Linking Community-Based Water and Forest Management for Sustainable Livelihoods of the Poor in Fragile Upper Catchments of the Indus-Ganges Basin

Resource Management for Sustainable Livelihood
Challenge Program Project No: 23

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Preface

- *– a generic paragraph explaining the CPWF (to be drafted by CPWF) and introducing this project (to be drafted by PL)*

This study was carried out with the goal of contributing to enhanced sustainable livelihood opportunities and reduced vulnerability for poor rural people in upper catchments in Nepal and India. The specific objectives of the project were to:

1. Identify innovative policy and legal measures and their associated institutional structures that permit integrated forest and water resource management in Nepal and Uttarakhand state in India.
2. Promote opportunities to strengthen livelihoods based on forest and water resources in two Himalayan sub-basins through assessment of present use and analysis of constraining and facilitating factors for enhancing water and forest productivity.
3. Examine expanded mandates for local CBINRM institutions by strengthening users' roles and linkages with external resources leading to integrated water resources management and sub-basin level planning.
4. Assess and determine mechanisms to scale up integrated water and forest management at the catchment level.

This study was conducted in Begnas Catchment in Western Nepal and Hilaungad in Uttarakhand, India).

Acknowledgement

The project research team would like to express its gratitude to numerous institutions and individuals both in Nepal and India, who were involved in the design and implementation of the project activities. The action research was conceptualized to address one of the major issues in resource management at the basin level. It was observed that despite the existence of various resource user groups at the local level, the institutional arrangement for integrated management of resource at the sub-basin/catchment level was lacking. Therefore, there was need to understand the dynamics of resource management to explore the possibility of enhancing the role of existing institutions at local level.

In this respect, the project team received valuable inputs from a number of experts from different countries in IG Basin during workshops organized to discuss the various proposals to be submitted to the CPWF which is duly acknowledged. In particular, we very much appreciate Dr. Chris Scott, Dr. J.S. Samra, Dr. Bharat Raj Sharma, Dr. Alok Sikka for their valuable contribution in developing and refining the proposal. Likewise, we would like to express heartfelt thanks to the Dr. Peter McCornick, Dr. Deborah Bossio of IWMI, CPWF secretariat team, Basin co-ordinators and Theme Leaders for their suggestions/comments which were very helpful in achieving the project outputs.

The project team also would like to recognize the necessary support extended by the government agencies and the officials both in Nepal and India from central level to the local level, without which the study would not have been completed due to absence of required information that are available with them. Likewise, we appreciate support provided by local level elected institutions along with SORUP – an NGO which helped in carrying out field level studies in Nepal.

Being an action research, the close interaction with members and officials of the resource users group played an important role and would like to acknowledge the valuable time they have provided and their contribution in shaping the study outcome. We also would like to recognize the important role played by I/NGOs, CBOs, and other institutions in facilitating the study by sharing their experiences and encouraging the users to participate in the action research.

We also would like to acknowledge insights gained through the thesis of M.Sc., P.hd. Students and consultants work, which was complimentary to the various component studies carried out by the project researchers.

The project team would like to express its gratitude to Multiple Use Scheme project of FAO/IWMI/IPTRID, which supported construction of one MUS scheme in one of the study villages of the project area to ensure regular supply of water for productive and domestic use.

Finally, the project team is grateful to CPWF project of CGIAR for its generous financial support for this action research.

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Project Highlights

The project CP 23, "Resource Management for Sustainable Livelihood" was a three year project, starting from April 2005 and ending in September 2008 with a no cost extension of six months from April 2008. It aimed at contributing to enhanced livelihood opportunities and reduced vulnerability for poor rural people in upper catchments, through understanding of legal, policy and institutional provisions for resource management in Nepal and India, resource assessment and livelihood analysis in the studied area, exploring expanded mandates for the existing resource users' groups and possibility for scaling up their activities. To fulfill the objectives, researchers advanced a range of activities such as household survey, PRA exercises, formal and informal meetings, GIS, establishment of rain gauge stations, data interpretation and analysis, etc. The project conducted different case studies to support the different research reports. Some of the research findings are as follows and are divided into three headings:

Diaognistic

1. Water and forest resources contribute to the livelihoods of the rural households but their management is guided by sectoral policies of the Ministry of Water Resources and Ministry of Forest and Watershed Management.
2. There is need to understand the some of the legal provisions that exists and can facilitate for integrated water and forest management while evaluating the opportunities and constraints for integrated natural resource management.
3. A comprehensive land and water use planning and management policy is fundamental to conservation and regeneration of forest areas in the State, and thus an integrated management approach is a critical need today.
4. The ownership and management of common property resources (CPRs), especially for the lake in Nepal and forests, water, including canals, in India is not well defined. This condition has hindered equitable access to benefits from the resource use and its management in an integrated way.
5. Both existing vertical and horizontal linkage between institutions are sectoral.
6. Environmental Services Fee (ESF) is quite new to the stakeholders.

Analytical

7. Contradictions exist among local development, irrigation, forestry policy provisions and between policy and law. For example, the farmers managed irrigation systems are not governed by any policy and law whereas the local development activities and forest management are governed by local governance and community forest acts respectively, which are not conducive to the integrated management of natural resources at local level.
8. The users involvement in the management of natural resources is a function of the livelihood opportunity associated with it, as indicated by the fisher and irrigation users group compared to the community forest users group.
9. The benefit accrued to different resource users is varied. Benefits are determined by the type of resource use, whether the benefit accrued is direct or indirect, the institutional

mechanism developed for management and how effectively the mechanisms are functioning.

10. The policy provisions have scarcely been disseminated at the community level. Furthermore, as specified in various legal? the rules and regulations for natural resource management and roles of local bodies (DDC, VDC, municipality, Gram Panchayats and Van Panchayats) and the user committees, are contradictory.
11. There is no linkage among the various water users in the downstream.
12. There exists inequity in benefit sharing among and across the users. In India, the class- and caste-based inequities are prominent in terms of assets, resource gaps and livelihoods availabilities.
13. There exists minimal role of elected institutions in the management of natural resources.

Policy Implications

14. The platform of the stakeholders has encouraged the communities and the other CBOs and NGOs to work in an integrated approach.
15. In India, there has been a massive shift of livelihoods from agriculture to off-farm employment. This process of shifting of the primary source of income from agriculture to non-farm employment has reduced incentive for the rural communities to participate in various activities required to manage common property resources,although this reduces the pressure in agriculture.

Already alienated by legal, policy and administrative procedures, rural communities display littleinterest in the management of resources. Establishing incentives includes institutional and policy reforms whereby the people not only have a sense of ownership of the natural resources and usufruct rights but also have a say in managementactions.
Though significant resource gaps exist in the mountain villages, large potentials exist for increasing water, land and forests productivity. Livelihood development strategies can be developed with a focus on providing food security and increasing income from agriculture, trees and grass plantations, animal husbandry and dairying, horticulture and micro-finance.

The project established a network between different users groups, government and non government organizations and other stakeholders. It created a platform for integrated natural resource management representing these users groups both in Nepal and India. Local people reacted positively to the committees created at the basin level and believe that these committees can help them address problems related to management of natural resource in an integrated way. The processes of platform formation are being written.

From the government's perspective, the formation of users' committees seems to fulfill the requirement, which is mandatory because of provisions in policy and Act but these users groups have not received adequate support and follow-up of their activities from the concerned government agencies. This has hindered in accomplishing government objective of Integrated Water Resource Management (IWRM) in Nepal as spelled out in the Water Resources Strategy 2002 of Nepal. Likewise, in Uttarakhand, India most of the UGs and other developmental CBOs have been formed as a result of Government Orders, without being written into law. The policy provisions are not explicit in terms of roles and responsibilities of the users' committees. Therefore, without adequate orientation, mobilization and support, they are not as active as the

resource users committee in Nepal. Incentive to manage natural resources requires people's ownership towards it, which is lacking at present in the studied area.

Executive Summary

The CP 23 project, "Linking Community-Based Water and Forest Management for Sustainable Livelihoods of the Poor in Fragile Upper Catchments of the Indus-Ganges Basin" (Resource Management for Sustainable Livelihood) aimed to contribute to enhanced sustainable livelihood opportunities and reduced vulnerability for poor rural people in the upper catchments in Nepal and India. It has achieved understanding of existing linkages and limitations to couple forest and water management leading to policy support to the respective governments on appropriate institutional frameworks and to program support for implementing agencies.

Poor rural women and men face critical food security and livelihoods challenges, particularly in marginal upper catchments of the Nepal and Indian Himalayas. Restricted access to often-degraded water, land, and forest resources combined with low productivity of open-access resources invariably result in seasonal or permanent out-migration and the loss of traditional knowledge, labor for management and community solidarity to address resource degradation. The result is insecure livelihoods and vulnerability to a range of environmental and other hazards. There are a number of successful examples of innovations in community-based natural resource management (CBNRM)—often led by poor women who directly face the brunt of resource degradation and migration—that have led to significant improvements in food security and livelihoods sustainability. The Community Forestry Policy in Nepal and some of the watershed development programmes in India are examples of successful replication of CBNRM over large areas. Functioning models of CBNRM largely seem to work for a single critical resource, e.g., forest. Examples of more integrated approaches tend to be found only at a small scale, in one or just a few communities. Yet communities need to manage multiple resources, particularly forests and water, and also have to address resource competition issues with other communities, e.g., upstream diversions of water that affect downstream availability. Successful examples of multiple resource management by communities are less common, and are generally confined to single sectoral approaches such as the community forestry program and the farmer-managed irrigation systems (FMIS) in Nepal and India.

This project intends to support the opportunities for poor women's and men's food security and improved livelihoods based on community-managed water and forest resources focusing on rainfed agriculture, harvesting of common property resources, small-scale irrigation systems, spring-fed drinking water supply, community forestry, and watershed management in Begnas sub-basin (50-100 km2) covering six communities in Begnas of Nepal and six communities of Hilaungad watershed in Uttarakhand of India. Internal and external linkages among multiple communities within the sub-basins were addressed.

Different activities were conducted to fulfill the project objectives with various methodologies, like desk reviews, baseline surveys (observation, household questionnaire), Focus Group Discussions, informal interviews, data analysis and interpretation, establishment of rain gauge stations, PRA techniques, Geographical Information System, etc. The major findings of the project are as follows:

A review of policy, legal and Institutional policy provisions in Nepal indicated that some policy provision for CBINRM already exist though it had not yet been practically tried and achieved in accordance with most of these provisions. The national water plan, 2005 and Local Self

Governance Act 2002 provides basis for Community Based Integrated Natural Resource Management (CBINRM) in Nepal. However, it was revealed that existing conditions do not facilitate CBINRM due to conflicting and contradictory provisions and its application in the field. Study on communities in Begnas Watershed Area, Nepal and Hilaungad Watershed, India indicated stratified socio-economic structure resulting into inequity in access to productive resources especially in the upper catchments. The livelihood study identified that half or just under half of the households both in upper and lower catchments were not food sufficient and households had employed different strategies for earning to support their livelihoods. The Assessment of Local Resource Base indicated that opportunities exist for the equitable allocation and distribution of the resources however, the existing socio-institutional structure and poor physical infrastructure hinder the process. External intervention on technological and institutional aspects could improve equity and sustainability of resource availabilities and meeting existing livelihood gaps.

The lessons learnt from the projects are as follows:

- Adequate mechanisms for common property resource management in an integrated way at local level are lacking due to either ill-defined or limited ownership of the resources.
- The role of intermediaries is found to be important in facilitating CBINRM at the local level. Platforms created during this project are expected to fill this gap.
- The network relationship between various users is not adequately identified and its potential is not fully realized to the benefit of all the stakeholders. This could provide adequate basis for facilitating CBINRM.
- Intermediary institution could facilitate implementation of environment services fee.
- Actualization of water-forest linkages at the basin level would be possible only when the governance at the system level is improved and delivery of water and accessibility to fuelwood and fodder to users be reliable and equitable

The issues that need further investigations are as follows:

- How do we understand the linkage?
- How diverging interests be brought together?
- Does platform creation facilitate better integration?
- What mechanisms are necessary for strengthening upscaled institutions?
- How do we link up informal resource management practices to formal process? Is it necessary?

Introduction

Forests and water constitute two major resources wherein people's initiatives in management have made important strides towards livelihood enhancement. This has contributed to the evolution of institutions that are central to resource conservation and utilization. Water users groups (WUG) that have traditionally utilised and managed water resources at the local level are considered to be important institutions for water management. Farmer-managed irrigation systems can be viewed as an instance of local communities establishing successful institutions for collective benefits (Pradhan and Bandaragoda, 1997; Pant, 2000, R.Chopra 2003.)

Many local level water management groups in Nepal and India have received institutional recognition by the government, while some are without formal recognition, which has restricted their access to external resources. Similarly, the management of forests by local communities in the hills of Nepal can be cited as a sustainable example of resource management. Forest users groups (FUGs) have evolved significantly over the last two decades (Soussan *et al,* 1995; Soussan, 1998) as strong and formal local institutions that address not only the protection of forests but also various developmental activities in villages (Springate-Baginski *et al,* 2000). The same is true of many watershed *samitis* (committees), Van Panchayats and joint forest management committees in India. From an early emphasis on physical soil and water conservation and forest plantation activities, these committees are increasingly managing natural resources as well providing critical links between users and state agencies (Farrington *et al,* 1999; Joshi *et al,* 2003; and K. Chopra, 2003). Throughout the Himalayan hills there are now thousands of community resource management groups acting as effective, participatory, and democratic institutions. This offers an opportunity to understand the relationships between FUGs and WUGs at the catchment level where the twin resources are clearly linked in terms of management of scarce resources and in creating employment opportunities, but where multiple communities must coordinate actions.

The study reports suggest that informal interactions between WUGs and FUGs do exist; however, these have not evolved towards an integrated approach to resource management to address the issues related to resource degradation, their availability and competition among multiple users. One of the challenges is the lack of an institutional base for the linkages between various resource management organizations. For example, forest and water users groups have only tenuous linkage with local government institutions. This has restricted their potential to address the multiple needs of the stakeholders. Furthermore, scaling up their scope so that multiple communities manage linked resources in an integrated way requires the introduction of a range of legal, policy, institutional, and local-level resource management innovations. Linking upstream and downstream resource management activities at the sub-basin levels in order to integrate the benefits and institutionalize win-win solutions for both forest and water-dependent women and men has not been systematically addressed either from the practical implementation or research perspectives.

The universal nature of and high priority given to water use at the community level makes this the obvious entry point from which to build integrated local level resource management whilst at the same time meeting immediate needs. This covers both rainfed agriculture and small irrigation schemes, but also critically spring-fed drinking water supply, all of which are central to

livelihood security in the Nepal and Indian Himalayas. At the same time, watershed-based forestry programs have significant impacts on livelihoods of the poor, particularly women who face the daily challenge of meeting fuelwood and fodder needs. The spread of community forestry groups also means that this sector offers a locally-rooted institutional base. Yet intensification of forestry activities also has downstream hydrological impacts on water supplies.

Gender and intra-community dynamics are critical to the internal functioning of institutional mechanisms for water and forest management. The role of local and national or state government policies and programs as well as civil society organizations and NGOs can influence local action at the household and village levels. Poor women (households?) in particular often face barriers or constraints in accessing water and forest resources and out-migration resulting from low productivity levels further diminishes the knowledge and labor pool required to maintain productive resources. These constraints will be addressed through gender-neutral pro-poor research methodologies including research tasks led by local women involved in participant observation.

Active policy and institutional reforms are underway in Nepal and the Indian state of Uttarakhand, but institutional fragmentation remains a key barrier to integrated approaches on the ground. Uttarakhand created a Watershed Directorate to coordinate actions of government agencies for forest, water supply and irrigation management. Similarly, Nepalese government policies have emphasised integrated resource management at the sub-basin and basin levels through the formulation of the Water Resources Strategy (WECS, 2002) and National Water Plan (NWP 2005). However, the lack of appropriate institutions at the local level has constrained the integration of activities. IWMI and WECS collaborated on a study to explore the evolution of the institutional base for integrated resource management although it is realized that institutional development is a long process (Pant and Bhattarai 2000). This is especially true where starting from scratch, so that a framework building on existing local institutions will allow the reform process to be more focused on specific needs and opportunities for poor women and men. In this context, the analysis and documentation of information obtained through participatory action research on institutional integration will provide a knowledge base and help develop strategies for the promotion of community based integrated natural resource management (CBINRM). This Challenge Program research will help government agencies in Nepal and Uttarakhand to develop and implement appropriate policy measures for linked forest and water management. Likewise, forest and water users will benefit by consolidating their knowledge base, a process that will facilitate the development of institutions for CBINRM through participatory action research.

Objectives

The objectives of the projects were as follows:

1. To identify legal, policy and institutional provisions and their associated institutional structures for INRM

2. To determine resource base in the research area, its present use and analysis of constraining and facilitating factors for enhancing their productivity

3. To determine users and local institutions role in resource management to identify challenges and opportunities for linking their activities

4. To identify mechanisms for scaling up action research to catchment/basin level to determine options for integrated water and forest management

For each objective - Methods, Results, Discussion, Conclusions – *this will be by far the largest section in the report e.g. 20-40 pp); include figures, diagrams and tables in results section*

Objective 1: Review of Policy Legal and Institutional Provisions

The policies, laws and regulations of different government sectors (land, water, forest, environment etc) were reviewed in both Nepal and India, and reports were prepared (see annex). Existing laws and policies were analyzed to determine whether they facilitate integrated management at the local level. Some changes were recommended. This study demonstrates that sectoral development of water and forests has a bearing on the livelihoods of rural communities and on low agricultural productivity, high population growth rates, livelihood enhancement of marginalized sections of the community and an increasing rate of urbanization. This was largely due to inadequate support provided by the government to the farmer managed irrigation system, inadequate access of the forest users in the upstream to on the water resources downstream where the irrigation users and the fishers groups are deriving benefits.These issues can be addressed through the policy thrust on integrated natural resource management (INRM). The INRM in this context is the institutional co-ordination and complimentatries among resource managers from the agency level to the local level. The existing inter relations and dependencies between various resources and their uses call for an integrated approach to resource management as well as the cooperation among various stakeholders in the river basins.

The conclusions and recommendations made in the institutional studies are presented by country and topic:

*Law*s *Institutions and Integrated Natural Resources Management*

- The close linkage between land and water management has raised the need for INRM which asks for cooperation among the various agencies and interest groups within various river basins. However, jurisdictional overlaps exist between central government Ministries of water resoureces, Forest and local development and local bodies (District Development Committees, Municipalities and Village Development Committees). Such overlaps point to a need to coordinate between the national and local organizations. In case of India, while the legal regime in the State has generally and historically not responded to the integrated resource management there are examples from specific state laws and regulations opening potential legal opportunities for achieving integrated management.

- INRM is imperative because, at present, there is lack of effective mechanism for coordination among agencies and stakeholders within river basins which are concerned with the management of natural resources. The challenge is to operationalize various plans and programs especially the National Water Resources Strategy (NWRS) and National Water Plan (NWP) in a collaborative and integrated manner in Nepal. So as the case in India, where explicit policy on Integrated Management of Natural Resources are lacking. The draft State Water Policy gives no indication of whether and how the larger and liberal approach to integrated water resource management is to be adopted in the State

- Many of the water-rights related activities remain based on customary rights. With the enactment of 1992 Water Resources Act (WRA), the Water Resources Ministry is empowered to allocate water rights through license, control water usage, and resolve water-related issues. Attracting new investments in water sector will require legal framework facilitating transitions from customary rights to statutory rights. In case of Uttaranchal, India also the water right is vested with the government but it does not recognize the customary right which is recognized in case of Nepal. Customary laws in India were recognized during the British period but were abolished after independence, in 1975.

- Several national-level institutions (public and private) are involved in the development and management of water and related activities. However, there is no agency to coordinate the multiple uses of natural resources such as water. River Basin Councils, proposed by NWRS in Nepal for large river basins can facilitate coordination but they have not yet been effective. While in case of India, 'Swajal' program of the government where community is empowered to water resource development responds well to the Constitutional mandate of CBNRM under the 73rd Amendment and under the Programme there are some significant Government Orders that have been passed especially in the last two years detailing the role and responsibilities of Panchayati Raj Institutions in water management.

National Policy and Law on Water

- The willingness to treat water together with soil conservation, as exemplified by the *The Uttarakhand Bhoomi Evam Jal Sanrakshan Adhiniyam, 1963* (The laws on protection of water and land resource) suggests that the thinking of integrated water resource management existed at least even over four decades ago. Whereas in case of Nepal the Water Resources Strategy (2002) recognizes the need for INRM. However, there is no legal provisions to facilitate the INRM. There is lack of regulations concerning inter-sectoral or interbasin water allocation and distribution, which hinders the integrated approach at basin level.

- The ***Kumaon and Garhwal Water (Collection Retention and Distribution) Act 1975*** sought to redefine the water law framework for the State, but ended up creating a regime

more in principle and less in operation. In the absence of rules and operative provisions, as required under the Act, the "rational distribution" including appropriate, even inter-sectoral allocation of water that the preamble of the Act suggested is just not possible to achieve.

- High Courts in Uttaranchal, India have recently established access to clean drinking water as a fundamental right. Nevertheless, where rights are denied, neither remedies nor responsibilities have been identified but in case of Nepal the national government policy assigns first priority to the drinking water but it is not legally binding.
- The national water rights regime and in Uttarakhand needs to mature more. Comprehensive documentation of different water rights, beyond constitutional rights, needs to be conducted. The water rights regime needs to evolve under a group entity who can become a right holder i.e basically having users right in the community.

- The 2003 Irrigation Policy seeks to promote surface and ground water for year round irrigation. However, legislative measures that integrates surface and groundwater into a single water management for agriculture is lacking. And the unenforceable policy provisions that doesn't get reflected in enforceable legal regime is an indication of weak governments, unsure of their abilities to mobilize public support

Policies and Field-Level Implementation

- The INRM conflicts at the local level are due to existing or non-existing policy, legal and institutionaldecision frameworks in Nepal. Policy details are rarely disseminated at the community level. At the same time, the roles of local bodies (District Development Committee (DDC), Village Development Committee (VDC), municipality). These conditions impede the coordination of INRM activities at the local level. In Uttaranchal, the Draft Water Policy commits itself to a 'Watershed approach' which does recognize only ecological/hydrological boundaries for water management. In contrast, the existing legal regime is based only on administrative boundaries for the management of natural resources.

Law and Policy Context on Forest

- In case of Uttaranchal, India the National Forest Policy of 1988 (NFP) was a total paradigm shift vis-à-vis the earlier two national policies. Unlike, the 'use – oriented' earlier policies, the present policy gives major emphasis on the ecological roles of forests, and envisages that the rights and concessions from forests are to be primarily for *bona-fide* use of communities living within and around the forest areas. Likewise, the Community Forest Act in Nepal handed over the management of the forest to the local community with specific rules and regulations.

- A useful classification while understanding the legal regime on forest from the standpoint of integrated forest management is to see laws separately as (a) Laws on protection of forest resources, (b) Laws on use of forest resources and (c) Laws on regeneration of forest resources. This approach can help avoid the mistake of seeing the legal frame from

a one-dimensional perspective. In India, the forest is looked from the perspective of conservation and maintaining the eco-system. Therefore, the users have little role to play in its management. Where as in Nepal, forest management is looked from the perspective of conservation and use only. Therefore, the involvement of users through community users group is emphasized.

- The creation of a large number of Van Panchayats under the Uttaranchal Panchayati Forest Rules, 2001 is not through a demand driven process but a supply driven one. The Van Panchayats thus formed are largely on paper. Practically most of them are dysfunctional. In contrast the community forest users group are very active and managing the forest through users group in Nepal.
- The introduction of Joint Forest Management Rules has been seen as one empowering the forest department to help it regain technical and managerial authority. Greater autonomy has a better chance to make the Van Panchayats effective, as the community forest users group in Nepal. Although, their activities are regulated by the community forestry rules, they are autonomous in their day to day management activities.
- Van Panchayats' jurisdiction. in Uttaranchal, India is limited only to revenue land, i.e., village commons and does not extend to forest lands whereas in Nepal the existing forest lands have been handed over for management to the users. The implication is that the resource base can adequately meet the forest product needs of the community and in some cases have generated surplus revenue from the sale of product in Nepal and which is not the case in Uttaranchal, India.

Objective 2: To Assess Resource Availability, Livelihood Pattern and Institutional Base

1. Resource Assessment and Livelihood Study

   The objectives of resources assessment in Begnas and Hilaungad Watershed were as follows:

- Assess natural resources base (land, water, and forest) and their management practices
- Assess present use and analyze constraining and facilitating factors for enhancing water and forest productivity.
- Identify gaps in use (availability) and demand (need) of natural resources

The methodology for this study included, Participatory Rural Appraisal (PRA), Reconnaissance survey for the selection of micro watershed and its communities for detail study. For this study, both quantitative and qualitative data were collected using various tools and techniques like direct interviews, transact walk, measurement, non-structured small-group interview, observation etc.

The map of the studied area is presented below (Figure 1.1 and 1.2)

Fig 1.1: Begnas-Rupa Basin

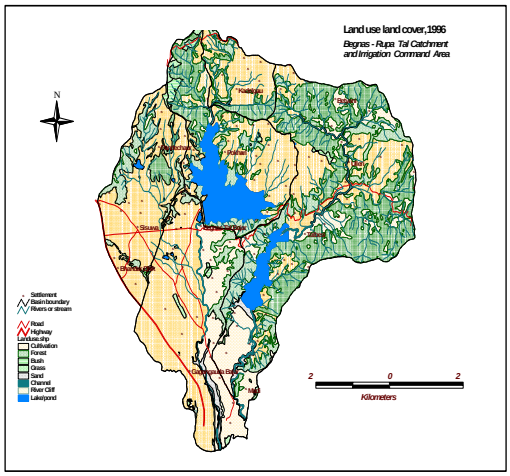
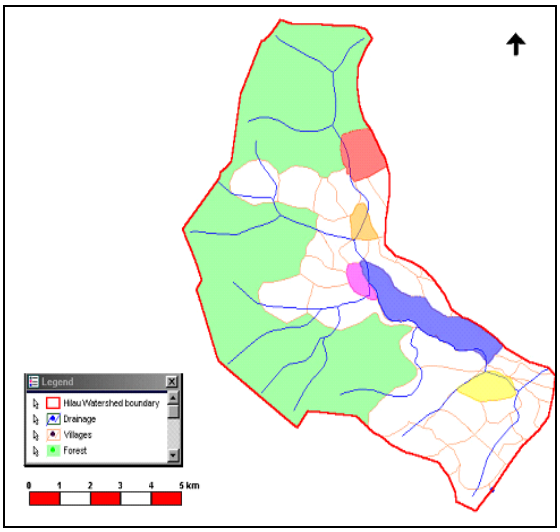


Fig 1.2: Showing the watershed area of Uttarakhand



Social and resources mapping

As, map is of fundamental importance for understanding the resource base and their management, preparation of the social and resources map was the first exercise conducted in both the study areas (Figure 2.1 and 2.2). This map was prepared at two levels – one at the level of watershed and the other at village level.

For preparing the map, an informal group of local community was formed in one of the village and they were asked to draw the watershed map highlighting its important features. These included watershed boundary, water bodies, forests, grass lands, cultivated lands, settlements, and physical features such as canal, road, temples etc. Once the map was prepared, it was then discussed in other villages for the confirmation of its features. Figure 2.1 presents the social and resources map of the study watershed.

Figure 2.1: Social and resource map of the Dund Khola watershed

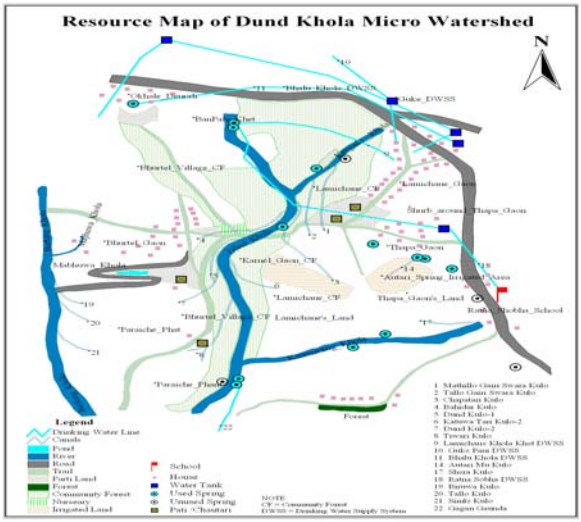


Figure 2.2: Social and resources map of the study villages

Begnas-Rupa basin, Nepal

Begnas-Rupa basin has an area of 75.04 square kilometers (Figure 1.1), and encompasses three basins namely: Begnas basin (34.06 sq km); Rupa basin (30.35 sq km), and Deurali basin (10.63 sq km). Of these basins, this study focuses on the Begnas basin

The Begnas Basin, which is a micro-basin of the Seti River, is located in the Begnas Municipality in the central part of the Kaski District. The area is located along the Pokhara-Kathmandu Highway, about 14 km east of the Pokhara Town.

As noted above, the Begnas basin is divided into two areas – upper watershed and valley floor - with the Begnas Lake at their interface (Figure1.1). The upper watershed is mountainous and supply water to the Begnas Lake. While the valley floor uses the water of the Begnas Lake for irrigation through the Begnas Irrigation System (BIS).

Major four types of resources were studied in the Begnas Basin, which were as follows:

- Land
- Forest
- Water
- Human

Land

In the upper watershed, the land use pattern was clearly dictated by the topography and the availability of irrigation water. Because of unavailability of irrigation water, *bari* (unirrigated) was used for homesteads. In such lands, rainfed crops like maize, millet, soyabean, blackgram etc were grown though they were suitable to be *khet* (irrigated). The *khet* were used mainly for the cultivation of paddy during the monsoon.

Unlike in the upper watershed, land use pattern in the valley floor was very simple. As the area constitute flat lands with some hillocks, most of the land areas were used for cropping of which large part are irrigated. The remaining land areas were either covered by settlements and infrastructures or by forests, especially at hillocks. The settlements were located within the irrigated lands. As a result, agricultural activities were intensive with higher cropping intensity. As the area has networks of roads, prospects of crop diversification were high. Table 1 presents the estimated land use pattern of the Begnas Basin

Table 1: Land use pattern in the Begnas Basin

Land use type	Area in ha			
	Dund Khola Catchment	Upper watershed	Valley floor	Total of Begnas basin
Cultivated land	317.914	935.517	1353.149	2288.666
Forest	134.792	524.988	112.739	637.727
Bushes		31.937	5.044	37.017
Grass land	0.843	17.431	19.016	36.447
River cliff			15.031	15.031
River bed (Sand)	2.94	5.972	45.473	51.445
Water bodies		322.627	17.335	339.962
Total	456.489	1838.508	1567.787	3406.295

Source: Topographical map, Survey Department, Government of Nepal

Forest

Community forests and private forests were the found in the Begnas Watershed. The major forest types were:

- Hill Sal (Botanical name?)
- Chilaune-Katus (Botanical name?)
- Pine (Botanical name?)

Water

The major sources of water were:

- Rainfall: 3000 mm in upper watershed, 2000 mm in valley floor
- Streams
- Springs
- Begnas Lake

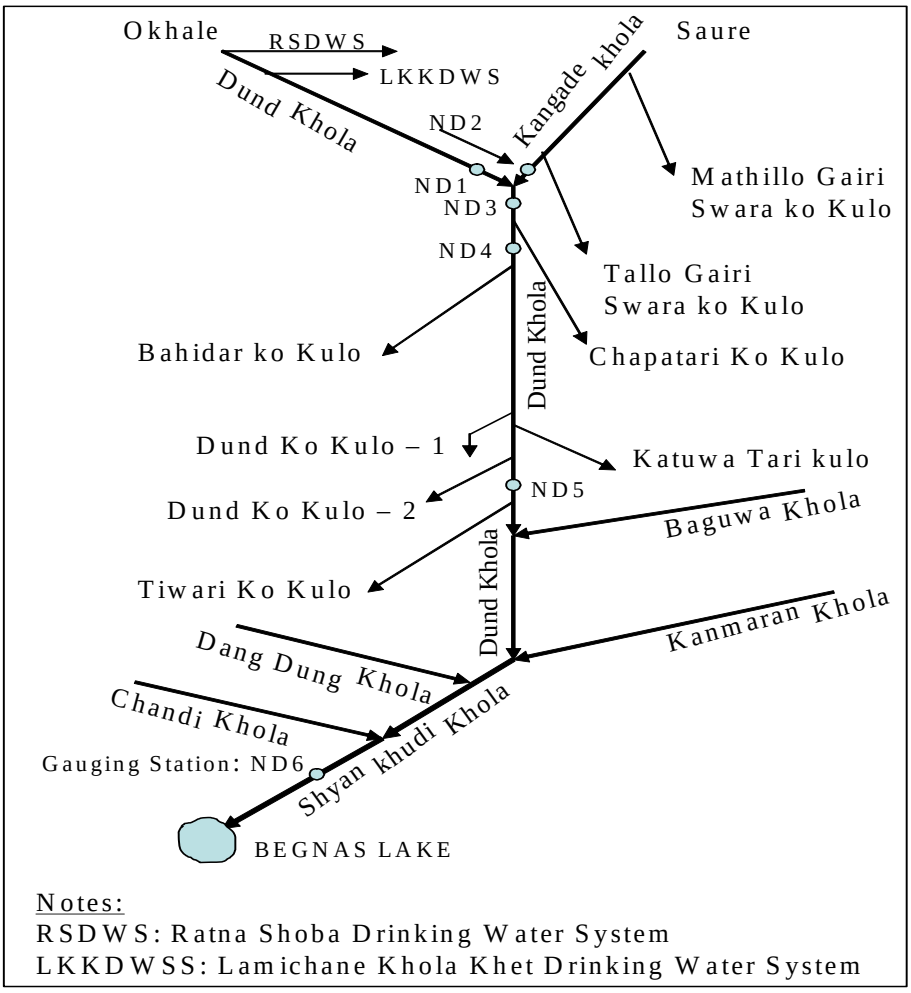
The Dund Khola and water availability

The Dund Khola is a perennial stream that flows from north to south. It is the main source of water for all the study villages[1] in the upper watershed. At its head end, it has two tributaries. The first one, also known as Dund Khola, originates at Okhale hill at an altitude of about 1450 m. The second one, known as Kangade Khola, originates at Saure hill at an altitude of about

[1] These villages are the Lamichane Gaun, Thapa Gaun, and the Bhurtel Gaun

1200m. The catchment area and the length of the river up to the confluence with Dangdung Khola is about 456.5 ha (4.56 sq km) and 3.46 km respectively. The average slope of the stream is 21.6 per cent. Figure 3 presents schematic layout of the Dund Khola and its off taking canals for both the irrigation and domestic water supply.

Figure 3: Schematic layout of the Dund Khola and its off taking canals



Note: ND refers to node

The Dund Khola is fed by perennial and/or seasonal springs in its catchment, which almost entirely depend on the rain. During the monsoon season (June-September), the river discharges maximum flow, which gradually reduces to about 25-30 lps (at the confluence with the Kanmaran Khola) during the spring season (April-May) (Table 2). Even during the monsoon season, relatively short dry spells lead to considerable reduction in the river flow. For this reason the Dund Khola exhibit high fluctuation of flow in response to the monsoon rain. Table 2 presents observed and estimated flow at different nodes of the river system. Likewise, the table 3 shows the number of canals and its users using the water in the river for irrigation purpose.

Table 2: Observed and estimated lean season flow at different nodes of the river system

SN	Node location	Flow (lps)	
		Observed[2]	Estimated low flow[3]
1	Node 1: In the Dund Khola, slightly U/S of the confluence between the Dund Khola and Kanmaran Khola	80	10-15
2	Node 2: In the Kangade Khola, slightly U/S of the confluence between the Dund Khola and Kanmaran Khola	25	4-5
3	Node 3: U/S of the intake of Chapatari Kulo	110	12-15
4	Node 4: U/S of the intake of Bahidar Kulo	70	5-7
5	Node 5: U/S of the intake of Tiwari ko Kulo	60	15-20
6	Node 6: At gauging station	400	150

Table 3: Irrigation canals belonging to the upper watershed study villages

SN	Name of Irrigation System	Water source	Owner villages		Number of users
			Principal	Secondary	
1	Mathillo Gairi Swara Kulo	Kangade Khola	Lamichane	-	13 /14
2	Tallo Gairi Swara Kulo		Lamichane	-	
3	Chapatari Ko Kulo	Dund Khola	Lamichane	Thapagaun	56/60
4	Katuwa Tari Ko kulo	Dund Khola	Lamichane	Thapagaun	12/13
5	Thul Dihi Mul ko Kulo	Thul Dihi Spring	Thapagaun	Lamichane	9
6	Autari Mul ko Kulo	Autari Spring	Thapagaun	Lamichane	37
7	Shera ko Kulo	Thado Khols	Thapagaun	Others	10-12
8	Tallo Dhab Ko mul	Local spring	Thapagaun	Others	8-9
9	Bahidar ko Kulo	Dund Khola	Bhurtel	-	1
10	Dund Ko Kulo – 1	Dund Khola	Bhurtel	-	120-130
11	Dund Ko Kulo – 2	Dund Khola	Bhurtel	-	
12	Tiwari Ko Kulo	Dund Khola	Bhurtel	-	
13	Biruwa Ko Kulo	Majhuwa Khola	Bhurtel	-	10-12
14	Tallo Kulo	Barlang Khola	Bhurtel	-	Same as no. 10,11,12

The valley floor of the Bagnas basin is irrigated by the Begnas Irrigation System (BIS) by utilizing waters of the present Begnas Lake. Prior to 1988[4], part of the present areas of BIS were also irrigated through traditional canals, also by utilizing waters of the then Begnas Lake under natural condition. Thus, the present irrigation system in the valley floor is integration of old network of traditional canals with the new ones. Figure 4 presents layout of the Begnas Irrigation System and the traditional canals. Based on the socio physical setting, the valley floor irrigated

[2] Observed during August 19-23, 2006

[3] Assuming that all canal flow during the dry season

[4] Before the construction of the Begnas Dam and the BIS

area can be categorized into three groups. Table 4 presents these grouping and their associated old and new canals and Table 5 presents the physical features of the BIS.

Figure 4: Layout of the canal network of BIS and the traditional canals

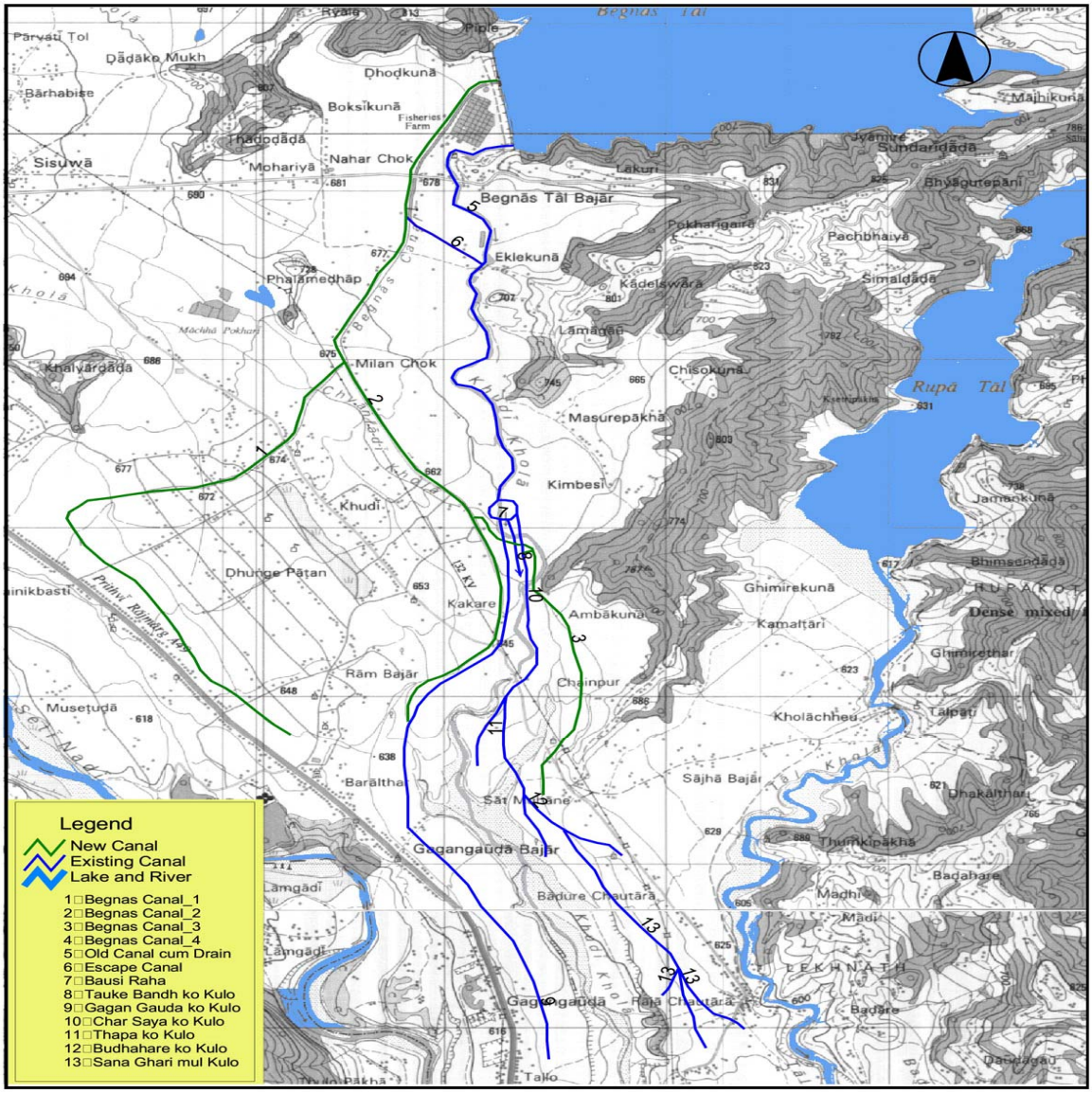


Table 4: Irrigation canals belonging to valley floor study communtieis

Group	Villages under each group	Status of irrigated area (New/old)	Associated canals	
			Traditional canal	BIS canals
1	Khudi, Sainik Basti, and Bishalthar	Newly developed area (by BIS)	Do not existed	BC-1
2	Gagan Gaunda	Old irrigated area	Gagan Gauda ko kulo	BC-2
3	Saat muhane, Raja ko Chautara, & Baharabise phant	Old irrigated area	Saat muhane ko kulo and Tauke Badh ko kulo	BC-3

Note: BC refers to Branch Canal

Table 5 Main physical features of BIS canal system

S. No.	Name of canal	Length (km)	Command area (ha)	Key control structures and remarks
1	Main canal	3.4	550	Gated escape; regulators at BC-1, BC-2, and BC-3; drops; and un-gated pipe outlets
2	BC-1	3.0	200	Drops; 35 no. of un-gated pipe outlets located close to the canal bed
3	BC-2	1.83	150	The canal length indicated here also include the length of the traditional canal
4	BC-3		200	
5	BC-4	Few meters	As of BC-2 and 3	As a branch canal, it is not effective. It does not have any control structure.

Several domestic water supply systems (DWSS) supply water to the study villages in both the upper watershed and valley floor areas of the Begnas basin. Some of these systems have their source within the study watershed, while some other supply water through inter-basin transfer. The different drinking water system in upper and valley floor areas are as follows:

WSS supply water to Lamichanne Gaun through:
Lamichane Khola Khet DWSS
Guke Pani DWSS
Bhlu Khola DWSS
Thak DWSS
Juki-Pahuni DWSS

The Thapa Gaun (31 households) relies on only one DWSS named "Ratna Shoba Khane Pani Yojana". Recognizing the water scarcity of in the village, the project CP 23 in collaboration with International Development Enterprise/Nepal (IDE/Nepal) and Department of Irrigation, Government of Nepal (DOI/GON) with financial support from IWMI/FAO/IPTRID project facilitated construction of a 3000 liters Thai Jar for both drinking water as well as vegetable cultivation as Multiple Use Scheme (MUS) scheme (Picture 1).

Picture 1: Multiple Use Scheme in Thapagaun

Bhurtel Gaun (x households) does not have a planned domestic water supply system. Earlier, a water supply was planned from the Thak DWSS. However, the original plan was not realized. Presently, most of the villagers have their privately managed water supply system, which receive waters from the near by spring. This became possible because the Bhurtel Gaun is located at lower elevation in the watershed and several small springs are available around.

Drinking Water Supply System in Valley floor areas

In the valley floor areas, several DWSS supply water to the villages. Many of these systems supply water from outside the basin. However, there exists one system named "Gagan Gaunda DWSS (GGDWSS)" that has its source in the upper watershed (at the tail end of Dund Khola) and supply water to the Gagan Gaunda and Baral Thar Villages in the valley floor area.

Human Resources

Estimates of population growth are sensitive and available information indicates that there are 550 households in Begnas basin (IWMI 2005). Based on the household survey data compiled by the study team in the three villages (Lamichhane gaon, Thapa gaon and Bhurtel gaon) of the upper watershed the average household population is 5.4 (ranges between 4.9 to 6.0).

Overall, it is estimated that the annual growth rate of the population in the study area is about 2.5%. Field survey data also indicate that 85% of people are the resident population while about 12% are the outside migrants. The male ratio in the three villages revealed that male out number the female by 1%. Age group distribution includes about 23% between 6 to 16 years,

50% between 17 to 59 years, 8% above 60 years. The unidentified age group category is fairly high with about 19%

Hence, the resource assessment in Nepal, highlights that natural resources in the watershed areas play an important and integral role in the daily subsistence and livelihoods of the people. It is difficult to trace out any single natural resources component and deal with its management as the people use them in an integrated manner. The natural resources are also interdependent and managing one has clear effect on the other resource components. Such natural resources in the watershed include land, water, forest, and agriculture. Realizing their interdependence it is essential that these natural resources need to be managed in an integrated manner, so as to harness the optimum benefit at minimum efforts. The interdependence between land, water and forest should be looked from the various perspectives such as water quantity (yield), water quality (especially for irrigation and drinking), and land productivity. One aspect of inter-relation between these natural resources is that forests contain plenty of organic materials and surface runoff through forest enriches water fertility which in turn increases land productivity. Management of the water resource is studied in different aspects; i. Management of the Lake and Irrigation system and ii. The management of domestic water supply system. Major event of the Begnas basin and resources change pattern was also identified.

The constraints and opportunities of the resource management in Begnas Watershed were identified, which are as follows:

In Upper watershed, WUGs are not recognized and no linkage exist with the government – they are unaware of govt Policy

Some lands in Thapa Gaun are not irrigated, though water & system exist: Improvement in physical system and establishment of social linkage is needed.

No linkage exist between users and managers of the large scale Thak Khola drinking water scheme

The upper watershed is the source of water to the people of valley floor. This flow of benefits is to be recognized

There exist gap between local forestry institution (CFUG) and local water institution (WUA)

In Begnas Irrigation System, the present water distribution is in-equitable. A participatory intervention in the area is essential to improve access to water for poor & improve livelihood.

Several user groups derive benefits from the Begnas Lake, but there is no mechanism for the lake maintenance

Communication and linkage among people within and across systems are lacking, which needs to be improved

Gaps in realizing Water- Forest Linkages

1. Lack of technical, managerial and organizational skills
2. Mechanism to actualize such linkage is not reflected by the relevant policies
3. Actualization of such linkage at the basin level would be possible only when the governance at the system level is improved and delivery of water to users be reliable and equitable
4. There exists an institutional gap in actualizing the said linkage

Livelihood Study

The livelihood assessment of Begnas Watershed provides information about livelihood activities of upstream and downstream communities', impacts of land, water and forest management on livelihood and their constraints and opportunities. The information were collected through checklists, focus groups discussions, participant observation and other secondary sources.

Five assets of livelihood were studied as follows:

1. Natural Capital

a. Resource mapping: identify spatial distribution/location of roads, forests, water resources, farmlands, etc.
b. Trend line of major natural resources.

2. Social Capital

a. Stakeholder analysis: identify types of stakeholders and stakes in NRM (CBOs, NGOs, developmental agencies, etc.); identify key social actors and their relationships between village and local people (use of Venn diagram).
b. Social mapping: map social institutions and organisations (such as schools, post office, telecommunication, police post); identifying ethnic and caste groups clusters (main settlements).
c. Wealth ranking: list out local people's criteria of wealth and well-being; identifying relative wealth and different socio-economic characteristics (categories/classes) of households.
d. Decision-making matrix: understanding decision-making practices (for example, men and women, poor and rich groups) and prioritise problems experienced by men and women.

3. Human Capital

e. Capacity status in the communities: list of skills and knowledge (literacy levels and workability by gender);
f. Mobility mapping: social and gender equities/inequities in terms of contact with the outside world (markets, etc.)

4. Physical capital

g. Infrastructures mapping: social institutions and organisations (access to infrastructure such as transport, water supply, irrigation, etc.)
h. Trend line: developmental infrastructures (bridges, drinking water, roads, etc.)

5. Financial capital

a. Average income levels of different livelihood groups, consumption loan borrowed by sample households; remittances
b. Market structures present in the study area: labour market, nature of migration, wage rate received in different types of work
c. Cost/benefit analysis: Levels of inputs and investments in major resource management (such as forest and water).

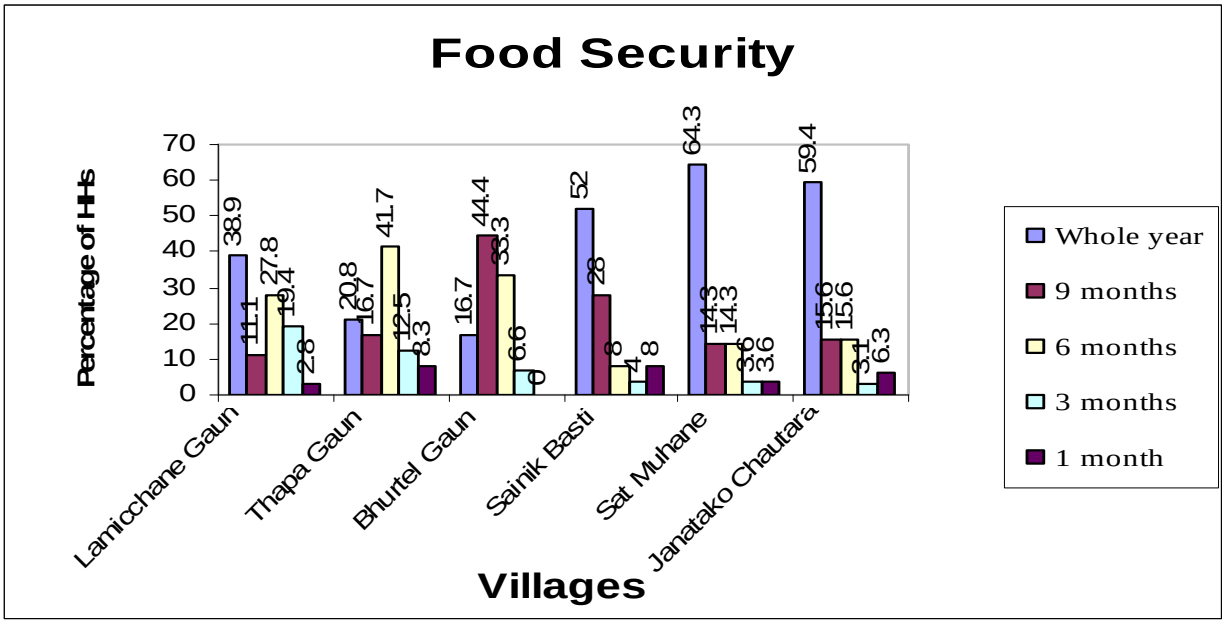
Table 6 provides land tenure status of the households in the study area as it is the Main source of livelihood. Likewise food security status of the household is presented in figure 5.

Table 6: Land tenure status among the sampled households

Villages		Total HH	HH with Cultivated Land	HH with rented in Land	HH with rented out land	HH with land outside watershed area
Lamichhane Gaun	Total	42	37	8	4	18
	Percent		*88.1*	*19.1*	*9.5*	*42.9*
Thapa Gaun	Total	26	25	3	3	6
	Percent		*96.2*	*11.5*	*11.5*	*23.1*
Bhurtel Gaun	Total	18	17	6	4	6
	Percent		*94.4*	*33.3*	*22.2*	*33.3*
	Grand Total	86	79	17	11	30
	Percent		***91.9***	***19.8***	***12.8***	***34.9***
Sainik Basti	Total	25	24	4	3	21
	Percent		***96***	***16***	***12***	***75***
Sat Muhane	Total	28	26	7	21	11
	Percent		***92.9***	***25***	***75***	***44***
Janatako Chautara	Total	32	32	0	0	25
	Percent		***100***	***0***	***0***	***78.1***
	Grand Total	85	82	11	24	57

Source: Household survey 2006

Fig 5: Food Security Status of the households



The perception of user household about the existing challenges and opportunities are presented in Table 7 followed by its consequences to the downstream Communities (Table 8).

Table 7: Upstream communities' perception of challenges and opportunities to livelihoods

Challenges	Opportunities
Drinking water scarcity	Fresh air and water (environment)
Irrigation water source not available; distribution	Fertile land (even without proper irrigation facility)
Rainfed agriculture	Own forest (so good FPs supply)
Developmental infrastructure lacking	Nice locality and environment (aesthetics: Mt. *Machhapuchhre* in the back and Begnas *Tal* in the front)
Low levels of economic opportunity (Off-farm employment earnings)	Community cohesion, unity and cooperation
No Market linkages	Security (outsiders/Maoist intervention is less)
Youth out-migration (temporary)- therefore technology transfer is difficult	

Table 8 :Management actions and their consequences for downstream communities livelihoods:

Management actions	Examples of +ve impact	Examples of –ve impact
1. Forest management (communi	Firewood and fodder supply increased; women's time to collect these reduced; conservation of water sources; improved water quantity and quality; increased	Issues of equity not addressed adequately, silviculture skills lacking in CFUG members; fund management is sometimes considered extra-burden;

ty forestry)	agricultural productivity; landslides stopped in upstream areas; greenery increased (added to aesthetic value of the place)	management is more of a social work and so mostly undertaken by community elites
2. Upstream Irrigation Water	Increased agricultural productivity; winter farming is possible; low cost for maintenance of canals; distributional efficiency (due to terrace farming)	Conflicts over water use between upstream and downstream landowners, instigates social mistrust/misunderstanding between adjacent communities for water distribution
3. Begnas dam constructi on	Plenty of water available for downstream irrigators; increased size of the lake attractive to tourists, promotion of local tourism; commercial fishery as livelihood opportunity; income from boating increased, flourishing of organized local level institutions (eg. boaters' association, fishers' association, etc.)	Large piece of fertile land submerged; commercial fishery resulted in decline of local fish population, inter-institutional competition results in community disharmony
4. Begnas irrigation canal	Increased irrigation water supply, increased agricultural productivity, well-organized irrigation institutions	Irrigation water disputes between head and tail water users, increased use of chemicals, intra-institutional inequities, high cost of canal maintenance

Changes in various aspects of rural life were gathered through focus group discussions which is presented in table 9.

Table 9: Trend and change analysis of environmental, social, economic and political aspects

Analysis factors	10 years ago	5 years ago	Now
Agricultural productivity	Good	Good	Decreasing Dryness increased, rainfall decreased
Forest condition	Poor	Started regenerating	Good
Livestocks	5-7 L/HH	3-4	2 L/HH Livestock sheds in fields are no more Less compost School going children? (not due to water but due to compost unavailability, agri production is decreasing)
Landslides	Frequent	Occasionally	Completely stopped
Rainfall	Sufficient	Sufficient	Not sufficient
Water volume in the stream	Less	Satisfactory levels	Improved/increased

Water Use			
a) Drinking water	From Dund Khola (about 1 hr distance)	Tanks constructed/drinking water stored in tanks at different places	One Tap in the village
b) Irrigation water (from Dund Khola)	Sufficient for Lamichhane Gaon (used only by Lamichhane Gaon whose land fell in the downstream)	Shared with a few household in adjoining Thapa Gaon in the upstream (due to familial ties of one of HHs with Lamichhane Gaon)	Used by Lamichhane Gaon only
	No Conflict	Shared water	Conflict b/w Thapa Gaon and Lamichhane Gaon
Toilets	Open field	Sulav toilets (temporary toilets)	Permanent toilets (in Thapa Gaon 4 permanent toilets)
Local Fish population	Locals used to fish for domestic consumption before the construction of Begnas Dam	Local fish population started decreasing (eaten by introduced commercial fish); commercialization of fish	Commercial fish population dominates (local fish like sahar, riya, phusre, katle and bam have almost disappeared)
Youth migration	Temporary migration to Pokhara cities during off-farm seasons (>6months)	Migration to urban and semi-urban regions in the country, India, and few to Gulf countries (1-2 years/intermittent)	Increased migration to gulf countries for extended period (at least 2 years)
Tourism	High	Lowest	No improvement
Armed Conflict	Low	Violence increased Unstable political situation	Violence decreased but unstable political scenario
Infrastructure/information	Low levels	Roads started to be constructed in upstream, community bridges in downstream	Transportation services, telephones (including mobile phones connection)

(Source: Focus group discussion)

Hilaungad Watershed, Uttarakhand, India

The Hilaungad watershed, a sub-catchment of the larger Lastargad basin, lies on the west bank of the Mandakini river. The watershed is spread across an area of 78.77 sq. km (7877 ha) from a lower elevation of about 900m to an altitude of about 2600m. Reserved forests cover 51 per cent (4000 ha) of the total watershed area along the upper northern and

western part of the watershed. The remaining area (3877 ha) contains 27 villages with a total population of 11780 persons, the density being 150 persons/km^2. There are 1228 women per 1000 men and scheduled castes (SCs) make up 9.5 per cent of the total population.

Six sample villages were selected in the upper, middle and lower slopes of the watershed. Dhan Kurali and Gorti (upper slopes), Mamani and Gharara (middle slopes), and Makhet and Bainoli in the lower slopes.The study focused on estimating the resource availabilities and gaps alogwith livelihood assessment in the six villages selected from the upper, middle and lower slopes of the Hilaungad sub-basin. A variety of PRA exercises were conducted to generate data on resources, socio-economic and environmental conditions in each village.

There are 515 households in the six selected villages having a total population of 2920 persons. Women marginally outnumber men due to the outmigration of men in search of employment. The average household size varies from five to six persons. Demographic details and caste structure for each village are given in Table 10.

Table 10: Demography and Caste

Village	**Dhankurali**	**Gorti**	**Mamani**	**Gharara**	**Makhet**	**Bainoli**	**Total**
Area (ha)	30.68	100.0	21.66	75.00	40.23	36.16	303.8
Households	58	147	65	88	96	61	515
Total Population	323	931	329	496	521	320	2920
Av. Hhold size*	6	6	5	6	5	5	6
Sex Ratio**	1168	1011	859	1000	1035	1078	1018
Castes							
SC Households	0	72	1	43	-	-	116
OBC Hholds	-	1	-	35	66	-	102
Rajput Hholds	58	69	40	10	30	15	222
Brahmin Hholds	0	5	24	0	0	46	75

Note: * Rounded off to the nearest whole number; ** Females/1000 males
Source: Social mapping, PSI, 2006-07.

The present land use pattern of the selected villages is shown in Table 11. Just under half the geographical area is cultivated land (47%). Gorti, Makhet and Bainoli residents have agricultural lands in other villages also. Community forests, known as Van Panchayats, cover about a fifth of the area. The civil lands (village commons) are quite degraded and are mainly used for grazing animals.

Table 11: Land use pattern

Village	**Cultivable Land**		**Waste Land (ha)**	**Civil Land (ha)**	**Van Panchayat Land (ha)**	**Other Land (ha)**	**Total (ha)**
	Irrigated (ha)	**Unirrigated (ha)**					

Dhan Kurali	1.0	19.6	0	6.4	0	3.7	30.7
Gorti	3.5	35.4	4.4	41.8	5.7	9.3	100.0
Mamani	5.2	7.5	2	0	4.1	2.9	21.7
Gharara	9	32	0	23	8	3	75
Makhet	8.1	3.4	2.3	2.3	22.1	2	40.2
Bainoli	10.3	7.9	0.2	2.2	13.9	1.7	36.2
TOTAL	**37.1* (12%)**	**105.8 (35%)**	**8.9 (3%)**	**75.7 (25%)**	**53.8 (18%)**	**22.6 (7%)**	**303.8 (100%)**

Source: Land revenue records, 2004.

*The PRA exercises revealed that by 2006 the irrigated command of the six villages had increased to 63.7 ha.

Major findings recorded from the research study are discussed below.

Resource Assessment

a) Water : The rural water supply norm in India is 40 lpcd. In the study villages household water consumption ranges between 14 lpcd to 27 lpcd (Table 12). In addition, some water is consumed for, washing clothes and utensils and even bathing during the summer at public stand posts or springs.

Table 12: Daily per capita Household Water Consumption

Village	Daily Per Capita Water Consumption (in litres)			
	Summer	Monsoon	Winter	Average
Dhankurali	22	17	13	17
Gorti	17	12	12	14
Mamani	23	19	15	19
Gharara	21	20	17	19
Makhet	22	16	14	17
Bainoli	29	27	24	27
Total	21	17	15	18

Source: Sample household survey, 2006-07

There is ample scope of rainwater harvesting and multiple water use not only to augment the household and irrigation water supplies. The aim should be to provide increased water in the homes and reduce the drudgery of women, since they are the main hewers of water. Accessibility of water will consequently improve the hygiene of the rural people and provide time, especially to the women for productive works for livelihood improvement or much-needed rest time. Increased irrigation can help enhance crop productivity and household incomes leading to reduced outmigration.

b) Fuelwood and Fodder: The present average daily per capita fuelwood demand ranges between 1.00kg/p to 2.4kg/p (Table 13). The low end is in those households (and villages), which have significant access to LPG cylinders.

Table13: Daily per capita Fuelwood Collection and Annual Requirements

Village	**Daily Per Capita Fuelwood Collection (in Kg/p/d)**				**Annual Requirement (Tons)**
	Summer	**Monsoon**	**Winter**	**Average**	
Dhankurali	3	2	0.1	1.7	212
Gorti	2	0.4	3	1.6	544
Mamani	2	1	2	1.7	216
Gharara	2	2	3	2.4	435
Makhet	0. 5	0.2	2	1.0	190
Bainoli	1	0.8	1.7	1.3	152
Total	**2**	**1**	**2**	**1.6**	**1749**

Source: Sample household survey, 2006-07.

The villagers are primarily dependent on the reserved forests for meeting their fuelwood needs as the village farmlands and Van Panchayats can meet only about 10 to 40 percent of the annual fuelwood requirements.

Table14 : Present daily fodder consumption (in kg/head) and annual fodder requirement (in tons) in Hilaungad watershed

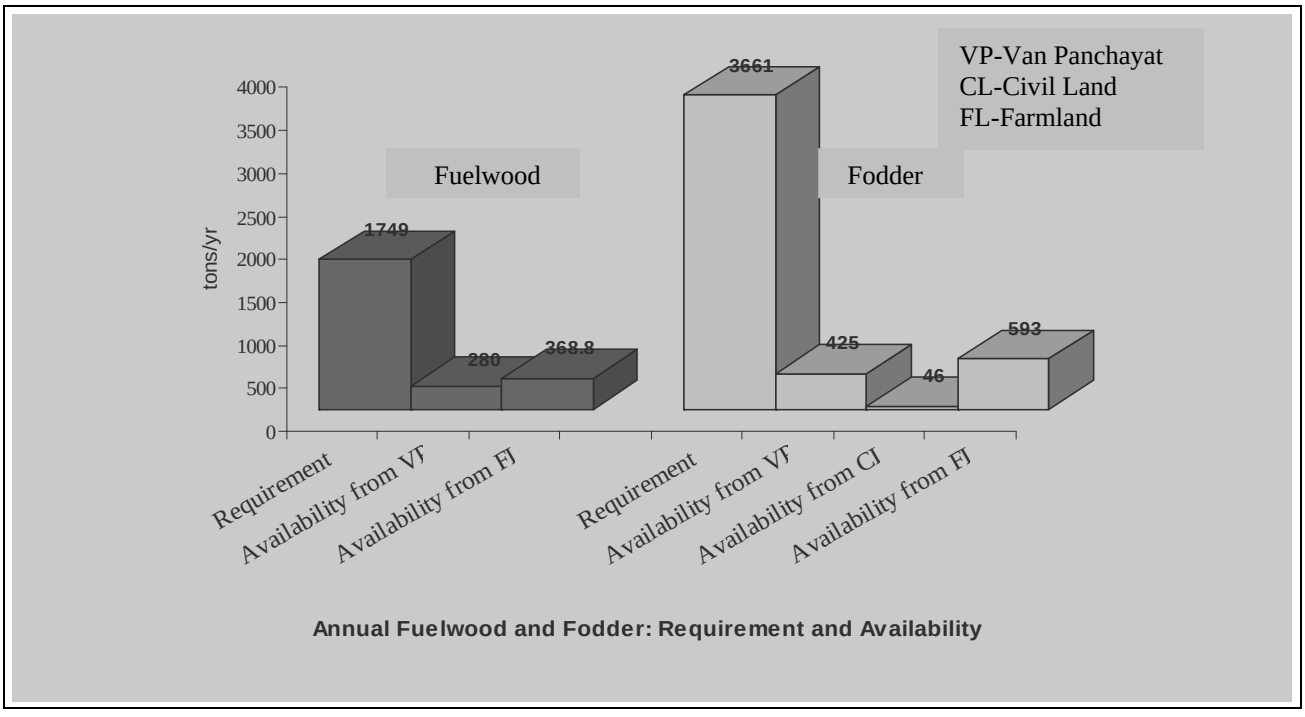
Daily fodder consumption (kg/head/day)		Cows -331		Buffaloes- 321		Oxen -351	
		Green	**Dry**	**Green**	**Dry**	**Green**	**Dry**
Season	Summer	7	5	8	6	7	5
	Monsoon	10	4	10	5	8	4
	Winter	6	6	7	8	4	6
Annual fodder requirement (ton)		**1208**	**725**	**1172**	**703**	**1281**	**769**

Source: Present Consumption on the basis of village survey, 2005-07

Annual fodder requirement: As per standard (Green-10kg/head/day, Dry-6 kg/head/day)

Significant shortages of quality green fodder exist in all the studied villages (Figure 6). Green fodder availability from van panchayats, civil and farmlands ranges from a mere 7 per cent to a maximum of 48 per cent of the annual demands in the villages. Therefore, villagers have to rely heavily on the reserved forests for meeting their needs. It also adds to the workload of the women, as they have to traverse long distances for collecting fodder and fuelwood from outside the villages.

Figure 6: Distribution of fuelwood and fodder requirement in the study villages



Therefore there is a need to strengthen the Van Panchayats and mobilize the communities to undertake fuelwood and fodder plantations in the Van Panchayat lands. Encroached forestlands (be it Van Panchayats or reserved forests) need to be transferred to Van Panchayats with clearly defined usufruct rights & rules of forest management. The proportion of chir pine can be reduced through scientific felling of chir pine. The degraded civil lands can also provide additional biomass if properly managed. High-density tree plantation of *banj, shahtut, bheemal, kachnar, aonla, dainkan, utees, bans, reetha* and grasses namely hybrid *napier, gini, guchhi, dolni, rai, brome, ons and setaria* in wastelands, community and Van Panchayat lands along with creation of a sense of ownership through appropriate legal measures will minimize the gaps in requirement of fuelwood and fodder. Fuelwood and fodder plantation, on farm bunds can provide additional biomass. Supply of LPG cylinders can further reduce the fuelwood requirement and consequent pressure on the reserved forests.

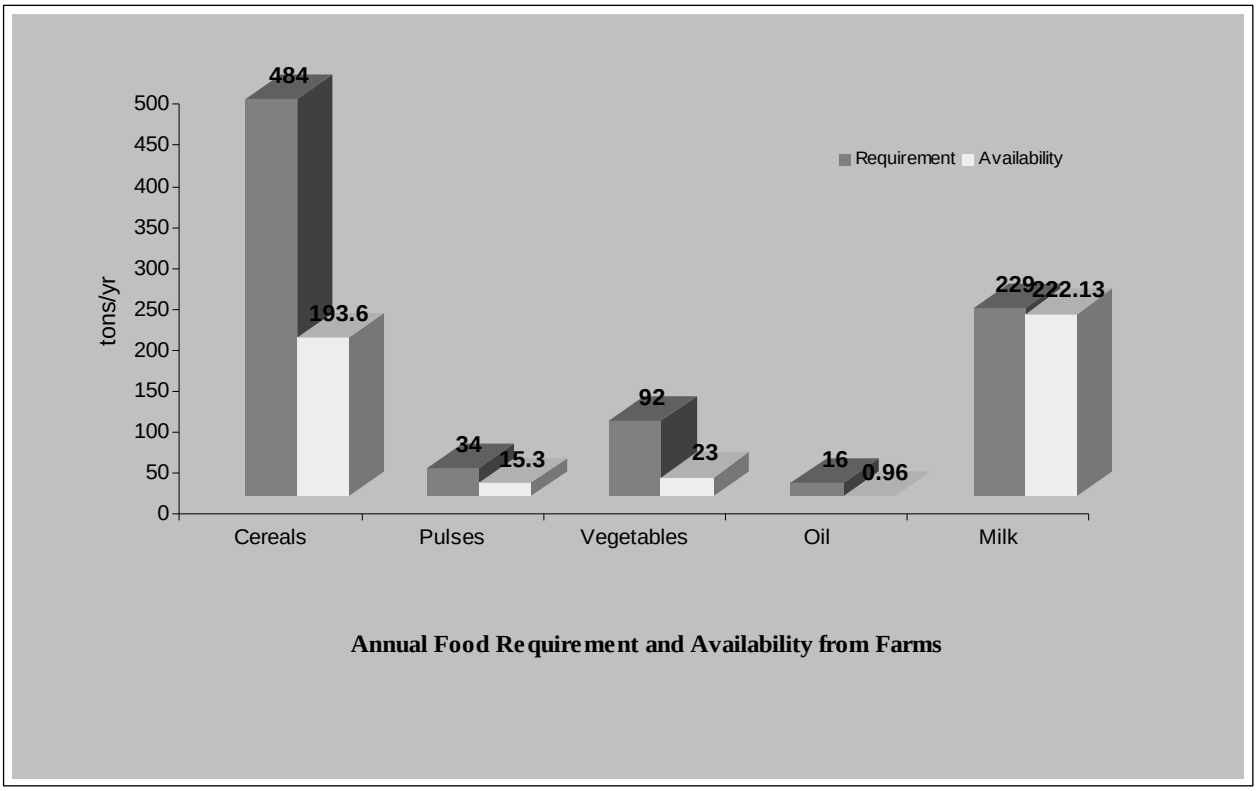
c) Food: The villagers' diet comprises of inadequate vegetables and oil consumption in all the selected villages and limited cereals and pulses consumption in specific villages, which are either remote or a have a high proportion of scheduled caste population. Milk consumption is adequate in all the villages (Table 15 and Figure 7).

Table 15: Present food consumption level in the villages (gm/person/day)

Food Item	Cereals	Pulses	Vegetables	Oil	Milk
Standard (gm/p/d)	420	**40**	**125**	**22**	**150**
Dhankurali	409	42	71	16	266
Gorti	463	22	83	14	130
Mamani	470	26	108	17	254
Gharara	407	26	66	13	175
Makhet	498	43	100	18	287
Bainoli	470	41	99	13	312
Average	**454**	**32**	**86**	**15**	**215**

Source: Sample household survey, 2006-07

Figure 7: Distribution of annual food requirement and availability



The percent availability of cereals, pulses, vegetables, oil and milk from the farms is 40, 45, 25, 6 and 97 respectively. Villages in the upper slopes reported less availability of cereals from farms as compared to the villages of middle slopes and valleys. People prefer to grow cereals on irrigated lands. The low farm production is primarily due to low soil fertility and then scarcity of irrigation, topsoil erosion, less availability of manure, destruction by wild animals and lack of awareness about appropriate practices. Village communities are therefore forced to purchase food items from the market to fulfill their requirements for most of the year. Livelihood analysis of the region reveals that agriculture and livestock rearing are the primary sources of income for less than 16 per cent of the total households!

Thus there is a need to increase farm production by creating additional irrigation facilities and adoption of appropriate agricultural practices. The area is suitable for agriculture diversification. Presently, cultivation of vegetables is quite limited and most of the villagers grow few vegetables in their kitchen gardens for their household consumption. Vegetable cultivation for sale, especially potato, onion and garlic can be promoted. Similarly, pulses and oilseed production can be enhanced in the unirrigated lands. Efforts need to be made to popularize better agronomic measures, establish crop demonstration units on farmers' field, and promote proper composting techniques. Adoption of new methods like green houses and crop intensification has the potential to meet the present gaps existing in the diet of the rural villagers. The changes in resource availability over a period of time is presented in table 16.

Table 16: Trend Analysis of Resources in Hilaun Gad

Parameters		40 years ago	20 years ago	Present
Water	Rainfall	Sufficient	50% decrease	60% decrease Occurrence of Droughts
	Water availability in natural sources	Good water discharge	50 % decrease	Still decreasing. Now only 40 % of the earlier discharge
Agriculture	Productivity	Good and self sufficiency	25 % decrease in crop productivity	45 % decrease in productivity and crop diseases increasing
	Cropping Pattern	Many crops (ma*ndwa, jhangora, cholai, kale bhatt, gahat, masur & urad*)	15 % of the earlier crops are not grown, decrease in area under coarse cereals and pulses	Increase in area under wheat, paddy and vegetable production
Forest (R/F)	Density	Trees density was good	60% left	70 % (increase due to afforestation by the forest department)
	Species	Many species	50 % left (decrease in o*ak, moru,kKharsu, anyar,kafal & burans*)	75% (25% has increased due to afforestation)
Fodder	Species	Good	40% decrease in availability	Still decreasing
	Availability	Easily available within 1-2 kms from villages	Not easily available. Distance & time increased	75 % fodder collection involves trekking 8-10 kms
Fuel		Easily available within 1-2 Kms from villages	30% decrease in availability, 5-6 kms away from villages	60% decrease in availability, 8-10 kms away from villages

Source: Force Group Discussion

Livelihood Assesment :

Livelihood opportunities and constraints were comprehensively understood by analyzing the conditions of the human, natural, social, physical and financial assets in the watershed. The main findings are given below:

Human Assets

- Good human assets in terms of relatively high literacy levels.
- Presence of caste hierarchy.

- There are clear gender inequalities in literacy/educational level, mobility, and daily workloads.

Natural Assets

- Low productivity of agricultural land, forests and livestock.
- Encroachment of forestlands.
- Weak management system of forests results in poor productivity of Van Panchayat lands.
- Planning and construction of irrigation systems largely managed by the state.
- Smaller irrigation systems managed by local community are better maintained through the community's own efforts.

Social Assets

- Traditional institutions of caste, kinship and traditional panchayats are strong and enduring.
- New development institutions like Van Panchayats, Mahila Mangal Dals are weak.
- Villagers display little sense of ownership of these institutions, their resources and development processes.
- Community level institutions created by VOs, however, have been able to create an involvement of the local community in the development process.

Physical Assets

- Reasonable access to infrastructural facilities.
- The quality of the service available may leave much to be desired.

Financial Assets

- A good number of households have investible surpluses. Yet the main sources of financial capital are the traditional moneylenders.
- Banks and SHGs need to be strengthened as credit institutions.
- Households dependent on agriculture and related activities like livestock rearing are few (15%) and amongst the poorest people in the villages.
- About 50 percent of the local population is well off and it obtains major fraction of livelihood from outside the village.
- Therefore, younger generation and most able-bodied male prefer to migrate.

d) *Livelihoods:*

The most striking feature of the livelihoods assessment study is that less than 16 per cent of the sampled households are primarily dependent on land, i.e., agriculture and livestock rearing, for their livelihoods. The rest depend on non-farm income sources. Service or pension is the primary income source for nearly half the households (45%). The second largest occupational group is of daily labourers (26%). These labourers are non-farm labour engaged

in doing roadwork, house construction, etc. Business and trade are the major income source for the remaining 13 per cent households.

The minimum annual income required to meet basic living expenses as defined by the local people has been estimated at Rs. 7611 per person (Rs. 634.25/p/m). This is about 33 per cent higher than the Planning Commission's estimated poverty line of Rs.478.02 for rural Uttarakhand in 2004-05 which, however, does not include education and health care expenses.

Table 16: Households unable to meet basic living expenses

Village	**Households Surveyed**	**Households unable to meet basic living expenses**	**Per cent of Households unable to meet basic living expenses**
Dhankurali	29	15	52
Gorti	73	38	52
Mamani	32	7	22
Gharara	44	29	66
Makhet	48	15	31
Bainoli	31	10	32
Total	**257**	114	44

Source: Sample household survey, 2005-07

About 44% of the households in the selected villages are unable to meet these basic living expenses. Nearly 66 per cent of them are either daily labourers or farmers (Table 16-18).

Table17: Occupation-wise poverty

Household Type	**Agriculture**	**L'stock**	**Daily Labour**	**Trade**	**Business**	**Service/ Pension**	**Total**
Sampled Hhs	37	3	65	9	26	117	**257**
Poor Hhs*	26 (70)	1 (33)	49 (75)	1(11)	7 (27)	30 (26)	**114 (44)**

Source: Sample Household Survey, PSI, 2006-07 and revenue records.
Note: *With household incomes below Rs.7611/p/yr; Figures in brackets give the percentage of the sampled households in that column.

The poor are thus mainly daily labourers or agriculturists by occupation and Scheduled Caste or Rajputs by caste.

Table 18: Caste-wise poverty

Household Type	**Schedule Castes**	**OBC**	**Rajput**	**Brahmin**	**Total**
Sampled Hhs	61	43	118	35	257
Poor Hhs*	36 (59)	12 (28)	61 (52)	5 (4)	114 (44)

Source: Sample Household Survey, PSI, 2006-07 and revenue records.

Note: * With household incomes below Rs.7611/p/yr; Figures in brackets give the percentage of the sampled households in that column.

An equity analysis reveals that the poor, SCs and female-headed households are marginalized in terms of their incomes, assets and resources consumed. Therefore, there is a need to promote livelihood development to increase their household incomes and ensure food security in these villages.

Households who earn a major part of their income from service/pension or business are generally well-off. The difference in incomes between the agricultural households and those in services or business helps explain the massive shift from farm to non-farm occupations. This has serious negative implications for integrated resource management, which has to be community based.

There is a need to develop livelihood opportunities by diversifying sources of income, enhancing agricultural productivity and through value addition to local products. Tremendous potential exists for increasing the resource productivities and promote livelihoods development in the region. Region specific appropriate technologies need to be developed and demonstrated for use amongst local communities.

Efforts need to be made to use the capital available with the local thrift (savings and credit) groups and local banks to provide credit for productive purposes, including promotion of micro-enterprises. These might include secondary income generation activities like bee-keeping, mushroom cultivation, poultry farming, pisiculture, sericulture, floriculture, community-based tourism, developing new products for value addition and marketing. Value additions will require additional inputs of technologies, managerial and/or institutional support and knowledge systems support. Thus women's SHGs could be encouraged to invest some of their funds to set up processing units. Instead of selling garlic and ginger, their paste fetches a much higher value and can be manufactured at the village level. At the watershed level, marketing management support would be required to ensure maximum return for the sale of any surplus produce. Farmers' producer groups (SHGs) can be constituted and trained for this purpose.

The key to a positive turnaround lies in enhancing the local livelihoods potential through improved productivities of agricultural, forest and common lands. Other livelihood opportunities based on niche products and services, e.g., village tourism also need to be promoted. A critical constraint is the flagging community sprit, dysfunctional village level institutions and inadequate knowledge and management capabilities. The involvement of dedicated, competent and honest voluntary organizations can help overcome these handicaps and strengthen local institutions.

Given the good human assets in the region, adequate precipitation, streams and springs and good infrastructural resources, there is good scope for creating desirable local livelihood opportunities. But the present alienation of the local communities is a constraint. It is therefore necessary to create a sense of ownership or community control over critical natural resources like forests and water. Once the community is engaged in planning and

implementing its own development, then it can display ownership of the development process. This is visible in a watershed development project being implemented in a part of the Hilaungad watershed. It will require not only mobilizing the communities but also changes in the policy, legal and institutional frameworks.

Objective 3: Strengthen users' roles and linkages with external resources to integrate water resources management and sub-basin level planning

Institutional Study

A rapid assessment of user's role in Resource management from institutional perspectives was carried out in Nepal and India.

Begnas-Rupa Basin, Nepal

Forest Users Group (FUGs) and Water User Groups (WUGs) are two major organizations functioning in Begnas catchment. These institutions are contributing to livelihood opportunities. The study tried to understand the dynamics of resource management from the perspective of the users groups with focus on institutional arrangement between forest and water resources. The main research questions of the study were as follows:

1. What are the institutional roles of each of the resource user groups?
2. How these various resource user groups are linked to each other?
3. What complimentary role these institutions are playing for each others activities?

Forest User Groups and Water User Groups were the major resource users of the catchment.

The water users are divided into following groups:

- Informal Irrigation User Group
- Boaters' Association
- Fishers' Group
- Begnas irrigation system

Forest users group

Forest management and the forest product distribution were the major functions of FUGs (Table 19). The function of informal irrigation groups was to clean the canal once a year before plantation. Formal water user groups were:

- Boaters Association
- Fishers Group
- Begnas System Irrigation Users

Boaters Association

A boater association was formed in 1985 and registered with the DDC in 1994. They have to register their occupation in the municipality and pay renewal charge of Rs.360/year. The functions of the association are:

- Regulate the activities of boaters such as enforcement of queue system in boat operation, collecting monthly fee from each boater, pollution control activities etc.
- Establishing relation with DDC and Municipality.

Table19 : Details of Forest User Groups

S.N	Parameters	Indicators	Ban Samudaya Upvokta Samitee		
			Andherikhola Tinsimle	**Sepilopakho Parilopakho**	**Bhurtel**
1	Handover date		2051 B.S (1994 A.D)	2051 B.S (1994 A.D)	2051 B.S (1994 A.D)
2	Total Area		14.5 ha	16 ha	26 ha
3	Members (This should include total members or households also	Executive Committee	9	9	9
		Female in executive committee	2	-	2
		General Member	37	24	71
		Total members	46	33	80
4	Work plan		• 2051/52–2061/62 • 2062/63-070/71	2051/52-2055/56 2056/57-2061/62	2052/53 - 2062/63
5	Renew		Once	Once	Not renewed

Source: Field Study 2006

Fishers Committee

is also a major resource users of Begnas Tal. Fishers have their association named as **"Machha Byawasayi Samiti, Begnas Tal".** The organization was formed in 1981 and registered in 1999 The organization has 42 members. Each household is a member. Functions include:

- Fish farming/Fishing/Fish business
- Lake sanitation
- Protect lake from Eichornia (Jal kumbhi) species.
- Protection of lake fish flowing through irrigation canal or during overflow when lake is filled up.

- There is differentiation of gender role in the community as separate women groups are active in social activities.
- Women are also contributing equally to make a living as the female equally participate in the job of canoeing and fishing respectively.

Begnas Irrigation System Users

- Reservoir area (lake): 300 ha
- Catchment area: 19 sq.km.
- Main canal capacity: 8.0 m3/sec
- Irrigated area: 540 ha.

Functions of Begnas Irrigation System User include:

- To operate (close/open) the dam, for the downstream irrigation group.
- Collect money from the users and mobilize fund available from the government to carry out maintenance of the damages in irrigation system.
- Small representation of women in the decision making.

Major findings of the study were as follows:

- Fisher groups' livelihood is entirely dependent fish farming.
- Boaters group also earn cash income through boat operation.
- The downstream users are mostly benefited compared to the irrigation and forest users upstream.
- There is no system of payment for environmental services. However, all the user groups are interested in it.

Picture 2: Showing meeting of users group in Nepal.

The issues raised by various organizations are as follows:

Forest User Groups

- Low level of income source in absence of economic value of forest products.
- Lack of technical support for diversifying agricultural crops.
- Lack of fund for the renewal of the work plans of FUGs.
- Lack of research on alternative income generating plants/ NTFPs suitable to climate

Informal Irrigation Users

- Lack of resources for the improvement of the irrigation infrastructure.
- Lack of access to government fund due to informal nature of users' organization and small irrigation system.

Boaters association

- There should be more advertisement of Begnas Lake for tourist flow.
- According to the members of Boaters Associations, the Lake is the property of municipality and it should take action on the preservations of the Lake.

Machha Byawasayi Samiti (Fisheries Group)

- Should take action to preserve the indigenous species of fish in lake.
- Should maintain the water level in the lake.

Begnas Irrigation User Association

- The ownership of the lake is not properly defined.
- According to the view of president of WUA, Begnas Dam was constructed mainly for the irrigation purpose. So, they have all the rights about the Begnas Lake within the defined boundary. Other organizations have to take recommendation from their association.

Major works being done in Begnas Watershed by Lekthnath Municipality

- Saat Tal Ko Bagaichha Sahar" i.e. "The Garden City of Seven Lakes"
- Promoting village tourism
- Plays an advisory role to other organizations
- Developing a local level network of INGOs, NGOs and CBOs along with their programs

Past Intervention in Begnas Watershed:

- CARE-Nepal (1985) implemented Begnas Tal Rupa Tal (BTRT) project which had conservation and community development components
- Villagers say that due to initiation of BTRT for the plantation, a very dense forest can be seen compared to the forest here in 1986.
- The project supported on the following:

(a) conservation farming
(b) agro-forestry
(c) conservation engineering
(d) forest development and management, and
(e) community organization, conservation training and extension

Analysis, Conclusions and Recommendations

There are various stakeholders with both formal and informal organizations in the management of resources in the Begnas Catchments. The important are the water users group, forest users group, boaters group and fishers group. There is possibility of augmenting more water if the head works and canals are improved in the upper catchment but there is no interest among the head enders, as they are afraid of loosing their water right by sharing water with the tail enders.

There is no relation among various users in the management of natural resource. In practice, all the users are working in their own way without discussing with other user in resource utilization. Even the FUGs are not formally interactive with each other. However, they all wish to work in integrated way with other users group also. They believe that they can do better if integrated approach practiced by the user group. For this, they seek guidance and support from external institutions. It seems that a platform creation could be helpful for these user groups where this group present their view, interests and demands. Various existing institution could be facilitated to take up integrated approach in natural resource management.

The upstream forest user group and downstream irrigation users are quite strong, but these two institutions have hardly any relation in terms of natural resource management. This is because the users do not overlap as management of both the resources is segregated by the Begnas Lake. Therefore, the other stakeholders also need to be brought into the picture for the integrated approach. The Begnas Irrigation users seems to be in a better position to lead the integrated approach as they are the major user of the lake water for irrigation beside the fisher user group. The forest user group has also emerged as strong institutions but their activities are confined to the upstream only and are not the direct beneficiary from lake water resources. Nevertheless, their activities upstream would have detrimental effect on the environment of lake for which they need to be compensated. But the concept of Environmental Services Fee (ESF) is quite new and the stakeholders need to be made aware of this. Beside, the users of these two institutions could learn from the experiences of each other and some of the experiences should be shared among them for better resource management. For this, the users group could strengthen relationship with local institutions, government agencies and other external institutions for expanded and integrated activities on land and water management.

The downstream irrigation groups and the fishers group of the Lake are the direct beneficiaries of the lake. The irrigation group and the fisheries group are using the water of lake and are benefited with agriculture and fish business respectively. So, these two groups should contribute more for the management of the lake. Similarly, the hotels and shops running around the Begnas Lake is also directly benefiting from the Begnas Lake from the tourism. But, the economic analysis of the business should be done.

Recommendations

FUGs have potential to improve livelihoods through distribution of fuelwood, fodder; seed distribution and credit facilities for income generation activities.

This seems to be an important area where the District Forest Office (DFO) could provide expert guidance to diversify forest plantation upon request from the users.

Issues

The major issues in resource management are:

- Insufficient irrigation water at the tail end due to lack of proper maintenance of infrastructures.
- Lack of collection of Irrigation Service Fee
- The ownership of the lake is not properly defined
- Various stakeholders are benefiting from the use of lake but are not contributing according to their earning.
- Lack of co-ordination and cooperation among various stakeholders

Hilaungad Watershed, India:

In the project site of Hilaungad Watershed, there are institutions for forest resource management and for water resources management

Forest Resource Managers:	Van Panchyats
Water Resource Managers:	Irrigation Department (ID) Systems
	Minor Irrigation Department (MID) Systems and
	Household Water Supply by Jal Sansthan.

1. **Forest Users Group (CBO): Van Panchayats (VPs) a**
   - Constitution of VPs initiated in 2004-05, except for Bainoli in 1995.
   - No VP in Dhankurali due to encroachment of community lands.
   - Four VPs are defunct (registration still pending).
   - Bainoli VP is active and responsive due to dire need.
   - In others, encroachment on VP lands and poor survival rate of plantation observed.
   - Alternative systems developed by some villages (Mamani and Makhet), especially through the involvement of women's group known as Mahila Mangal Dal.
   - Potential exists for formation of community based institutions.

Table20 : Status of Van Panchayats

Village	Dhan Kurali	Gorti	Mamani	Gharara	Makhet	Bainoli
Year of Formation	Not formed	2005	2005	2004	2005	1995
Composition of Executive Committee	-	9 Members (5 M &4 F)	9 Members (5 M & 4 F)	5 Members (3 M & 2 F)	7 Members (5 M & 2 F)	9 Members (9 M)
Area under Van Panchayat's jurisdiction	-	5.7 ha	4.14 ha	8 ha of which 2 ha has been encroached	22.14 ha	13.93 ha
Registration Status	-	Registration pending	Registration pending	Registration pending	Registration pending	Registered
Operational Status	-	Dysfunc-tional	Dysfunc-tional	Dysfunc-tional	Dysfunc-tional	Functional

Source: Focus Group Discussions with villagers and Mahila Mangal Dals, 2006-07

Water User groups

The status of irrigation systems are presented in table 21.

Irrigation Department (ID)

- Site selection mostly done in consultation with Gram Pradhan only.
- Beneficiaries themselves operate canal due to unavailability of ID's watchman-cum-supervisor
- ID does not take timely and adequate maintenance, despite beneficiaries regularly paying tax.

Minor Irrigation Department (MID)

- Gram Pradhan and Junior Engineer run the show without consulting users.
- Functional User Groups do not exist.
- Day to day operation and maintenance in the hands of Users

Household Water Management System

- Jal Sansthan is responsible for the supply of household water
- No community ownership nor responsibility for O&M

Table21 : Status of Irrigation Systems

Village (No. of Households)	Type & Length (Year of Construction)	Constr-uction Agency	Manage -ment	Irrig. Area (in ha.)	Benefited Households		
					SC	OBC	G
Dhankurali (58 - All General)	850 m PVC guhl (2005)	VDC	UG	3	-	-	45
	700 m lined guhl (2006)	MID	Villagers	2	-	-	15
Gorti (147 – 74 General, 72 SC and 1 OBC)	800 m lined guhl (2002-03)	MID	Users	0.5	7	-	-
	1200 m guhl (100 years' old) of which 800 m is being lined, along with tank	MID	Villagers	3.0	50	-	35
Mamani (65 – 64 General and 1 SC)	150 m lined guhl (1991)	SCD	Users	0.7	-	-	12
	1800 m lined guhl – in progress (2000)	ID	ID & Users	-	-	-	-
	70 m lined guhl (2005)	ZP	Users	0.3	-	-	8
	2" x 1" hydram (2005)	VDC	UG	0.5	-	-	8
	1500 m lined guhl (2006)	MID	Users	7.0	1	-	24
Gharara (88 – 43 SC, 35 OBC & 10 General)	150 m unlined guhl (Before 100 years)	Villagers	Users	2.5	-	-	8
	3000 m lined guhl – under repair (1979)	ID	ID (Dysfun-ctional)	-	25	-	-
	100 m lined guhl (1991)	GP	Users	1	-	-	9
	150 m lined guhl (2004)	MID	Users	3	20	30	18
	1500 m lined guhl (2005)	ID	ID. & Users	4	28	30	-
Makhet (96 – 66 OBC & 30 General)	350 m unlined guhl (100 years old)	Villagers	Users	3	-	32	9
	800 m lined guhl – in progress (1999)	ID	ID & Users	5	-	50	-
	300 m lined guhl (2003)	MID	Users	1	-	18	7

	400 m lined guhl (2003)	MID	Users	2	-	18	22
	500 m lined guhl (2006)	ID	Users	4	-	40	7
	Hydram (in progress)	MID	-	-	-	-	-
Bainoli (61 – All General)	5000 m lined guhl (1963)	ID	ID	10	-	-	47
	100 m lined guhl (1985)	MID	Users	1.2	-	-	6
	500 m lined guhl (1991)	MID	Users	2	-	-	47
	1200 m lined guhl (2006)	MID	Users	8	-	-	14

Source: Focus Group Discussions with Villagers; Irrigation Department and Minor Irrigation Department, Block Jakholi, District Rudraprayag, Uttarakhand (2006-07)

MID: Minor Irrigation Department; ID: Irrigation Department; SCD: Soil Conservation Department; GP: Gram Panchayat ; ZP: Zilla Parishad; VDC: Village Development Committee; UG: Users Group; G: General

The other institutions are related to finance like Savings and Credit groups and Income Generating Groups, (b) Village Development Activiites, and (c) women and youth welfare.

Other Groups

Savings and Credit Groups (SCGs)

- 25 SCGs in 6 villages formed since 2001, through local NGOs.
- About 53 % of the total village households have membership in SCGs, 54 % of SC and 61% OBC households covered.
- Only 13 groups are inter-loaning
- Total savings of IRs. 4,46,040 and inter-loaning of IRs. 3,37,194
- Five groups each in Gorti and Makhet linked with bank

Income Generating Groups (IGGs)

- Two functional groups (Milk Dairy & Vegetable Cultivation) in Bainoli

Institutions for Village Development

- GP - Gram Sabhas not involved in planning and execution of activities, Gram Pradhan and Executive Committee members dominate the decision making.
- Gram Shiksha Samitis (Village Education Committees) constituted in 6 villages, properly functioning only in Bainoli and Mamani.
- Aapda Prabhandan Samiti (Disaster Management Committee) constituted in Mamani but it is defunct.

- Future of Village Development Committees formed by VOs in Mamani and Dhankurali is at stake with the watershed programme coming to an end.

Institutions for Women and Youth Welfare

- Mahila Mangal Dals (MMDs (representing 61% households) are defunct but have potential for revival.
- Yuvak Mangal Dals constituted in Makhet and Bainoli have not yielded benefits for the youth.

Conclusions

The study reveals that most of the institutions for resource management are dysfunctional. Since many of these institutions have been formed as a result of government orders, villagers display little sense of ownership of these institutions and the associated development processes. They look at the entire initiative as a government exercise. Some of the community level institutions created by VOs have been able to create an involvement of the local communities in the development process.

The Gram Panchayats are responsible for undertaking various village development activities and managing local resources in consultation with the Gram Sabhas and with the help of sub-committees. However, the Gram Sabhas are not actively involved in decision-making. It is the Gram Pradhan and other executive committee members who dominate and run the show. The affiliated sectoral sub-committees of Gram Panchayat are also non-existent.

The main sources of financial capital are the traditional moneylenders. The existing Savings and Credit Groups are in an early stage of growth. Most of the groups lack proper direction. The goal of providing funds to the deprived households is not fulfilled due to inadequate inter-loaning activity. The groups need to be strengthened and linked with commercial banks for access to additional funds for promoting micro-enterprises. Due to lack of direction and cooperation from the government machinery, the Mahila Mangal Dals as well as Yuvak Magal Dals are also in a defunct state.

In keeping with the spirit of the Panchayat Raj Act of 1992, funds, functions and functionaries need to be devolved on the PRIs. So far the transfer of funds and functionaries to the PRI has been resisted by the functionaries who see their power diminishing as a consequence. Without the transfer of funds and functionaries, the transfer of functions is a mockery. A full devoution, along with activation of the sectoral Gram Panchayat sub-committees, can lead to improvement of the services provided to the local communities. Capacity building of Gram Panchayat, its sub-committees and Mahila Mangal Dals needs to be undertaken through VOs and other institutions. New policy and legal reforms are required.

Picture 3: Landscape of Hillaugand Watershed, Uttarakhand

Objective 4: Assess and determine mechanisms to scale up integrated water and forest management at the catchment level.

Introduction

Since April 2005, PN 23 has been undertaking action research on CBINRM in the Begnas catchment. Inception workshop was organised in 2005 in Kathmandu and at the field. In February 2007, the project conducted two workshops: one at local level and second at the district level and shared the information collected from the village level studies. During that the project team developed good rapport building with the users and local and district stakeholders. Keeping in view of the project objective, the idea of forming platform was shared with local stakeholders during FGD, informal interview and they have shown interest for platform formation. 'Platform is a venue where resource users and stakeholders are brought together to discuss the issues related to resource management and it is believed that this process will contribute to the users' and other stakeholders' understanding and thinking on integrated resource management.'

Vision of Platform Formation

The main purpose of the platform formation is to bring together concerned stakeholders in one place and facilitate interaction among them for Community Based Integrated Resource Management (CBINRM). This is expected to contribute to people's understanding of the importance of CBINRM and help learn from the community about CBINRM. The platform provides local stakeholders a venue where they can show and discuss local knowledge and practices, finally contributing conservation planning.

Methodology

This idea was more intensively pursued by visiting district level agencies and stakeholders at local level individually in July 2007. The idea was to garner support for platform from key stakeholders and also to identify lead agency that could take forward the activities of platform. In that respect, the response from the district level line agency officials and the representatives of local level stakeholders from various organizations was positive for platform creation. Now, the focus was at holding a first platform meeting of representatives of stakeholders. The meeting deliberated on the role and functions of platform for CBINRM at local level. To that respect, the platform elected the executive committee and developed the modalities for the functioning of the platform. For this stakeholder's holder consultation meetings was organized once in a month to initiate the collective decision making.

Role of Project team

The Project Team with support from local NGO (SORUP) worked as external facilitator to promote CBINRM in consultation with the local stakeholders. In this respect, the project team undertook following activities.

1. Initiated dialogue with the local stakeholders on CBINRM.
2. Undertook research on various aspects of CBINRM and shared it with the stakeholders.
3. Held discussions with stakeholders (Government Agencies and other local level stakeholders) individually to know their view on CBINRM and garner their support for the same.
4. Helped organize the platform meeting and facilitate the discussion.
5. Helped formation of executive committee to prepare plan of actions for CBINRM.
6. Helped document the discussions in the meeting.
7. Facilitated arrangements to ensure the sustainability of platform after the project work phased out from the area.

The project team along with community people and other stakeholders tried to build consensus among stakeholders on addressing issues on CBINRM. It assessed progress, documented lessons from platform, and arranged future research and development priorities. With so many sectors in resource management, getting people together to reflect on issues towards integrated natural resource management was challenging. Municipality was expected to lead the platform.

Role of SORUP in Platform facilitation

SORUP, the local NGO facilitated the organization of platform meeting by contacting representatives of local stakeholders and executive committee meeting. SORUP had knowledge about the community and willingness to work with the project for platform They served as a link between the project team and the community, and executive member of GA.

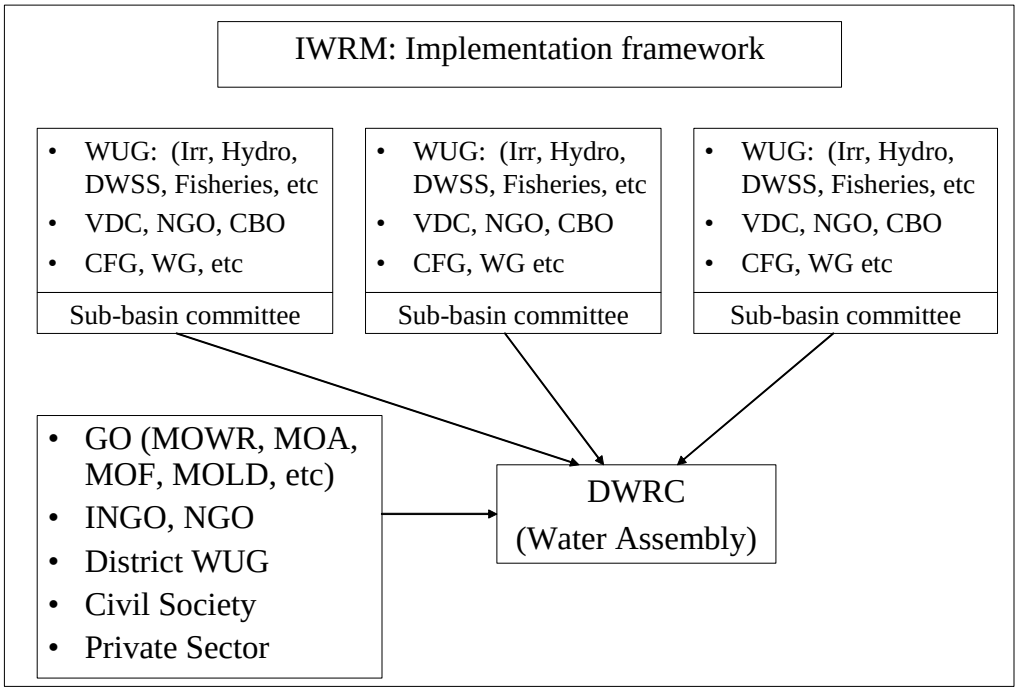
Role of Stakeholders

Representatives of all the stakeholders participated in the platform meeting. Representatives from different natural resource users and managers were nominated by these groups. Users, beneficiaries, stakeholders contributed in identification of the problem and solution for it. They discussed and formed an executive committee to carry on CBINRM activities. They prepared the action plan for food security, that was facilitated by the consultant hired by the project.

Processes followed for Platform Formation

A platform is a common federation of natural resource[5] users and its managers (GO and NGO) who can discuss and decide aspects related to integrated natural resources management at the sub-basin level. The National Water Plan (NWP) has also envisaged similar type of forum named as sub-basin committee (Figure 2).

Figure 2: IWRM implementation framework adopted by NWP



Source: Water Resources Strategy 2002

As also envisaged by the National Water Plan, the platform included members of existing water users group, forest users group, women group, local government, NGOs, advocacy group etc. In establishing this platform, first, step was to form a general assembly (GA) of the said group of resources users and managers. The GA then elected its executive committee for administering day to day business. Following paragraphs outline processes of forming a platform.

The first step in forming the platform for Begnas Basin Management (BBM) was to visit the basin area and meet concern personals of resource users, GOs, and NGOs, and brief them about the objective, methodology, scope, and activities of the said platform. In this process, key individuals of the area who worked actively in managing the Begnas Basin, but not involved in any organizations were also consulted. Following were some of the organizations visited.

[5] Natural resource here refers to mainly land, water, vegetations (forests), and people

- WUA of Begnas Irrigation System (BIS)
- Community Forest Groups
- Water Users Group of FMISs
- Fishermen's Associations
- Boat Owners' Association
- Youth Clubs
- Fishery Development Board
- Mothers' Groups
- Eco-tourism Committee,
- Government line agencies (Irrigation, Forestry, Agriculture, Livestock, Fisheries, etc)
- Local NGOs: World Vision, IDE, SORUP
- Begnas Municipality
- Kaski DDC
- Other key stakeholders of the basin area representing different categories (well being, ethnicity, gender etc)

While meeting with personnel of above organizations, mechanism of forming a general assembly of the platform was discussed. Accordingly, a general assembly was formed. The General Assembly was formed with the representation from Forest Users Group, Water Users Group, Local NGOs, Youth clubs, Chambers of Commerce and industries, Officials from District level Government agencies and local dignitaries. The representation was choosed depending on the extent of their association with the Begnas Basin, especially from the perspective of livelihood, management responsibility.

First General Assembly (GA) meeting

A start-up introductory meeting of the GA was conducted. The purpose of the meeting was:

- To share the rationale and objective of platform formation
- To discuss on the suitable methodology for forming an executive committee of the platform

The introductory meeting was started with the presentation (by CP researchers) on the findings of the study. This was followed by presentation (by IWMI) on rationale, objective, and scope of the platform. After the presentation sessions, there were floor discussions on various aspects of platform. Participant decided to form 13 members committee: 3 members each from agriculture, forest and irrigation sectors will be involved in this platform, 1 from Drinking water and 3 from other sectors. Participants encouraged female member to be included in this committee. The committee was named as Integrated Resource Management Committee (IRMC), Lekthnath Municipality, Kaski.

The platform committee member requested for a training workshop for dissemination of knowledge on integrated resource management. To that effect, IWMI-Nepal, SEI, IWHRD, and local NGO SORUP and CIRM jointly organized two day workshop, one at local level (26th Jan 2008) and other at District level (27th

Jan 2008) in Begnas and Pokhara, Kaski district respectively. The local level workshop was aimed at sharing the knowledge of integrated water resource management, its implementation, problems and challenges and about the action plan development. About 25 participants, mostly from CIRM, SORUP and other users group and the organizers from IWMI-Nepal, IWHRD, and SEI were present at the workshop. The district level workshop was aimed at building linkages between platform committee and district level government organizations, NGOs and INGOs, in order to mobilize the platform committee. About 20 participants were present in the district level workshop.

Finally a policy round table was organized with the objectiv of 1). share the research finding related to resource management for sustainable livelihood in two watershed, Nepal and in India, 2) highlight the issues pertaining to policy, institutions, livelihood and resource management, and their linkages, and 3) to draw a policy conclusion for further action to reach the development stage on integrated resource management. The workshop was attended by senior officials from National Planning Commission, Government Ministries and Departments. It was successful in highlighting the issues on IWRM and drawing policy maker's attention towards it.

International public goods[6]

The action research was participatory, process oriented and had the involvement of the various actors at different levels. The key actors among them were the policy makers at central/state level government, district level government functionaries and resource users in the study area beside other development actors. Therefore, the outcome of the action research is shaped by these actors at different level unlike the other researches in which the team researchers play a dominant role.

Being a process oriented participatory action research, the project ensured the participation of above mentioned actors by organizing inception meeting for policy makers at the central level at the beginning of the project, that was useful in developing the detailed methodologies. This was essential because the outcome of the action research was to help in operationalisation of the Integrated Water Research Management (IWRM) through appropriate policy measures.

A meeting of the local stakeholders including the members of resource users group was organized at the field level before the initiation of field research and the objective, scope and methodology of action research was shared with them in order to receive their feed back. This process enabled to receive their opinion/suggestions which were relevant adapt study objective to local situation. Beside it was important also to receive their commitment to participate in the action research and to establish working relationship which was vital for action research.

During the period of action research two district level workshops were organized in order to facilitate linkage and interaction between local resource users and district level functionaries. The purpose was to enable them to identify existing gaps in understanding of the local

[6] (2 pp.) - summarise new insights, tools and methodology, data and any other IPG of value beyond the project location/country/basin

resource management issues, as most of the problem in resource management is related to the discrepancy in policy and its implementation.

At the end of the field study, an extensive interaction with local level stakeholders was organized to share the preliminary findings of the various components of the study. The idea was to let them know what we did during first half of the study and to know from them if this was consistent to the outline we presented at the beginning of the study. This was essential to build up confidence among researchers and the local stakeholders for carrying out remaining works of the action research. Beside, the interaction was fruitful as it provided opportunity to cross check the findings of the field studies with them and based on that necessary corrections were incorporated and that was important for the validation of the field study.

Finally, the policy round table with participation of the central level policy makers with participation of various ministries and departments of the government, development practitioners, I/NGOs project researchers, and the representative of the local users was orgnaised to facilitate discussion on IWRM and its issues. This was useful in facilitating greater understanding on issues of IWRM among various stakeholders. This process was very much appreciated by the participants.

Shift from farm to non-farm occupations: The most significant finding of the Indian component of this study is that land-based occupations, agriculture and livestock rearing, are the primary sources of income for less than 16 per cent of the sampled households. Though it is generally kwon that mountain households are shifting from farm to non-farm occupations, the extent of the shift comes as a surprise.

Implications for integrated natural resource management (INRM): This transformation of the household economy has major implications for community-based natural resource management (CBNRM). Integrated resource management requires effective village level institutions and investment of time by the local communities in decision-making for planning development projects, implementing and managing them. Households whose primary income comes from non-farm sources are less willing to be involved in CBNRM. To create an active interest in CBNRM, agriculture must be made remunerative. The study argues that this can be done and suggests measures for doing so. Policy makers also need to consider promoting niche-based occupations based on the conservation of local resources, e.g., village-based tourism.

Dysfunctional institutions: The Indian component of the study reveals that most of the development instructions at the village level are dysfunctional. The data also shows that productivities of the village commons are abysmally low. Local communities do not display a sense of collective ownership of the commons, the village level institutions and the development processes. This is because of alienation due to government-centric policies, institutions and laws of resource management. Integrated natural resource management, while occasionally referred to in policy documents, lacks appropriate legal and institutional frameworks. This needs to be changed.

Determination of Poverty: The project developed an insightful methodology for determining rural poverty. A locally perceived poverty line for communities of Hilaungad watershed was determined by estimating basic living expenses i.e. per capita food and non-food expenses. The locally perceived poverty line is Rs. 634.25/p/m or Rs.7611/person/year. This is about 33 per cent higher than the poverty line determined by the Planning Commission of India (Rs. 5736/p/yr). According to the state revenue records the official BPL figure works out to only 28 per cent of the sampled households. According to the Planning Commission's estimates, nearly 30 per cent of the sample households can be classified as poor while according to people's perceptions as many as 44 per cent of the sampled households are poor. Thus the project gives insights into ways that rural poverty can be measured and analysed which is applicable beyond the selected watersheds.

Outcomes (1-2 pp.) – *how has this project influenced your "change partners" – the people, groups and organizations with whom you are working to effect change (see Outcome Mapping at* http://web.idrc.ca/en/ev-64698-201-1-DO_TOPIC.html

Vision

To contribute to an enhanced understanding of sustainable livelihood opportunities and reduced vulnerability for poor rural people in upper catchments in Nepal and India.

This project intends to identify the opportunities for poor women's and men's food security and improved livelihoods based on community-managed water and forest resources focusing on rainfed agriculture, harvesting of common property resources, small-scale irrigation systems, spring-fed drinking water supply, community forestry, and watershed management in one sub-basin (50-100 km2) covering 6 communities each in Nepal and Uttarakhand, India. Internal and external linkages among multiple communities within the sub-basin will be addressed.

1. Mission

The mission is to help identify opportunities and constraints for improved livelihoods of the poor in mountain regions through improved institutional arrangements for sustainable use of natural resources.

2. Boundary Partners(BPs)

BP 1.:- Local NGos:

1. Society for Rural Urban Partnership (SORUP)
2. Begnas Irrigation Users' Association (BISA)
3. Water Users' Association (WUA)
4. Community Forest User' Group (CFUG)
5. Fishers' Group (FG)
6. Boaters Association (BA)
7. Small Holders Irrigation Market Initiative (SIMI)
8. Centre for Integrated Resource Management (CIRM). The project facilitated the formation of this as an intermediary institution for resource management at sub-catchment level.

India (VOs):

1. Himalayan Jan Kalyan Evam Bal Vikas Samiti (CDI), Rudraprayag
2. Jan Vikas Sansthan (JVS)
3. Parwatiya Niyojan Avem Bal Vikas Samiti (PANVAS)
4. Gramin Sudhar Avem Shramik Sewa Sansthan (GRASS)

CBOs:

5. Gram Panchayats namely Bajira, Gorti, Uroli, Gharara, Makhet and Srikot (local self-governance units in India)
6. Hilaungad Vikas Sangathan -. The project facilitated the formation of this as an intermediary institution for resource management at sub-catchment level.
7. Van Panchayats – Gorti, Mamni, Gharara, Makhet and Bainoli
8. Mahila Mangal Dals - – Dhankurali, Gorti, Mamni, Gharara, Makhet and Bainoli
9. Yuvk Mangal Dals - Makhet and Bainoli
10. Savings and Credit Groups -– Dhankurali, Gorti, Mamni, Gharara, Makhet and Bainoli
11. Village Development Committees - Dhankurali, Mamni
12. Block Panchayat-Jakholi
13. Zilla Parishad

BP 2:- Government Offices:

1. DDC (District Development Committee)
2. VDC (Village development Committee)
3. Lekhnath Municipality
4. DoI (Department of Irrigation)
5. DIO (District Irrigation Office)
6. DFO (District Forest Office)
7. DSCO (District Soil Conservation Office)
8. WECS: Water and Energy Commission Secretariat
9. MoWR: Ministry of Water Resources
10. MoFSc: Ministry of Forest and Soil Conservation
11. Fisheries Center

(b) India

(a) DRDA (District Rural Development Agency)
(b) Panchayati Raj Department (District and State)
(c) FD (Forest Department – District and State)
(d) ID (Irrigation Department – District and State)
(e) MID (Minor Irrigation Department – District and State)
(f) Agriculture Department (District and State)
(g) Jal Sansthan (District and State)
(h) SCD (Soil Conservation Department – District)
(i) BDO (Block Development Office at the block or sub-district level)

(j) FRDC (Forest and Rural Development Commission)
(k) AJEEVIKA - Uttaranchal Livelihood Implement Project for the Himalayas
(l) Watershed Management Directorate
(m) Swajal Project
(n) Zilla Sahkari Bank

BP 3:- Private Sector

1. Federation of Community Forest User Groups in Nepal (FECOFUN) (Centre and District).
2. Banks (State Bank of India, Mayali and Jakholi; Co-operative Bank, Mayali and Jakholi; Union Bank, Budna, all in Rudraprayag district, Uttarakhand, India)
3. Himmothan Society, Dehradun, Uttarakhand, India, set up by Sir Ratan Tata Trust.
4. Aniket, Gopeshwar, Chamoli, India, a regional news paper.

BP 4:- Academic and Research Institution

Tribhuwan University, Kathmandu, Nepal
University of East Angelia, UK
Asian Institute of Technology, Bangkok
Central Soil and Water Conservation Research and Training Institute, Dehradun, India
Forest Research Institute, Dehradun, India
Indian Institute of Remote Sensing, Dehradun, India
National Institute of Hydrology, Roorkee, India
Indian Institute of Technology, Kharagpur, India
Indian Institute of Technology, Roorkee, India
Uttarakhand Space Application Centre, Dehradun, India
Queen's University, Canada
Universidade Fedral De, Vicosa, Brazil
Kulbhaskar Ashram Post Graduate College, Allahabad, India
CEDAR, New Delhi, India

3. Outcome Challenge

Outcome Challenge 1:-
The project intends to see local communities recognize the importance of integrated approach of natural resources management and are engaged in it in partnership with different users in their catchment. They are able to clearly plan and articulate the community based integrated natural resource management approach. They can motivate others in the partnership to continue their collaborative work and also convince local people about the usefulness of integrated approach in Natural Resource Management
Outcome Challenge 2:
The project intends to make government officials and policymakers aware of the need for Integrated Natural Resource Management (INRM) by (i) Effecting necessary policy changes and adhering to their principles in the course of implementation; (ii) Supporting the development of local capacity for planning and decision making about integrated resource management; (iii)

CBINRM is accepted at the policy level and practiced by various stakeholders at community level.

Outcome Challenge 3:
The project intends to see that private sectors who are active participants in the resource utilization are aware of INRM practices and recognize its importance. They provide necessary support to the implementation of CBINRM and encourage users for sustainable practices.

Outcome Challenge 4:
The project intends to see academic and research persons who are actively involved in the research understand, adapt and share tools developed to assist local users for CBINRM. They undertake research that influences decision-making and document local strategies to improve inter community benefits and reduce conflict.

Progress Markers

Progress Marker 1

Expect to See

1) Communication among different users groups and work in collaboration with each other and local NGOs.
2) Platform committee meeting monthly with stakeholders.
3) Consultations on problems and analysis for their resolution is initiated through collective decision making.
4) Participating in project decision-making and benefits accruing to all the stakeholders.

Like to see

5) Learning about new technologies and their adoption for the improved livelihoods of the users through pro-active role in seeking services from the government and other external agencies.
6) Sharing the knowledge and interaction between FUGs and WUGs, local communities and other user groups.
7) Active CIRM and HVS, the intermediary institutions for CBINRM.
8) Learning the importance of CBINRM (Community Based Integrated Natural Resource Management) and applying the same for resource management by local users.
9) Active involvement of women and the poor in CBINRM-related decision-making and planning.
10) Scaling out of the intermediary institutions through local NGO's, CBO's and local bodies.
11) Adoption of project concepts proposed by the intermediary institutions by government by scaling up and scaling out through policy reforms.

Love to see

13) Adoption of the project approach for the implementation of Water Resources Strategy in Nepal.
14) Revival and effective functioning of local institutions (Van Panchayats, Water User Groups and Mahila Mangal Dals) in India for CBINRM.
15) Strengthened Gram Sabhas and effective Gram Panchayats in India

16) Community ownership and management of natural resources

Progress Markers 2

Expect to See:
1. Communication among users and the government agencies is established through CIRM and HVS.
2. Receiving feedback about the concept.
3. Acquiring new skills by users for their involvement in the CBINRM.
4. Improved livelihoods of the users through CBINRM.

Like to See:
5. Increased interaction with external agencies and access to improved services.
6. Supporting each other for local capacity building
7. Local users implementing integrated approach and encouraging others as well.
8. Increased membership of women in executive committee of resource users.
9. Adoption of CBINRM concept by resource users in adjoining areas.
10. Adoption of the concept by the governments in other areas of the countries/state.

Love to See
11. Implementation of sub-basin committee concept of Water Resources Strategy through project approach.[7]
12. Function local level resource management institutions in India.

4. Strategy Map

The strategy map of the project is presented in following tables (Table 22)

Table 22: Strategy Map of Project

Strategy	Casual	Persuasive	Supportive
	I-1	I-2	I-3
Strategy and Activities aimed at a Specific Individual or Group	Inviting Users groups and local NGOs for sharing about the project initiation.	Organising workshops with policy level stakeholders Organising inception workshops for the implementers and boundary partners. Creating awareness among the users through focus group discussions. Encourage involvement in income	Organising stakeholders meeting on a regular basis. Organising trainings to establish linkages among users group. Facilitate interactions among stakeholders through platform creation.

[7] Not clear

		generating activities to strengthen their livelihoods.	
	E-1	E-2	E-3
Strategy and activities aimed at Individual's or Group's Environment	Encourage policy changes to facilitate Integrated Management of natural resources. Encourage downstream users to develop (payment for environmental services) incentive system for the upstream users for their effort in maintaining environment.	Allow the flexibility in using the new policy of integrated natural resource management, Payment for environmental services. Share the collected information through reports and engage in dialogue with local users for improved management of natural resources. Research fellows disseminate the information to broad audience through publications, conference, workshops papers.	Organising policy dialogues among stakeholders. Documentation of the methodologies applied by the communities in the implementation of action plans. Review of papers and comments suggestion on it.

5. Organizational Practices

- Encouraging boundary partners for new ideas.
- Experiment with multiple water use systems.
- Improving relations between various users.
- Seeking feedback from various user groups.
- Sharing the concept of Integrated Watershed Management and Payment for Environmental Services with Boundary Partners.
- Organising meetings with boundary partners.
- Sharing the project outcomes with Policy makers.
- Monitoring 'platform activities for six months/ or a year?.
- Impacts (2-4 pp.) – *current, potential (say 5 years after project ended) in terms of scientific impacts, community impacts (social, economic, environmental etc), capacity-building impacts*

The project has positive impacts in the Begnas watershed. The project had facilitated the construction of a MUS scheme in one of the village of the study area. People learned the importance of CBINRM and applying the same for resource management. The creation of platform is the most visible impact of the project. The platform committee as a unit for sub

basin involved themselves in the preparation of action plan facilitated by the project, which is aimed at watershed management and the betterment of their livelihood. The implementation of the action plan by the committee would be the long term impacts of the project

CP 23 is essentially a research project, albeit and action-research or participatory one. Its direct impacts therefore are primarily of an improved understanding of problems, potentials and constraints, for INRM and improved livelihoods, at various levels from the community to the state government and other external agencies. The project has potential for impacts in the Begnas as well as Hilaungad watersheds, both for the local communities and the policy makers.

(a) Local Communities

The field studies provided opportunities for the communities of both the watersheds to identify their problems in the current resource management practices and identify opportunities to strengthen livelihoods based on forest and water resources. The communities have suggested various land and water based interventions along with institutional mechanisms to strengthen livelihoods. The project had facilitated the construction of a MUS scheme in one of the village of the study area in Benas watershed. People learned the importance of CBINRM and applying the same for resource management.

Assessment of institutions through PRA exercises gave opportunities to the selected communities to have a common platform for discussing their current situation and analyse the same. This itself has been an empowering process where people tend to take action themselves. Defunct Mahila Mangal Dals (local village level women's organisation) have been revived in Bainoli, Makhet and Mamani during the study. The above institutions will be responsible for the management of community forests.

The formation of platforms is the most visible impact of the project and its impact on community based integrated natural resources management is likely to be observed in the long run if it is sustained overtime. The platform committee in Begnas watershed as a unit for sub basin involved themselves in the preparation of action plan facilitated by the project, which is aimed at watershed management and the betterment of their livelihood. The implementation of the action plan by the committee would be the long term impacts of the project.

In India, the platform (Hilaungad Vikas Sagathan) was formed in November 2007 by drawing representatives from the village communities. A five-member executive committee has also been formed. It is presently drafting its constitution. The platform in India is acting as a planning and monitoring body for the integrated development of the Hilaungad sub-basin. The platform committee has mobilised village level resource groups to prepare action plans for integrated resource management for meeting the basic needs of the communities. About 35 members of village level resource groups from 14 villages have also been trained to undertake participatory rural appraisal exercises for making the village level work plans. These plans can be utilised by the local self-government, i.e., Gram Panchayats for taking appropriate measures using government funds.

About 1000 farmers in the sub-basin of Hilaungad have also been trained in the System of Rice Intensification (SRI). Most have adopted SRI in Kharif 2008, which will contribute towards food and livelihood security of the communities.

During the project implementation period, the project generated knowledge, where each partner contributed through research. Based on the research report, knowledge was shared among the local stakeholders and the issues of local level discussed at the district and central level workshops. The project organized the platforms where all the stakeholders showed their interest. The representatives of all users groups and other stakeholders contributed on a regular basis.

The local user groups are excited with the formation of the platform committees as they are sure that these committees will contribute to Community Based Integrated Natural Resource Managament and can seek support from them whenever and wherever required. The platform of stakeholders is expected to mobilize internal and external resources for the CBINRM activities. The project (CP 23) supported the operational cost for the platform committee in Begnas watershed and developed such linkages that could support the sustainability of the platform.

(b) Policy Makers

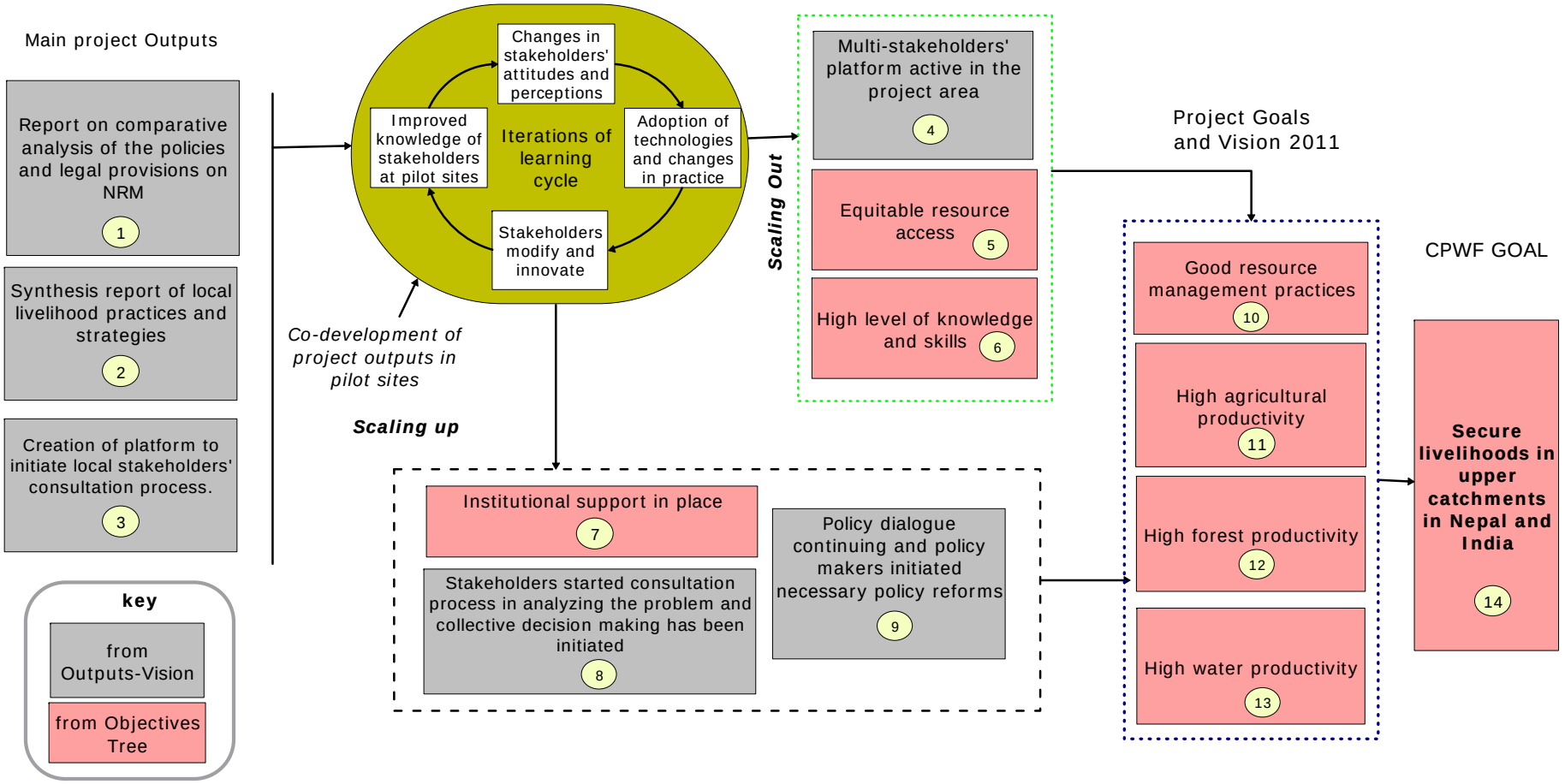
The recommendation for devolution of power to village level institutions (like Gram Panchayats in India) for resources management was accepted in principle by the policy makers at workshops held in Kathmandu, Nepal as well as Dehradun, India. The study would help in creating public pressure for hastening the transformation. After five years of project completion, the project expects to see the revised policy for integrated natural resource management by the governments. The difference between resource management practices now and then will be observed by the concerned authorities. The platform committees formed as the unit for sub basin should lobby for overcoming the constraints and capitalizing on opportunities for the integrated water resource management and they should disseminate their knowledge to other sub basin committees. Community based integrated natural resource management practices must be accepted at policy level and sub basin committees should be formed at various catchments to realize the implementation of Integrated Water Resource Management (IWRM) as envisaged in the Water Resources Strategy (2002) in Nepal and community led natural resource management practices in Uttarakhand, India.

Box 1: Narrative for Figure 8

The project works in pilot sites to develop, adapt and validate new institutional intervention in partnership with key stakeholders which the project hopes to influence. The pilot site intervention lead to the participants—Users group, farmers, scientists, extension workers, etc.—going through experiential learning cycles that lead to individual and collective changes in attitudes and perceptions, experimentation, adaptation and adoption (Outcomes 1 to 4 in Figure 8). End-user adaptation to new institutional arrangement in the pilot sites based on positive feedback and promotion by the first adapters, and scaling out begins as the new institutional set up and strategies to manage natural resources in integrated approach begin to spread to other villages/catchments (Outcome 5). At the same time scaling up begins as the project boundary partners, who are taking part in the field work, gain ownership of the platform for integrated natural resource management (project outputs) and begin to realize its benefit and promote them in their own organizations (Outcome 6). Members of Users group begin to see real increases in income as a result of integrated approach in natural resource management (Outcome 7) and this helps fuel continuing positive feedback which drives an acceleration of platform creation from catchment to catchment (Outcome 8). Positive feedback also drives an increase in institutional knowledge and support for the project outputs (Outcome 9) through policy reform.

The shaded boxes (Outcomes 1 to 9) are outcomes that one might expect to at least partially achieve before the end of the project. Purpose level outcomes, such as eventual wider adoption; community level livelihood improvements, and creation of a favorable policy environment at different scales (see Figure 8) will only be achieved after the end of the project. Achieving the goal will take even longer.

Figure 8: Project 23 Adoption theory Model



During the project implementation period, the project generated knowledge, where each partner contributed through research. Based on the research report, knowledge was shared among the local stakeholders and the issues of local level discussed at the district and central level workshops. The project organized the platform where all the stakeholders showed their interest. The representatives of all users groups and other stakeholders contributed on a regular basis. The local user groups are excited with the formation of the platform committee as they are sure that this committee will contribute to Community Based Integrated Natural Resource Managament and can seek support from them whenever and wherever required. The platform of stakeholders is expected to mobilize internal and external resources for the CBINRM activities. The project (CP 23) supported the operational cost for the platform committee and developed such linkages that could support the sustainability of the platform.

After five years of project completion, the project expects to see the revised policy for integrated natural resource management by the government. The difference between resource management practices now and then will be observed by the concerned authorities. The platform committee formed as the unit for sub basin should lobby for overcoming the constraints and capitalizing on opportunities for the integrated water resource management and they should disseminate their knowledge to other sub basin committee. Community based integrated natural resource management practices must be accepted at policy level and sub basin committees should be formed at various catchments to realize the implementation of Integrated Water Resource Management (IWRM) as envisaged in the Water Resources Strategy (2002) in Nepal and community led natural resource management practices in Uttarakhand, India.

Partnership achievements[8]

This action research fostered partnership with local stakeholders for the organization of the 'platform' of the resource users, which is expected to act as an intermediate institution to facilitate IWRM at local level is an new approach in addressing the issues of IWRM. The processes adopted in the formation of the 'platform' were participatory as mentioned in earlier paragraphs. This was unique, unlike in other parts of the world where government used to form basin committees, in the sense that the 'Platform' was formed by the local stakeholders after realization that this would facilitate IWRM. Therefore, this process could be replicated in other areas also to learn from the experiences.

The research issue on Integrated Water Resource Management (IWRM) that this action research has tried to explore is one of the major challenges that the government in developing countries are trying to address. This has been reflected in policy documents of Government of Nepal and Government of Uttarakhand, India. The realization and acceptance by the policy makers both in Nepal and Uttarakhand, India that there are issues on IWRM that needs to be addressed at the policy level is the important achievement of the partnership fostered between the project team, government agencies and the resource users. In this respect the project work has been able to sensitize the mindset of the government officials and local users with respect to the

[8] (1 p) – what has been the value adding to science, outcomes and impact achieved through new partnerships developed as a result of your participation in CPWF

operationalisation of IWRM at basin/catchment level.

The action research work was carried out by the researchers in these two countries with inputs from international researchers in IWMI and SEI, York. This provided an unique opportunity for collaborative research between researchers from government agencies, NGOs and International researchers. Thus, the accomplishment of project outputs could be considered an important achievement.

In the initial phase of the project, PSI entered into a partnership with Himalayan Jan Kalyan Evam Bal Vikas Samiti (CDI), Rudraprayag to undertake watershed based planning for integrated community management of natural resources for livelihood security in the selected sub-basin. In each of the selected communities within the sub-basin, CDI and PSI worked together to carry out field studies in the selected watershed for (i) identification of resource dependencies, (ii) identification of gaps between resource availabilities and demands, (iii) analysis of existing institutions, and (iv) preparation of work plans for integrated natural resource management by communities to enhance livelihood security and minimizing the gaps between resource needs and availabilities. During the process, PSI got into new partnership with other local NGOs like Jan Vikas Sansthan (JVS), Parwatiya Niyojan Avem Bal Vikas Samiti (PANVAS) and Gramin Sudhar Avem Shramik Sewa Sansthan (GRASS). Through these NGOs it has further extended support to large number of MMDs, SCGs and VDCs in the Hilaungad basin. As stated earlier, PSI is now promoting the System of Rice Intensification amongst 1000 farmers in the basin through partnership with these NGOs. A basin level platform, i.e. Hilaungad Vikas Sangathan was created in November 2007, including representatives of all the 27 villages of the Hilaungad watershed. Village works plans are currently being prepared for addressing the food and livelihood needs of the communities. The block Panchayat and Zilla Parishad have expressed their consent to support the above platform for resource management at the sub-catchment level. Successful experiment in intensification of wheat cultivation have been conducted in Bajira. Further experiments with mandua (foxtail millet), rajma (red kidney beans) are planned. The goal is improved livelihoods and food security.

During the course of project implementation, PSI got into partnership with academic and research institutions like Central Soil and Water Conservation Research and Training Institute, Dehradun; Indian Institute of Remote Sensing, Dehradun; National Institute of Hydrology, Roorkee, India; Indian Institute of Technology, Kharagpur; Indian Institute of Technology, Roorkee, and Uttarakhand Space Application Centre, Dehradun, India for scientific inputs regarding soil fertility studies, GIS based studies and hydrological studies. This led into the capacity building of its own personnel in various areas.

The project also gave the opportunity to PSI to work in collaboration with partners like (1) International Water Management Institute, Nepal, (2) Stockholm Environment Institute, United Kingdom, (3) Department Of Irrigation, Nepal, (4) Institute of Water and Human Resource Development, Kathmandu, Nepal,. Each of the partners had different but significant roles towards achieving the project goal and objectives and PSI's project team was enriched by its interactions with these partners.

Recommendations (1-2 pp.) – *for research, extension, policy, institutions…*

Recommendations:

1. Policies
   - Need of workshops for steering committee to develop TOR for action plan in National Water Plan is necessary
   - Find out what is already there in previous research findings; recommendations etc. and use that information should be fed at policies and plans.
   - Contradictions between different policies, legal acts and strategies of different sectors need to be removed.
   - Development of mechanisms for integrating upstream and downstream activities.
   - Review of policy and acts required to facilitate integrated natural resource management.
   - Policy should strengthen implementation, monitoring and evaluation development tool
2. Institutions
   - Strengthening of the role of lead agency for integrated natural resource management required.
   - Decentralised institutions at watershed level and empowerment of these institutions.
   - Recognition of informal institutional practices by government agencies.
   - Understand the linkages between various institutions to coordinate their activities.
   - Strengthening local institutions through legal measures and policy backup.
   - Reorganisation of organizational structure to facilitate integration.
3. Resource and Linkages
   - Information sharing among government organizations should be promoted.
   - Stakeholders should be encouraged for sustainable land management.
   - Equity and benefit sharing mechanism needs to be developed for strengthening upstream and downstream linkages.
   - More research towards understanding of natural management practices by locals is required
   - Government agencies link up their local activities with the activities of platform or other sub-committee for their sustenance.
   - Government should allocate annual budget for sub-basin committees.
4. Livelihood
   - Link sub-basin committee activities to livelihood.
   - Synergistic integration of five capital assets at policy level is necessary.
5. Research
   - Study on the distribution of water to different sectors.
   - Science based research need to be promoted in policies.

Publications[9]

Reports

1. A Review of Policy, Legal and Institutional Provisions for the Management of Natural Resources (of Nepal and India).
2. Community Based Integrated Natural Resource Management: An Introductory review of literature. (By Dr. Sabita Thapa, SEI)
3. Rights of Access and the Management of Irrigation Systems: Two Case Studies Examining Social Equity in Begnas Watershed, Kaski District (By Joe Hill, Ph.D Intern from East Anglia University, UK)
4. Institutional Study of Begnas Catchment. (By Dhruba Pant and Pratima Shrestha, IWMI-Nepal)
5. Begnas Tal Livelihood Study. (By Dr. Sabita Thapa and John Soussan, SEI)
6. "Application of Hydrological Similar Catchment Concept for the Hydrological Modeling of the Begnas Lake watershed." (By IOE student, Dhruba Shrestha, under research grant from the project for M. Sc. thesis)
7. A preliminary report on household survey of three communities in Upper and Lower stream Begnas Watershed Area (Dudkhola microwatershed). (By Binod Bhatta, IWHRD)
8. Assessment of LOCAL Resources Base and its Management in Relation to Local Livelihoods in the BEGNAS – RUPA Catchment. (By Dr. Umesh Nath Parajuli and Dr. Khem Raj Sharma).
9. Network Analysis of Stakeholders of Begnas Watershed (Dr. Dhruba Pant and Ms. Pratima Shrestha, IWMI,Nepal)
10. Landuse Change of Begnas Basin from 1958 to 1996. (Dr. Umesh Raj Parajuli, IWHRD).
11. Computing Canal Flows In The Begnas Irrigation System For Assessing Equity In Resources (Water) Distribution.
12. Sediment and NPK analysis of Inlet of Begnas Lake. (By Pratima Shrestha)
13. A Dissertation on "Women's Coping Strategies As A Result Of Male Out-Migration: A Case Study of Nepali Community". Draft. Ms. Anupa Lamichhane. AIT.
14. Study of Forest of Begnas Catchment. Ongoing. (Dr. Binod Bhatt)

Papers

1. Institutional Context of Resource Management: Stakeholder Perspective in Begnas Watershed area in Nepal. February 2007 (Dhruba Pant, Umesh Nath Parajuli, Sabita Thapa, Khem Raj Sharma, Binod Bhatta and Pratima Shrestha).
2. **"**Multi-stakeholder Perspective in Catchment Management –Case from Nepal". August, 2007. Dhruba Pant, Umesh Nath Parajuli, Khem Raj Sharma, Binod Bhatt, Sabita Thapa, John Soussan. 10th River Symposium. Australia**.**
3. Community based integrated natural resource management: Policy options and areas of intervention. October

[9] project publications and other tangible outputs (e.g. software; training materials; survey materials); include to links to websites where these materials are available

2007. Sabita Thapa, John Soussan, Dhruba Pant, Umesh Nath Parajuli, Khem Raj Sharma, Binod Bhatt. Himalayan Policy Research Conference, University of Wisconsin.

4. "Livelihood Transitions in Hilaungad Watershed", June 2008, R.Chopra, D.Sen, S.Bharadwaj and H.Bharti, People's Science Institute, Dehra Doon.

5. "Disowned Institutions in Hilaungad watershed", June 2008, D.Sen, R.Chopra, S.Bharadwaj & D.Negi, People's Science Institute, Dehra Doon.

6. "Resource Availabilities and Gaps in Hilaungad Watershed", July 2008, D. Sen, R. Chopra, S. Bhardwaj, A. SharmaaAnd S.N. Goswami

- Bibliography - *list of references cited in the report other than project publications*

---------- (2007): Annual Report, Uttaranchal Livestock Development Board (2006-7).

……..…….(2006): From Hariyali to Neeranchal, Report of the Technical Committee on Watershed Programmes in India, Department of Land Resources, Ministry of Rural Development (GoI), New Delhi.

---------- : (2005): Letter No. 338/11-2004/2005, Principal Secretary and Commissioner, Government of Uttarakhand, March 2005.

……. (1978): Nutritive Values of Indian Cattle Feeds and the Feeding of Animals, ICAR Publication.

----------: '*Nigam Va Sansthan Se Chini Gramin Peyjal Yojna*ein', Dainik Jagran, Dehradun Edition, April 21, 2007

----------: Payjal Sansadhan Vikas Nigam, Dehradun.

----------: Primary Census Report-2001, Census of India 2001, Office of the Registrar General of India, GoI, New Delhi.

---------- (2008): Promoting SRI Dhan in Uttarakhand (Under Farm Innovation and Promotion Fund)-Final Report submitted to NABARD, Dehradun, People's Science Institute, Dehra Doon.

---------- (2005): Reading Material for ASHA (Accredited Social Health Activist), Book No.1, NRHM.

----------: Garhwal and Kumaon Water Act 1975.

----------: The Constitution (Seventy-Third Amendment) Act, 1992, as passed by Lok Sabha on 22nd December, 1992.

---------- (2007): Understanding the Impacts - An Impact Assessment Report of Nine Watersheds, People's Science Institute, Dehradun.

A. Agrawal & S. Narain (1997): Dying Wisdom, Centre for Science & Environment, New Delhi.

B.R. Pant (1996): "The Geographical study of scheduled castes population in Uttarakhand Himalaya (India)", in The Indonesian Journal of Geography, 28(7.

C. Agarwal, S. Tiwari, M. Borgoyary, A. Acharya & E. Morrison (2007): Fair deal watershed services in India, International Institute for Environment & Development (UK), London.

C. M. Singh & K.K. Katoch (2000): "Management of Hill and Mountain Agro Ecosystem", in Natural Resource Management in India, J.P.S. Yadav & G.B. Singh (Eds), Souvenir volume International Conference on Natural Resource Management, New Delhi, February 14-18, 2000.

D.Sen, S.P. Chaturvedi, H.Bharti & R. Bansal (2007): "Promoting System of Rice Intensification (SRI) Among Marginal Farmers of Uttarakhand and Himachal Pradesh", Paper presented at the Second National Symposium on System of Rice Intensification (SRI) in India, Agartala, October 2007.

D.Singh, P.K. Chhonkar & R.N. Pandey: Soil Plant Water Analysis: A Methods Manual, Indian Agricultural Research Institute, New Delhi (undated).

J.Bandopadhyay (1992): "The Himalaya: Prospects for and Constraints on Sustainable Development", in P. B. Stone (editor), State of the World Mountain A Global report, Zed Books, London.

J. D.Ives and B.Messerli (1989): The Himalayan Dilemma, Routledge, London.

J.K.Galbraith (1979): The Nature of Mass Poverty, Harvard University Press, Cambridge (Mass), p120.

J.M.Baker (1997): "Common Property Resource Theory and the Kuhl Irrigation Systems of Himachal Pradesh, India", Human Organization, v.56, n.2.

J. M. Baker (2005): The Kuhls of Kangra: Community-Managed Irrigation in the Western Himalaya,University of Washington Press Seattle and London.

J.S.Singh (1998): "Sustainable development: An ecological viewpoint", in Perspectives for Planning and Development in Northeast India, Himavikas, No. 11, G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal, Almora, pp.5–16.

J.S. Singh and S.P. Singh (1998): Forests of Himalaya: Structure, Functioning and Impact of Man, Gyanodaya Prakashan, Nainital.

K. Banskota (2005): "New Opportunities for Mountain Economies", ICIMOD Newsletter, No. 48

Land Records (2004): Dept. of Revenue and Land Record, Dist, Rudryaprayag, Uttarakhand.

M. K. Gupta (2007): "Promoting Self Sufficiency through Carbon Credits from Conservation and Management of Forests", in a research paper submitted to Clark University, Worcester, Massachusetts, USA.

M. Bell (2008): "Fresh Heights", TIME, May 29, 2008.

M.S.Swaminathan Research Foundation (2001): Food Insecurity Atlas of Rural India, prepared jointly by MS Swaminathan Research Foundation and World Food Programme (WFP).

NCAER (2007): Uttaranchal Development Report (Draft), NCAER, New Delhi, 2007.

N.S.Jodha (1991): "Agricultural Growth and Sustainability - Perspective and Experiences from the Himalayas", in Stephen A.Vosti *et al* (Editor), Agricultural Sustainability, Growth and Poverty Alleviation: Issues and Policies, Proceedings of the Conference held from 23-27 September 1991, Germany.

P.K. Khosla & D.K. Khurana (1996): "Agroforestry for Sustainable Development in the Himalayas: Potential and Scope", in

Farming Systems in the Himalayas, Ministry of Agriculture, GoI, New Delhi.

Press Information Bureau (2007): "Poverty Estimates for 2004-05", GoI, New Delhi, March 2007.

R. Chopra (2003): Survival Lessons: Himalayan Jal Sanskriti, People's Science Institute, Dehra Doon.

R. Chopra (2003): "Uttarakhand's Draft water Policy: A visionless document", People's Science Institute, Dehra Doon (Unpublished).

R.Chopra & S.Passi (2002): "Where Are The Empty Thalis In Uttarakhand: A District Level Food Insecurity Analysis", paper presented at the Uttarakhand State Consultation on Food Security, Dehra Doon, World Food Programme, April 2002.

S .Bhatt (2007): "*Palayan say 35 hazaar jot huyee kum*", Amar Ujala, Dehra Doon edition, May 31, 2007 (In Hindi)

Sheena & Sharma P.N. (1998): Ripples of the Society, GPF-FAO, Gandhi Peace Foundation, New Delhi.

S.J.Phansalkar (2003): Livelihoods: Promoting Livelihoods Enhancement, Sir Dorabji Tata Trust, Mumbai.

Survey of India (1964): Topographical Sheet No. 53, J/15.

The Uttaranchal Panchayati Forest Rules (2001).

U. Pandey and J.S.Singh. 1984. Energy-flow relationships between agro- and forest ecosystem in Central Himalaya. Environmental Conservation, 11, 45–53.

Uttarakhand Rural Development Survey, PSI, Dehra Doon, 1998-99 (unpublished)

V. K. Mishra (2004): "Van Panchayats in Uttaranchal, India" (unpublished)

V. Upadhyay (2006): "Water-Forest Management, Law and Policy in Uttaranchal: Issues, Constraints, Opportunities", People's Science Institute, Dehra Doon (Unpublished)

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Appendices

– include copies of Abstracts of all key publications

1. Paper submitted in IWMI Tata Programme

Institutional Context of Resource Management: Stakeholder Perspective in Begnas Watershed area in Nepal

Dhruba Pant, Umesh Nath Parajuli, Sabita Thapa, Khem Raj Sharma, Binod Bhatta and Pratima Shrestha

Forest Users Group (FUGs), Water User Groups (WUGs), Fishers group, Boaters group are the institutions functioning in Begnas catchment to help organize users to facilitate users' access for the sustained use of available water and forest resources for the benefit of their member households. These users are dependent on these resources for their livelihood. FUGs are formal as they are registered with the government agencies with their constitutions. Begnas Irrigation System on the lower catchment of Begnas watershed, which is Agency-Farmer Managed Irrigation System (A-FMIS) is formal, as it is registered with the government agency and has written constitution. Beside, it manages the irrigation system jointly with Irrigation Directorate of Government of Nepal (GON). Likewise, the fishers group and boaters group at the lower catchment are also formal. However, users' organizations of Farmers' Managed Irrigation Systems at upper catchment of the watershed are informal as they are not registered with government agencies. These institutions are contributing to livelihood opportunities and reducing the vulnerability of poor rural people through their involvement in resource management. However, these institutions have not been able to address the problems of resource management in an integrated way. Integrating the activities of various local level institutions like WUG, FUG and other water users institutions, could help in overcoming the problems of resource management. Community level household survey and focus group discussion with various stakeholders were carried out to understand users' role and their perspective in integrated resource management in relation to improved livelihood. The study findings shows that the stake of different resource users varies as the benefit they derive from the resources are not the same. In practice, all the users' organizations are working in their own way without consultation with other user in resource management. Therefore, these institutions have not been able to address the problems of resource management in an integrated way. The preliminary finding suggest that interaction between various local level institutions like WUG, FUG and other local institutions, could help in maximizing the benefit from resource management through integrated approach. It was also found that they all wish to work in integrated way with other users group also. But they do not know how? It seems that a platform creation could be helpful for these user groups by providing opportunity to express their view, interests and issues. The up-scaling of their institutional role to look at resource management from catchment perspective seems to be useful through appropriate intervention from outside.

2. Newsletter article on CPWF news

A platform for improved natural resource management, Nepal

Ms. Pratima Shrestha and Dr. Dhruba Pant

In no other place do the mountains rise so quickly than in the Pokhara district in Nepal. Within 30 km the land climbs from 1000 m to 8000 m above sea level. This gives rise to a highly diverse landscape of deep canyons, high forested mountains and wild rivers. It is here that CPWF researchers from Project 23, 'Linking Community-Based Water and Forest Management for Sustainable Livelihoods of the Poor in Fragile Upper Catchments of the Indo-Gangetic Basin,' are conducting much needed research into strengthening multi-stakeholder resource management.

In the Begnas watershed of the Pokhara district, CPWF researchers have outlined three major barriers to effective natural resource management. These are (1) a lack of clear ownership over water resources among lake users to enable common property resource management and development, (2) inequitable access to water resources, especially for users at the tail end of irrigation and (3) a lack of established linkages between upstream forest and irrigation users and downstream lake users.

To address these barriers, CPWF researchers created "Platform", a meeting place to bring together water and forest users in order to achieve increased integration in management of these resources. Project leader, Dhruba Pant, helped to develop Platform.

'Platform is a venue where resource users and stakeholders are brought together to discuss the issues related to resource management and it is believed that this process will contribute to the users and other stakeholders understanding and thinking on integrated resource management.' Says Dhruba

Platform was constructed after researchers identified lack of communication and information sharing between the resource users of the Begnas Watershed. The mechanism is designed to breach communication gaps.

'Through their involvement in Platform, stakeholders are now able to effectively communicate perspectives and identify avenues for change in order to improve forest and water management in the region.' Dhruba observed 'Stakeholders were enthusiastic to learn about the resource management practices and (have) suggested some follow-up studies'

Community members participating in Platform identified a need to address the issue of ownership of a lake that provides water for irrigation and fish farming. Project researchers are now shifting their efforts to facilitate discussion between government agencies, local elected bodies and local communities to develop a mechanism to ensure that users take collective responsibility for management of the lake.

CPWF researchers are also supporting local residents in overcoming the widespread problems of water scarcity. Despite receiving average rainfall of 3000mm in upper watershed and 2000 mm in valley floor of Begnas Catchment per year, residents are still feeling the pressures of not enough water. Here, water scarcity has eventuated due to the lack of financial and technical support for much needed water storage devices. To address this issue, CPWF researchers have collaborated with the International Water Management Institute's (IWMI) Nepal office and the Food and Agricultural Organization's (FAO) International Programme for Technology and Research in Irrigation and Drainage (IPTRID), and the International Development Enterprises (IDE) Nepal. The Department of Irrigation (DOI), Government of Nepal is also on board to implement a Multiple Use System (MUS) of water storage.

Such strong collaboration saw rapid implementation of researchers' recommendations to install a 1500 litre storage device to service 31 households in one village with water for domestic and productive uses. This has contributed to improved water productivity in the upper catchments through increasing vegetable production and encouraging better hygiene at the household level. Requests for similar structures have been received from nearby villages.

Researchers intend to build on the lessons learnt through Platform and the strong partnerships they have developed with stakeholders by continuing an in-depth study into the economic characteristics of the region, along with a policy study into the existing water resource ownership issues. This, combined with constant monitoring of water flows, volumes and usage patterns provides a strong knowledge base to support the improved management of natural resources in Nepal.

3. Abstract Submitted for Himalayan Policy Research Conference

Title of the Paper:
Community based integrated natural resource management: Policy options and areas of intervention

Sabita Thapa, John Soussan, Dhruba Pant, Umesh Nath Parajuli, Khem Raj Sharma, Binod Bhatta

The paper takes in stock of a research project on integrated water and forest management in Begnas watershed in Nepal. The paper demonstrates that while the results on the ground has been laudable, much more efforts are needed to consolidate the gains and to seize the window of opportunity provided by the strongly and rapidly evolving community-based natural resource management institutions in the country that can contribute positive policy reform, build synergy and enhance the capacities of local institutions communities to pursue integrated resource management for unleashing the country's potentials to fulfill and exceed MDG targets and reduce poverty.

From the information obtained through action research, the paper explains that while abject poverty and chronic deprivations are visible, community-resource management equation has been rather favorable. Despite the positives of community-based institutions, their strong emergence has neither resulted in consistent poverty reduction nor has created the fundamentals for the euity-based institutional development. Nepal was also under armed-conflict for more than a decade until recently which seriously undermined community based institutions' efforts on poverty reduction, economic and social progress. Furthermore, the tradition of isolated community driven initiatives or institutional arrangement continues to override the overall essence carried by integrated community-led natural resource management. This clearly demands a re-think on long-held tradition of isolated community-based management actions for natural resources such as water and forest resources. It is also a pointer to the urgency of strengthening local government institutions and local community institutions to identify, plan and implement local level management actions for reducing inter-institutional disparities for achievement of poverty reduction targets and achievement of MDG outcomes.

Abstract River Symposium, Brisbane, Australia

Multi-stakeholder Perspective in Catchment Management –Case from Nepal

Dhruba Pant, Sabita Thapa, Umesh Nath Parajuli, Khem Raj Sharma, Binod Bhatta, Pratima Shrestha

Executive Summary

Users' organizations at local level play an important role for the management of water and forest resources by organizing the users in the management of resources. A study carried out in Nepal focuses on institutional arrangement between forest and water resource users in Begnas Watershed of Indo-gangetic basin, Nepal. This study attempts to understand the dynamics of resource use. The information was collected through checklist in focused group discussion with different users group of water and forest. Forest Users Groups (FUGs) in the upstream are protecting the environment through Community Forest activities which has helped in protecting the lake environment downstream and users' access to the sustained use of forest resources. The WUG at downstream is more diverse as it includes irrigation users, fishermen and boaters groups whose livelihood is dependent on water in the lake. However, the Water Users Groups have different level of interest and the benefit they derive from the lake is also varied. Therefore, these institutions have not been able to address the problems of resource management in an integrated

way. Beside, the local level elected institutions also have interest in collecting taxes from the users of these resources but their contributions in overall management is negligible. The downstream irrigation groups and the fishers group are the immediate and major beneficiaries of the lake. The irrigation group and the fisheries group are using the water of lake and have benefited with agriculture and fish farming respectively. However, benefit distribution among the fisher group is more equitable than among the irrigation users group because of co-operative arrangement. But there is no relation among various users in the management process of natural resource. In practice, all the users' organizations are working in their own way without consultation with other user in resource management. The preliminary finding suggest that interaction between various local level institutions like WUG, FUG and other local institutions, could help in maximizing the benefit from resource management through integrated approach. It was also found that they all wish to work in integrated way with other users group also. But they do not know how? It seems that a platform creation could be helpful for these user groups by providing opportunity to express their view, interests and issues. The up-scaling of their institutional role to look at resource management from catchment perspective seems to be useful through appropriate intervention from outside.

Format

The standard format for all CPWF reports and papers should be used – see Appendix 2.

Submission

The Project Report should be submitted to the Project Manager together with the rest of the Completion Report, with a copy to the respective Basin Coordinator (BC) and Theme Leader (TL) or Basin Focal Project Leader (BFPL).

Review

The TL and BC will review the Project Report, and may request revision to improve scientific content and/or presentation. **The TL or BFPL will be responsible for final acceptance of the report, for informing the CPWF Project Manager of its acceptance, and for forwarding the approved version to the CPWF Communications Coordinator for publication.**

Documents reviewed in Nepal

i. *Irrigation Policy 1992 (First Amendment 1997) and Irrigation Policy 2003*
ii. *The National Code 1963*
iii. *The Water Resource Act 1992 and The Water Resources Regulations 2000 (Revised in 2004)*
iv. *National Water Supply Sector Policy 1998 (NWSSP)*
v. *The Electricity Act 1992 and The Electricity Regulations 1993*
vi. *Water Resources Strategy (WRS) 2002*
vii. *National Water Plan (NWP) 2005*
viii. *National Forestry Policy and Plan 1976*
ix. *Master Plan for Forestry Sector (MPFS) 1989*
x. *Revised Forestry Sector Policy 2000*
xi. *The Forest Act 1993 and The Forest Regulations 1995*
xii. *National Parks and Wildlife Conservation Act 1973*
xiii. *The "Environment Protection Act 1997" and Environment Protection Regulation 1998"*
xiv. *Agriculture Perspective Plan (APP) 1995*
xv. *Local Self-Governance Act (LSGA) 1999 and Local SelfpGovernance Regulation (LSGR) 1999*

Documents reviewed in India

The National Law and Policy Context on Water
The Constitutional Mandate on Water Rights
Water Rights for Participatory Management
Recent Central Government Initiatives and Implications in Legal Policy
'Swajaldhara', Haryali and Some legal - Institutional Issues
Landmarks in State Water Law in pre-Independence Period
Nayabad and Wasteland Grant Rules
Kumaoan Water Rules 1917
Kumoan Water Rules of 1930
Landmarks in State Water Law in post-Independence Period
Kumaoan and Uttarakhand Zamindari Abolition Act 1950
The Uttarakhand Bhoomi Evam Jal Sanrakshan Adhiniyam, 1963
Kumaon and Garhwal Water (Collection Retention and Distribution) Act 1975
The Uttarakhand Water Supply and Sewerage Act, 1975

Emerging Directions in Water Law and Policy
Rural Water Supply under 'Swajal' –Institutional Design, 73rd Amendment Imperative and some Questions
Proposed new Ground Water Law and Participatory Management
Formal Irrigation Associations: Why and in What Form?

The Draft State Water Policy: Some Fundamental Assertions Critically Examined
Water as a Basic Human Right: Its meaning for 4734 'Bastis'!

Raising the Ownership Question: Need and Validity
Traditional Water Resources, the Customary Rights Question and the Arbitrary provision in the 1975 Act
Water Conflicts Resolution Mechanism

The National Law and Policy Context on Forest
The National Forest Policy, 1988
The Forestry Legal Regime: A Framework for Analysis

Customary Forest Rights as Function of 'Shifting' Forest Lands
The Forest Council Rules 1931 and 1976

A New Era For Van Panchayats
Rapid formation of Van Panchayats
Introduction of Village Forest Joint Management Rules 1997
State Forest Policy 2001
The Uttarakhand Panchayati Forest Rules 2001
Van Panchayats' Legal Status:Gram Panchayat Committee OR
Village Forest Management Committee?
Van Panchayats and their Many Problems: A Brief Review
Review of Other Forest Laws
Indian Forest Act, 1927as applicable to Uttarakhand
Forests and Need for Land Use Policy
Specific laws and Rules on 'Use' of forest Produce and Forest Management
Specific laws and Rules on Conservation of Forest Resources