institutions. Since, there were many forest user groups in a catchment, households had membership in at least one of the FUGs, whereas only those households that had land falling in the command area had membership in the WUG. Considering this, some of the households were members of both FUGs and WUGs. Figure 5 for Begnas Catchment, represents how WUG and FUG members overlap in a given catchment.

Figure 5: Distribution of Membership in Begnas Catchment.



Source: Field study 2002

Of the total 30 respondents in the Begnas Catchment, 14 households (nearly 50%) are common members of both FUGs and WUGs. The overlap of membership between the users is providing an informal linkage between the two groups. Twenty-four FUG households (87.5%) and twenty WUG households (60%) members reported that they attend the group meetings and have been participating in the decision making process. Unlike WUG membership that requires landholding in the command area as the principal criteria for membership, FUG membership is flexible and is open to various categories of households, viz., forest dependent households that live close to the forest and partially or nondependent households that live far from the forest. Many of the households take membership in the FUG even though they are not dependent on forests for firewood and fodder, due to consideration of future requirement of timber for construction purposes. As FUG membership only

requires the entrance or membership fee, a large number of households become members. However, the cost for members that do not contribute actively into the management of forest is higher than those who are actively involved in forest management.

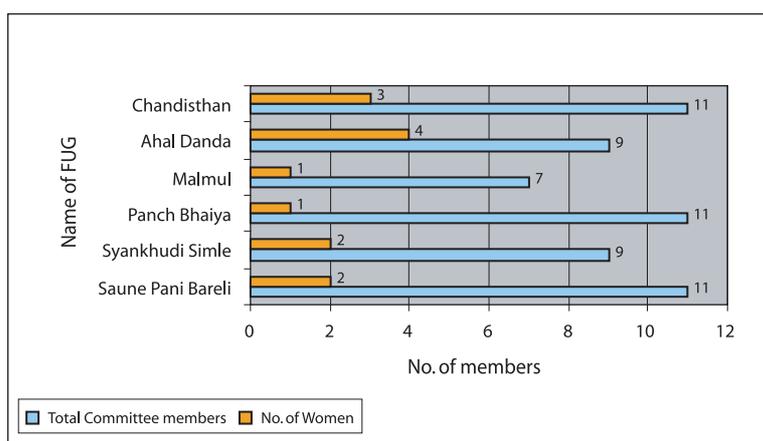
4.4.2. Gender Participation

Equality in roles of men and women in FUGs and WUGs was primarily determined by their representation in the committee and their role in the decision making process. The inclusion of women in one-third of the total committee positions has been a rule in recent years. This rule, however, has been breached by majority of FUGs and WUGs at the study sites. Only in Ahal Danda FUG and Chandisthan FUG of Bhanu Shera Catchment, women hold one-third of the positions in the committee. As observed in the figure 6, women representatives in Malmul and Panch Bhaiya FUGs are very low. Moreover, the positions filled by women were mostly in the category of ordinary members that carried less responsibility. All important positions such as that of chairperson, secretary, treasurer, etc. were filled by men. The participation of women in the CF is also low with regard to the national average, which is 21 percent. But outside interventions in the form of training and awareness creation has helped to increase the women's involvement in CF (CARE Nepal 2002).

Women's representation in WUG committees is no better than in the FUGs (figure 7). Only in the subcommittee of Begnas WUG (Begnas-1 has a one-third representation of women). One of the WUG committees, Begnas-3, does not have a single woman representative. In spite of the existing rules to have one-third of women in the committee, both in FUGs and WUGs, women are underrepresented.

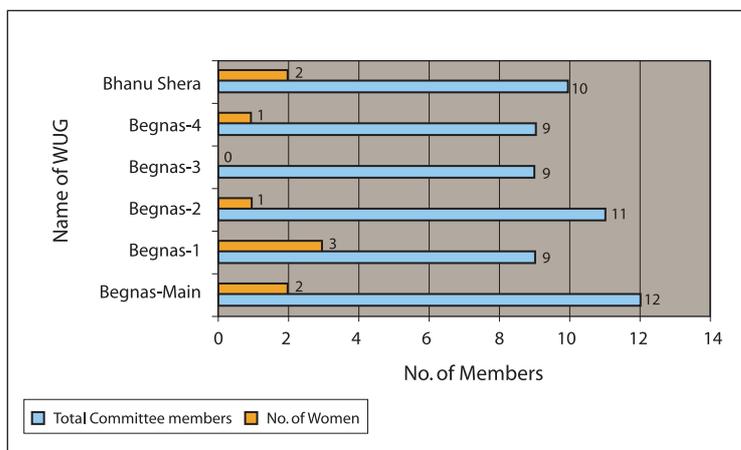
Women's participation in meetings, in general, was also reported to be negligible. Only in one of the surveyed households, the respondent told that his wife attends meetings. This trend of only men attending meetings was evident during the group discussion where women's presence was minimal. And even where women were present; they did not speak until questions were specifically put to them.

Figure 6: Representation of Women in FUG Committees.



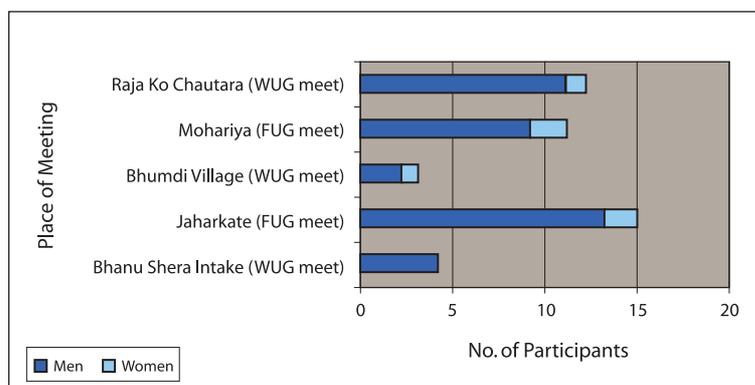
Source: Field study 2002

Figure 7: Representation of Women in WUG Committees.



Source: Field Study 2002

Figure 8: Women's Participation in Group Meetings.



Source: Field Study 2002

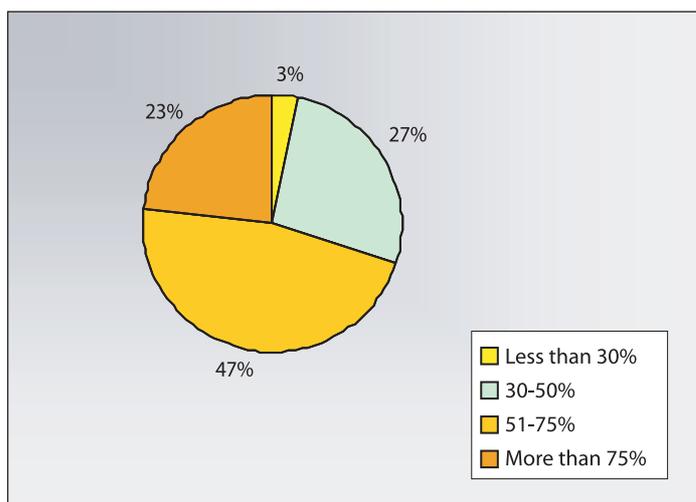
The figure 8 shows that women's presence in group and focus group discussions was minimal. During meetings with WUG members at Bhanu Shera Intake (Bhanu Shera Catchment), women were not present. FUG meetings at Mohariya (Begnas Catchment) and Jaharkate (Bhanu Shera Catchment) had a comparatively better presence of women. Women's participation in terms of raising their voice on pertinent issues or giving opinions at meetings was almost nonexistent. Increasing gender participation usually needs the outside intervention in the form of training (van Koppen et al. 2001), which in most cases is lacking due to primary focus being on the formation of user groups.

4.5. Equity in Benefit Sharing

At the study sites, usufruct rights and benefit sharing mechanisms in FUGs and WUGs were complex and exhibited a differing nature. Equity issues in WUGs are concerned with those community members that get direct benefits from water management. As land tenure right is the prerequisite for getting benefits from irrigation water, equity between members with small and large landholdings, and users at the head and tail is the chief concern. For example, in Begnas Catchment, almost half i.e., 14 households (47%) reported to have received irrigation water for 51 to 75 percent of their land. Very few (3 percent) of households reported that less than 30 percent of their land received

irrigation water (figure 9). However, eight households (27%) reported inadequate (30-50%) irrigation and seven of the households (23%) reported having received irrigation for more than 75 percent of their land. Interestingly, 50 percent of the total (30) respondents told that they are not satisfied with the present irrigation management in their village. It was interesting to note that all upstream farmers (15 respondents) expressed their satisfaction and the downstream respondents expressed their dissatisfaction, reflecting unequal distribution of benefits in the existing irrigation management.

Figure 9: Adequacy of irrigation in the farmer's field.



Source: Field Study

The distribution of benefits from irrigation among different categories of landholders show nearly half of the respondents receiving less than 75 percent of irrigation are poor farmers, whose lands are mainly located at the middle and tail-end of the irrigation system. The table 4 also indicates that it is not the size of the landholding but the location of the land, which is the primary reason for not getting sufficient irrigation.

According to the users, this situation arose partly due to lack of adequate consultation by DOI with the users while designing the project. Addressing the issue of inequality is fundamental in increasing the participation of the users in resource management. Initiation of on-farm water management practices in consultation with the farmers could help in addressing this issue. In contrast, the users in Bhanu Shera Irrigation System were satisfied with the present management due to the equality in benefit sharing. This seems to be possible due to the small size of the irrigation system and its improvement in recent years.

Table 4: Benefits from irrigation.

| Landholding Size | Households response to availability of irrigation water | | | | Total |
|-------------------|---------------------------------------------------------|------------|-----------|---------------|-------|
| | Less than 30 % | 30% - 50 % | 51% - 75% | More than 75% | |
| Small (<0.5 ha) | 1 | 4 | 7 | 6 | 18 |
| Medium (0.5-1 ha) | 0 | 3 | 4 | 3 | 10 |
| Large (>1 ha) | 0 | 0 | 0 | 2 | 2 |
| Total | 1 | 7 | 11 | 11 | 30 |

Source: Field Survey 2002

The above table 4 shows that the benefits from irrigation were not equitably distributed, since two-thirds of the smallholders are receiving irrigation to less than 75 percent of their land. It means that the food security of the household is not reliable. This is the general trend in many parts of the country. Therefore, poor households' access to irrigation needs to be improved to ensure a more secure livelihood for them.

In FUGs, usufruct rights and benefit sharing among different members varied according to their differing dependence level on the forest (see table 1). Some users were highly dependent on the forest and, hence were actively involved in overall management. There were other sets of users who were partially dependent on the forest. Few of the users were not dependent on the forest at all.

Contribution they make into forest management depends on benefit sharing by these different sets of users. Partially dependent users who do not actively contribute labor into forest management are liable to pay more cash for fodder and timber. Also, highly dependent users have priority over partially dependent users for obtaining any of the forest products. It is usually the poor in the society who are more dependent on the forest resources, as they are not able to spend on getting forest resources. Therefore, they also contribute more in the management of the forest. Hence, the poor benefit more from the management of the forest in contrast to the rich getting more benefits from irrigation. This is due to the restricted access to the productive assets.

In some FUGs in the catchment, social change process inherent in the community had an effect on the equity issue. Some users who earlier were dependent on the forest, with the implementation of the social change process, are no longer dependent on the forest. Many of these members come from richer households who held important positions in the FUG committee. After they opt out either from the committee or FUG, normally poor householders who depend very much on the forest resources get an opportunity to become representatives in the FUG committee.

Equity in the Process of Social Change: The Case of Panch Bhaiya FUG

Panch Bhaiya FUG (Begnas Catchment, Kaski District) is the largest FUG in the catchment that covers an area of 235.33 ha and consists of 378 member households. As livelihood diversification opportunities increased in and around Begnas Lake, chiefly due to tourism, middle income groups of society quickly switched over to alternative means of livelihoods. Many of them initiated tourism-based businesses or got jobs at offices of developmental programs that were launched by GOs, NGOs and INGOs. However, the poorer families that could not grasp those opportunities came forward to take over the management of the Panch Bhaiya FUG. At present, the committee of Panch Bhaiya FUG consists mostly of occupational caste groups (considered untouchables) who earlier were excluded from decision-making positions and also were reluctantly taken into management of the forest. Due to the changed situation at present, interests and needs of disadvantaged groups have found their way into operation plans, and their concerns are incorporated and addressed in overall management. The CF fund, under the present management, has been extensively utilized in development of the village and in the interest of poor and disadvantaged groups in the community compared to the past management, which was dominated by the interests and needs of powerful and richer people. It can be concluded that resource management institutions can provide a platform from where disadvantaged groups can develop capacity to articulate their interests, priorities and demands.

4.5.1. Intra-institutional Conflicts

Intra-institutional conflicts and problems within the FUGs and WUGs were of different nature, most of which arose due to the respective resource nature of forest and water. Boundary issues emerged as the major problem faced by the FUGs. The reasons for these conflicts are presented below in table 5.

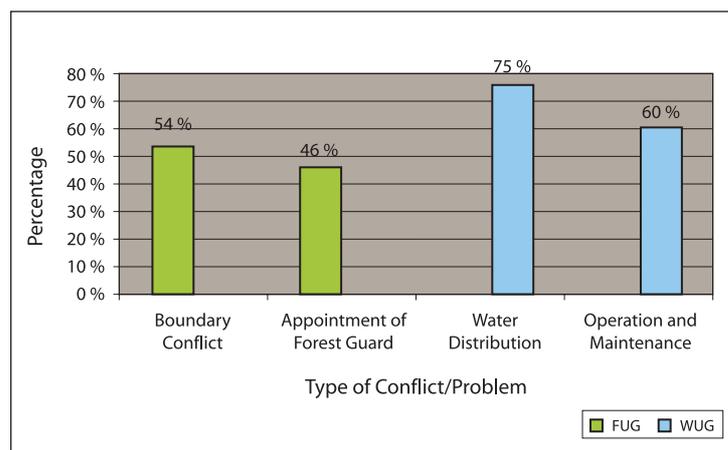
Table 5: Types of conflicts/problems in the FUGs.

| Name of the FUG | Conflicts/Problems |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Saune Pani Bareli | Boundary conflict; (forest area encroached by adjacent private landholders) |
| Syankhudi Simle | Boundary conflict; motorable road passes through forest; (danger of forest fire) |
| Panch Bhaiya | Illegal felling of trees by nonusers; (large number of forest guards have to be appointed because of the vastness of the forest) |
| Saune Pani Thantdanda | Not evident; (very small patch of forest protected by a community in a village hamlet) |
| Malmul | Encroachment by landless immigrants |
| Ahal Danda | Boundary conflict; increase in temporary users |
| Chandisthan | Landslide due to canal construction through the forest |

Source: Field Survey 2002

Of the total 24 FUG members at the study sites, the majority (54%) cited boundary conflict as the major problem (figure 10). Boundary conflicts arose due to the encroachment of forest land by adjacent private landholders and landless squatters. In another case, Bhimsenthumki FUG in Bhanus Shera catchment was registered as a new FUG after it separated from the Chandisthan FUG. The reason for their separation was the users managing the forests came from two different hamlets (wards) of the same VDC. This indicates that the geo-political boundary and involvement of local elected institutions is also equally important in the integration of the activities at the local level.

Figure 10: Conflicts in the FUGs and the WUGs.



Source: Field Survey 2002

The 21 (75%) WUG members cited water allocation and distribution among users to be the main problem (figure 10). Conflict over equitable distribution of water between upstream and downstream communities was existent in two of the three WUGs studied. The main reasons are the insufficient availability of water to irrigate the land in the command area, lack of water allocation,

an ineffective distribution plan, and poor operation and maintenance. The respondents also told that community cohesion for operation and maintenance of the irrigation canal was another major problem existent in the WUGs. Members were reluctant to contribute cash or labor for maintenance of irrigation canal in Begnas IP. Majority of the users opined that the District Irrigation Office that had invested in canal construction and, therefore, they should maintain the canal system, indicating their reluctance or inability to contribute for the operation and maintenance of the system. This shows that larger irrigation systems have more problems compared to the smaller irrigation systems. This sort of problem was nonexistent in the small irrigation system—Bhanu Shera.

4. 6. Interinstitutional Conflicts

Sectoral institutions were increasingly found to enter into conflicts with each other. For instance, within the boundary of Chandisthan FUG (Bhanu Shera catchment), Karnalitaar WUG has its source and its alignment also passes through this Community Forest (CF). Users of Chandisthan FUG think that careless laying of hume pipes of the Karnalitaar irrigation canal is the main cause of landslides in their forest. This could have been avoided had there been a mechanism for coordination of activities of these two institutions. Therefore, linking of their activities could be beneficial to both user groups in this respect, which is lacking at present.

5. INTEGRATION OF WUG AND FUG ACTIVITIES: CHALLENGES, OPPORTUNITIES AND BENEFITS

The discussions in the preceding sections reflect that the water and forest resources at the local level are managed separately, although these two resources have significant impact on the village economy and household livelihood. The management regime of both resources is different largely due to the effect of the nature of external intervention. The policy and legal provisions are the main external interventions in the management of forest resources and there are no physical interventions. Nevertheless, these interventions provide strong support for the management of forest resources through its effective enforcement. The irrigation systems, however, have physical intervention with external technology and finance, but enforcement of policy and legal provisions are weak. This has resulted in differences in the institutionalization process of the management of these two resources. The sectoral focus of the government's plan and programs is also instrumental for their independent management. Therefore, the decision-making processes for the management of these two resources are also independent from each other, but informal interaction between the groups of users does exist. However, lately it has been realized that the integration of these two activities could help in increasing benefits to the rural household, and thereby reduce poverty. The users themselves see challenges and opportunities for the integration of these activities. Users found the idea of integration as very innovative and useful for the future management of these resources. The participants of the group, however, (members from both FUGs and WUGs) have never thought before in this respect. The discussions in the following paragraphs will try to identify some of the challenges and opportunities for the integration of these two activities.

5.1. Challenges

The difference on the nature and structure of rights of resources between WUAs and FUGs is a fundamental cause for the dissimilarity in the functioning of these two institutions. Their membership patterns and benefit sharing are indicated in table 6.

Table 6: Comparative account of WUG and FUG management.

| | WUG | FUG |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management Unit | Limited (membership is acquired by only those who possess land tenure rights in the command area) | Unlimited (membership acquired on the basis of the need of the user) |
| Institutional Arrangement | Formal; Semi-informal; Informal | Formal and Informal |
| Usufruct Rights | Land tenure rights in the command area are the prerequisite. Contributions to the management (operation and maintenance of the system) are not necessary to protect the right. | Significant contribution into conservation and management is the prerequisite. Contribution to the management is necessary to protect the right. |
| Benefit Sharing | Benefit sharing is not tied to the contributions but is based on the first-use-right, which leads to inequality in benefit sharing. | Benefit sharing is tied to the contributions and most of the benefits go to primary stakeholders. Other levels of stakeholders also can demand or get benefits, guaranteeing equality in benefit sharing, but at a slightly higher cost. |

Source: Field Survey 2002

The participation in FUGs is broad-based and as such, a large number of people who live surrounding the community forest boundary could become members of the institution. In the case of WUGs, the membership is limited to those who have land in the command area of irrigation. Therefore, socioeconomic diversity and differences in individual access and control over resources; and the degree of cooperation and conflicts between and among communities is an important aspect to be considered for the integrated activities at the local level. Likewise, ensuring participation of most vulnerable and disadvantaged groups and fair distribution of benefits to them has remained challenging as ever for the integration of activities. But, if provided with an opportunity they could work for the benefit of the larger community (see box).

Another important area for INRM at the local level is dependent on provisions at the policy, legal and institutional levels. Ambiguities at the policy level are manifested in the legislative provisions too. This is fundamental to the identification of rights, role and delineation of authority among various stakeholders involved in the management of natural resources. At the same time the role of local elected institutions in INRM is not recognized, which is impeding the coordination of natural resources activities at the local level.

5.2. Opportunities

During the group discussions, participants mentioned that maximization of resource utilization that is available at the local level could help in increasing the income level of the people in the village. There are opportunities to improve the livelihood of the poor through increased utilization of the forest products. The study in the Koshi Hills, Nepal reported that the improvements in forest

conditions of the CF have not been productively utilized as 87 percent and 43 percent of the FUGs are harvesting less fuelwood and timber, respectively, than the actual productive capacity of the CF, (Branney and Yadav 1998).. This is largely due to the emphasis on protective measures in the CF and also because of a lack of proper mechanism for sustainable use of the resources. The optimum use of the resources is more important for those households who do not produce enough food. The study by Livelihood and Forestry Program (2003) conducted in 28 village clusters in Eastern and Western Region of the country reported that 35 percent to 50 percent of the sampled households had sufficient food supply only for 6 months, thereby indicating their dependence on income from other sources.

Since the income from agriculture alone is not enough to support the family, the income generated from the management of other natural resources would greatly contribute in enhancing the livelihood of the poor household. For example, natural resources like limestone, sand, and river bed materials (gravel and stones), that have not been utilized fully could be made use of for the benefit of both groups. These resources can be extracted and utilized in a sustainable manner if WUGs and FUGs can be integrated or linked to draw an appropriate plan for their proper use.

Likewise, the utilization of Non-Timber Forest Products (NTFPs) could be an important and regular source of income, if properly utilized. The users' from both groups opined that existing potential has not been fully utilized due to the lack of a joint effort, and that integration could help in overcoming these problems. The Livelihood and Forestry Program (2003) study also reported that the high value of NTFP has not been commercially exploited despite the scope for its utilization. Further, the resource generation from additional sources could also help in implementing other community activities that would directly benefit the needy in the community.

Users' believe that the integration would help better water management at the farm level through increased availability of water and also through improved on-farm water management practices. This would help resolve some of the intra and interinstitutional conflicts related to the rising competition in the use of resources (forest products and water). For example, the conflict between the head and tail-enders; and problems relating to the water source in the forest. Improved cooperation between the two sets of users could facilitate increased interaction to solve the inter-institutional problems as mentioned earlier. Besides, enhanced cooperation between the two users would lead to better management of the available resources, thereby increasing benefits to the larger population by tackling problems of erosion, landslides, forest encroachment and drinking water scarcity.

5.3. Benefits

Participants of the group discussions identified different benefits through the integration of the two institutions. The summarized views of participants at five group meetings held in different villages in the catchments are presented in table 7. The result has been presented according to the degree of emphasis put by participants at group meetings.

The participants of group meetings mentioned that integration or linkage between FUGs and WUGs could raise awareness among users. The users will come to know better their rights and stakes in resources and, hence can actively contribute to the success of the institutions. A large number of participants told that the integration of FUGs and WUGs would also improve their working relations with government agencies, and also help in establishing better coordination between government agencies.

Table 7: Users' opinions on benefits from integration/linkage between the FUGs and the WUGs.

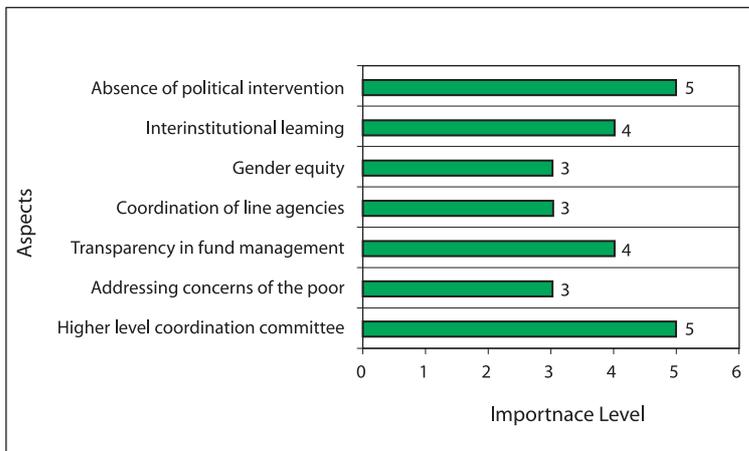
| | |
|---------------------------------------------------------------------------------|-------|
| 1. Cooperation between FUG and WUG will increase | ◆◆◆◆ |
| 2. Will raise awareness of users of both institutions | ◆◆ |
| 3. Will help in conflict resolution | ◆◆◆◆◆ |
| 4. New resources can be mobilized for mutual benefit | ◆◆◆ |
| 5. Working relations with line agencies and government departments will improve | ◆◆ |
| 6. Opportunity to learn from each other's experience | ◆◆◆◆ |

Source: Field Survey 2002

Note: ◆ Emphasis level

Though users could not exactly explain the nature of integration, they suggested that FUGs and WUGs should operate independently as to how it is now, but, some of their activities can be coordinated by forming a higher level coordination committee with representatives from both user groups. During the group discussion, participants also cited various conditions that need to be considered while looking for opportunities to integrate FUGs and WUGs. The participants strongly emphasized on the need to ensure the committee is free of party politics or any form of political influences.

Figure 11: Important Aspects for Intergration of FUGs and WUGs (Users' Views).



Source: Field Survey 2002

Similarly, other important aspects as mentioned by the users were inter-institutional learning and transparency in fund management. The users told that mutual learning from each other's experiences in FUGs and WUGs can greatly help in bringing equity to the benefit sharing mechanism in both institutions. The users also expressed the need of prioritizing women's and poor users' concerns when integrating FUGs and WUGs.

6. CONCLUSION

Both forest and water management institutions comprise communities from different hamlets (wards), villages, VDCs or districts. They are dependent on respective resources and are concerned to conserve, utilize and manage the resources for collective benefits.

Preliminary assessment reveals that these two resources have significant livelihood impact at the household level, especially for the poor. The increased availability of irrigation water has helped in agricultural production and productivity, cropping intensity, and increased employment opportunities for the poor households. But the benefits among the households are not equitably distributed due to the location of the land. Likewise, certain households have benefited through increased availability of fodder, litter and timber, but as for the poorer households', their dependence on forest products is high compared to the other farmers. Therefore, their (poorer households) participation in the forest management is also increasing. The non-utilization of Non Timber Forest Products (NTFPs), however, has negated the potential benefit that could be derived from it. It could be concluded that the investment in irrigation that includes external financial and technical assistance is likely to have an impact on less number of people, because the benefits are directed at a particular set of users. As for forest resources there is little or no financial and technological intervention from outside but the benefits accrue to the wider population.

FUGs are involved in community development by way of contributing to employment generation and community cohesion through investment in drinking water, irrigation, temples and other activities benefiting poor households. WUGs are lacking in this front. The differences in contributions to community activities between the two user groups can be explained through the variation in the type of resources they are managing. The forest resource generated locally is utilized for the common benefit as decided by the user's community. The benefits from irrigation, however, go directly to the individual, and sharing of these benefits for the common benefit of the users largely depends on the individual's decision.

The benefit sharing is more equitable among the forest users when compared with the water users. In the case of forest users the benefit is tied to the contribution made by the member, whereas with the water users the benefit is tied to the ownership of land and contribution for management is not given much importance. With respect to the participation in management and decision making also, it is more egalitarian among the forest users compared to irrigation users. A large gap, however, still exists in the success of these institutions in terms of gender equality.

Both the institutions have emerged as strong local level institutions, however, they lack a coordinated effort for the management of natural resources, as they are sector focused. There exists both intra and interinstitutional conflicts. Many of the conflicts over resource utilization and management noted during the study had arisen from administrative boundary issues. Natural resources within a watershed that fall into more than one political unit (VDC or DDC) often create conflicts between and among the communities. The conflict should be looked from the perspective that each of the user groups has its own needs, development priorities and is influenced by other interest groups and local politics. The involvement of local elected institutions in this respect could help in preventing and resolving conflicts.

The users of these two institutions could learn from the experiences of each other and some of the experiences could be shared among them. More particularly, the irrigation users could benefit more from the experience of forest users in the area of protection of user's rights, resource mobilization and benefit sharing. Likewise, the forest users could benefit from the long experience of irrigation users in resource management with external intervention beside experiences in interaction with outside agencies.

The study indicates that there are opportunities for the integration of the activities of these two institutions. However, overcoming policy level and management challenges are important for the integration of these two institutions. The identification of ways to reduce intra and interinstitutional conflicts could be the best starting point. One of the primary areas could be to work together to solve the problems or to derive benefit from the changes effected by land use practices in the catchment, which is prominent in the studied area. The community could take the initiative, through outside facilitation, to integrate the activities of external agencies that are working in the community.

Action research in the areas mentioned above need to be developed and conducted to explore the possibility of linking activities of these two institutions. The existing informal linkages due to the overlap of membership between two users group could serve as a platform for future integration of their activities. Successful Natural Resource Management (NRM) integration will, however, depend on how interests, needs and rights of different user groups are effectively represented in the institutional framework of the decision making process.

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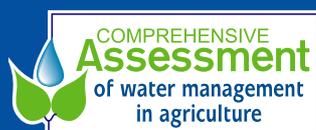
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ANNEX 1

Table1: Land use details of Kaski and Tanahu Districts.

| | Kaski District | Tanahu District |
|--------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Altitude Range | 450 m to 7,939 m | 340 m to 2,325 m |
| Bordering Districts | Lamjung (E), Myagdi and Parbat (W), Manang (N) and Syanja and Tanahu (S) | Chitwan and Gorkha (E), Syanja (W), Kaski and Lamjung (N) and Nawalparasi and Palpa (S) |
| Area | 201,700 ha | 156,877 ha |
| Land Use (ha) | Agricultural Land = 48,962 Human Settlement = 22,901 Rocks and Others = 39,894 | Shrub Land = 7,252 Rocks and Others = 7,293.85 |
| Forests (ha) | | |
| Total Forest Area | 89,943 | 76,231.15 |
| ACAP Area | 48,160 | |
| Handed-over CF Area | 12,845.58 | 19,141.51 |
| Leasehold Forest | - | 640.88 |
| Total FUGs | 389 | 278 |
| Forest Area per HH | 0.412 | 0.66 |
| Forest Type | Subtropical to Alpine | Subtropical |
| Irrigation Status | | |
| Total Irrigated Land (up to 1997) | 10,831 ha | 2,873 ha |
| Economically Irrigable Land | 15,960 ha | 14,496 ha |

Source: Field Survey 2002



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