

Himachal Pradesh Watershed Case Study

Internal Report II

Low Base Flows and Livelihoods in India (R8171)

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PREFACE

Water is pivotal in supporting and sustaining livelihoods. India shares about 16% of the global population but it has only 4% of the world's total water resource. Currently over 10% of blocks classified by the Central Ground Water Board have been identified as being over-exploited and blocks where exploitation is beyond the critical level have been increasing at a rate of 5.5% each year. Whilst moves by the GoI since 1995 have been made towards creating common guidelines in the form of a framework for watershed development, there are concerns that legislative measures in place to protect and manage India's water resources are hindered by the lack of political and local awareness in water and land resources management, and in some cases are based upon ingrained and incorrect scientific understanding of water resource management and land use.

The project 'Low Base Flows and Livelihoods in India' (LOWFLOWS) seeks to highlight the importance of taking into account both supply and demand issues in land and water policy formulation and implementation, and improving departmental co-ordination between the main policy actors by developing a framework for monitoring and evaluation. The project is focussed on the interface of forestry and watershed policies in India with particular attention to the States of Himachal Pradesh and Madhya Pradesh. This case study provides an introduction to the policy issues that need to be addressed in the State of Himachal Pradesh.

The objective of this case study is to present an initial assessment of the current land and watershed policies, strategies and related land and water problems in Himachal Pradesh. The study takes an in-depth look at watershed development in the Hamirpur district with particular attention to the perceptions about water, forest and watershed development of stakeholders at various levels. This will provide the basis for recommending changes in policy, developed through the course of the project LOWFLOWS, and strategies for policy implementation linked to watershed development and land/water resource issues by the Government of India (GoI), donor agencies and related NGOs.

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Abbreviations & Acronyms

BDO	Block Development Officer
DoA	Department of Agriculture
DDP	Desert Development Programme
DPAP	Drought Prone Area Programme
DRDA	District Rural Development Agency
DWS	Drinking Water Supply
FD	Forest Department
FSR	Himachal Pradesh Forest Sector Review
GIS	Geographical Information System
GTZ	German Agency for Technical Cooperation
HH	Household
HP	Himachal Pradesh
IPH	Irrigation & Public Health Department
IRDP	Integrated Rural Development Programme
IWDP	Integrated Wastelands Development Programme
MLA	Member of Legislative Assembly
MoRD	Ministry of Rural Development
NGO	Non-governmental Organisation
NIT	National Institute of Technology
PFM	Participatory Forest Management
PIA	Project Implementing Agency
PRA	Participatory Rural Appraisal
PRI	Panchayati Raj Institution
Qtl	Quintal
SC	Scheduled Caste
SHG	Self Help Group
SVY	Sanjhi Van Yojna
UG	User Group
VDC	Village Development Committee
VFDC	Village Forest Development Committee
WA	Watershed Association
WC	Watershed Committee
WII	Winrock International India
WSD	Watershed Development

1. LOW BASE FLOWS & LIVELIHOODS – HIMACHAL PRADESH CASE STUDY

1.1 Background

Realising the importance of water as pivotal in supporting and sustaining livelihoods and the fact that India shares about 16% of the global population but has only 4% of the world's total water resource, the Government of India has made moves since 1995 towards creating common guidelines in the form of a framework for watershed development. However, there are concerns that legislative measures in place to protect and manage India's water resources are hindered by the lack of political and local awareness on water and land resources management, and in some cases are based upon ingrained and incorrect scientific understanding of water resource management and land use.

The project 'Low Base Flows and Livelihoods in India' (R8171) focuses on improving scientific understanding of forests – water flows interactions, developing decision making tools for equitable allocation of water in watersheds and linking this improved understanding to policy through the development of GIS dissemination tools and direct interaction with institutions and policy makers. Two Indian states, Madhya Pradesh and

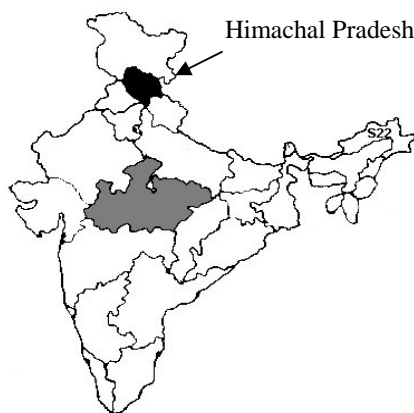


Figure 1: Location of Himachal Pradesh within India

Himachal Pradesh, have been identified for detailed study (Figure 1). Within the project framework, this report, prepared by Winrock International India¹, is the Himachal Pradesh component of the 'Sustainable Livelihoods and Perceptions Study'. The report aims to gather baseline socio-economic data and institutional perceptions from watersheds selected under this project. The analysis of this data provides key indicators for use in the GIS model being developed under this project and identifies gaps and modifications required in land and water management and in policy formulation and implementation.

This report has been divided into six sections and an appendix. The first section provides the background to the study, a brief overview of the methods used for data collection and the geographic focus of the study. The second section provides an insight into watershed development in Himachal Pradesh and more specifically in the study area. The third section deals with the key characteristics of the villages studied and the existing relationships between the livelihoods of the local communities and land, water and forest resources. The fourth section provides an insight into perceptions of the different

¹ With support from the Centre of Land Use and Water Resource Research, University of Newcastle.

stakeholders on forests – water – watershed – livelihood linkages. Section five maps the roles and dynamics of the institutional stakeholders and the final section covers the conclusions drawn from this study and provides a list of key learning. In the appendix the methodology in detail and the instruments used for data collection are provided.

1.2 Methods & Approach

The methods and approach (discussed in detail in the Appendix) used for data collection involved identifying two villages within a micro-watershed² where treatment activities have been undertaken and a third village, within the same area, where no treatment activities have been implemented as yet. A questionnaire was administered to all the households within each of these villages and focus group discussions were held with the different sections within the community and with the village and watershed level institutions. The data collection process was carried out by Winrock International India (WII) professionals and facilitated by a local NGO, Sandesh, which had done some watershed development work in the area and by the National Institute of Technology, Hamirpur. Semi-structured interviews were held with the various government line departments involved in land and water management. Precautions were taken to reduce subjectivity in data collection. These included, data collection by WII professionals, preparing checklists and a questionnaire that had open-ended queries and by double-checking the information collected through the questionnaires in the focus group discussions.

1.3 Geographic Focus

Himachal Pradesh (HP) is a mountainous Himalayan state situated in the North West corner of India (Figure 1). It constitutes a major natural watershed for the entire North India region. All of HP forms the watersheds of four major tributaries of the river Indus (the Chenab, Ravi, Beas and Sutlej) and of the river Yamuna that feeds into the Ganges. Within HP a watershed in the district of Hamirpur was selected for detailed study. Hamirpur district of Himachal Pradesh (Figure 2) is located between latitudes 31 degrees 25' and 31 degrees 55'N and longitudes 76 degrees 16' and 76 degrees 43' E at the foothills of the Himalayas and within the Shivalik Hills. It occupies an area of 1,118 sq. km. and is located in the southwestern part of the state. It has a population of 369,128 with a population density of 321 persons per sq. km (Census report 1991). It is the smallest but the most densely populated district of Himachal Pradesh. The



Figure 2: District of Hamirpur in Himachal Pradesh (encircled)

² A micro-watershed covers an area of around 500 hectares (5km²).

climate in the district is sub humid and tropical with temperatures ranging from 5 degrees to 37 degrees centigrade and an average annual rainfall of 1400 mm. The altitude in the area varies from 375m to 1200m. Most of the area is represented by a rolling topography, generally with narrow valleys.

Within Hamirpur district a milli-watershed³, known as Salasi Khud, falling within Hamirpur Block, was selected. The Salasi Khud milli-watershed comprises of 11 micro-watersheds of which one is the Chabutra Nullah I. Within this micro-watershed three villages: Banal, Chowki and Pastal were studied in detail (Figure 3). This pilot village study was later followed up by comprehensive survey that covered all the villages within the milli-watershed. The socio-economic data from all these villages was incorporated in the GIS tool.

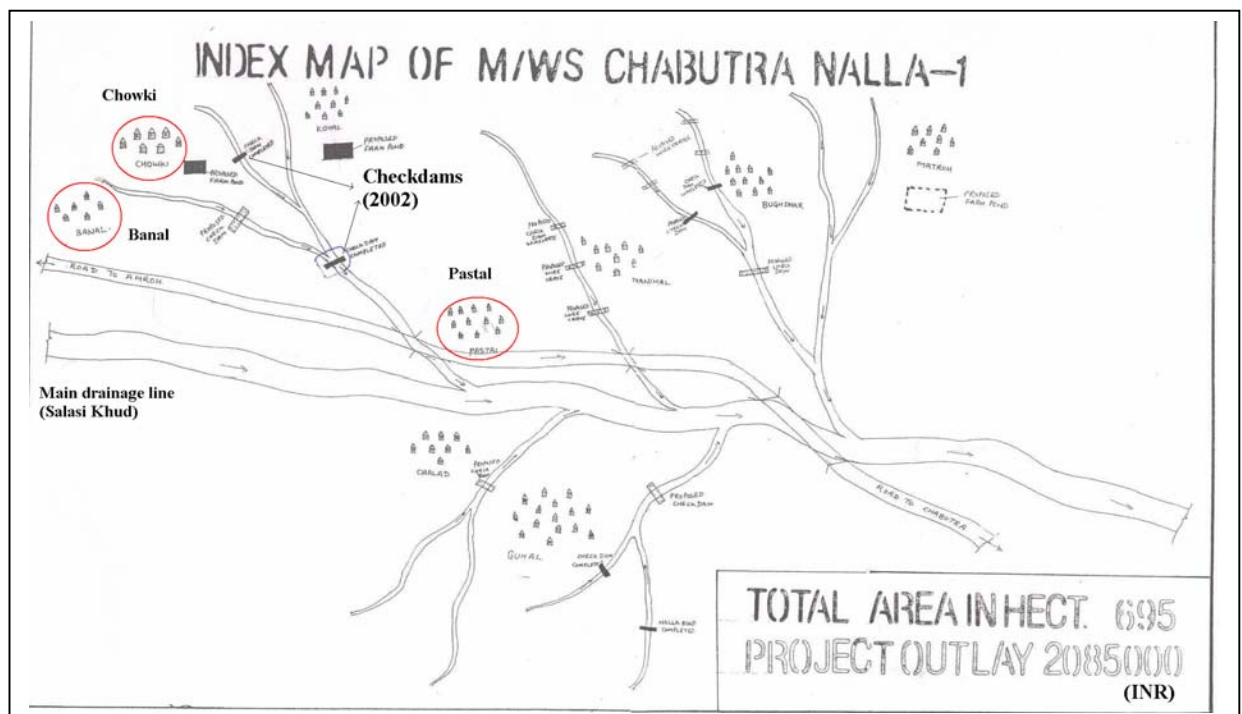


Figure 3: Location of study villages within Chabutra Nullah I

2. WATERSHED DEVELOPMENT IN HIMACHAL PRADESH

2.1 An Overview

The history of watershed development (WSD) in this state follows the trend of watershed development in India itself i.e. from government regulation to a more participatory

³ Typically a milli-watershed covers an area of around 5000 hectares (50 km²). Several micro-watersheds make up a milli-watershed.

approach. Apart from state sponsored schemes for watershed rehabilitation works in HP that have been running from 1970s onwards there are also centrally sponsored schemes for watershed development activities in the state. Schemes under which the government of HP receives central assistance through the Ministry of Rural Development (MoRD) are the Drought Prone Area Programme (DPAP), the Desert Development Programme (DDP) and the Integrated Wastelands Development Programme (IWDP). These watershed development programmes are being implemented with the aim of promoting economic development of village communities directly or indirectly, mitigating adverse effects of droughts and ecological restoration. These programmes are being executed through the District Rural Development Agency (DRDA) at the district level, a Project Implementing Agency (PIA) at the level of the micro-watershed, and Watershed Committees (WCs) at the village level. Apart from these, with forest lands accounting for over two-third's of the state's total land area, the protection work done by the HP Forest Department itself constitutes a large part of the watershed protection activities carried out in the state.

Besides government supported schemes for watershed development, there are two major donor aided watershed protection and development projects that are currently underway in HP. These are the World Bank supported *Integrated Watershed Development Project*, popularly referred to as the Kandi Project and the *Indo-German Changar Eco-Development Project* which is supported by GTZ.

The policy context of watershed development in this state derives from the recently formulated Draft State Water Policy in 2002. While recognizing the growing demand for water in diverse urban and rural sectors in HP and its increasing scarcity, the draft policy calls for an integrated, multidisciplinary and participatory approach in which the primary consideration is given to maintaining the environmental quality and the ecological balance of the state. It also acknowledges the role of forests in providing watershed services, in flood control, soil conservation and drought management, and makes a case for promoting watershed management through catchment area treatment, preservation and increase of forests and the preservation of alpine pastures.

The Draft State Water Policy also acknowledges that compensatory provisions for watershed management are not being adequately carried out by the present system of catchment area treatment, and that a more participatory process which has the complete involvement of the local communities has to be developed. The role of the forest department is also acknowledged in the document in playing a crucial role in watershed protection and development, firstly by protecting forests in upper catchment areas and also by undertaking soil and water conservation and watershed development works on degraded forest lands as part of its regular ongoing forestry activities.

The practice on ground however seems to be different as the ministries which are responsible for managing watershed development works lack inter-departmental coordination at the state level. Also despite the shift to participatory practices the level of awareness amongst people is still very low about the benefits of watershed development nor do they have incentives to contribute in the process.

2.2 Watershed Development in Hamirpur District

In Hamirpur, watershed development activities fall under the Integrated Wastelands Development Project (IWDP II) scheme that covers the milli-watersheds Salasi Khud and Bakkad Khud. The project implementing agency of the former is the Block Development Officer (BDO) Hamirpur and that of the latter the BDO, Sujanpur. The District Rural Development Agency (DRDA) initiated watershed development activities in the Salasi Khud milli-watershed in 2001. The main objectives of the IWDP programme are to develop non-forest wastelands through the holistic development of watersheds. It aims at checking land degradation, putting wastelands to sustainable use and increasing biomass availability - especially fuelwood and fodder. The scheme strives to increase rural employment and to ensure people's participation in wasteland development at all stages.

Watershed development activities incorporate three main components. These are:

1. Training- includes training of all persons involved in the implementation of the watershed programme including the village communities.
2. Community Organisation – activities such as PRA exercises, awareness camps, exposure visits and formation of Self Help Groups (SHG) and User Groups (UGs) are conducted.
3. Watershed Treatment/Development Works- Some activities taken up under these are:
 - Land development including *in situ* measures and soil conservation
 - Drainage line treatment by vegetative and engineering structures
 - Development of small water harvesting structures such as check dams, water percolation tanks, ponds etc.

2.3 Structure and Implementation of the Watershed Project in Hamirpur District

Keeping in tune with the current thought on watershed development in India, people's participation is the main requirement for its planning and implementation and is the most important element in this approach. The same is true for watershed activities in Hamirpur. In this region watershed development has been planned keeping in view three physical sectors: non-arable land (which includes forestland, grazing land and barren land), arable or cultivated land, and the drainage area comprising of networks of natural drainage lines and water bodies.

A watershed project has been delineated into various micro watersheds of about 500 ha. each of treatable land for various soil conservation measures, promoting sustainable production systems for arable and non-arable lands and also to improve the socioeconomic status of the watershed community.

The WSD programme envisages people's participation in the form of an association and its functional groups namely, Watershed Association (WA) and Watershed Committee

(WC). These have been formed in each micro-watershed. A watershed area consisting of 12-13 micro-watersheds has been allotted to one or more PIAs. Block Development Officers (and sometimes non-governmental organizations) designated as PIAs have been provided with a multidisciplinary team of 4 specialists, one each from the disciplines of forestry/plant sciences, animal sciences, civil/agricultural engineering and social sciences. Each WC has a Chairperson, a Secretary and a Treasurer for convening watershed meetings and maintaining the records and accounts of meetings and activities undertaken. Self Help Groups have also been formed at the village level.

2.4 Watershed Development in Chabutra Nullah I

Socio-economic data was collected for three villages within Chabutra Nullah I. These villages are Banal, Chowki and Pastal. Some watershed treatment activities have been undertaken in Banal and Chowki and Pastal is in a sense the “control” village where WSD works are as yet only proposed. However a note of caution that needs to be mentioned beforehand is that watershed development work in this region is only a year old.

Also, in this micro-watershed treatment activities have been minimal. Last year (2002) a few check-dams have been constructed and some plantation activities undertaken. Currently only portions of these micro-watersheds have been treated. The Department of Agriculture and the Forest Department had constructed some check dams a few years back in this area but these structures are currently totally silted up and are defunct.

Some baseline information on Chabutra Nullah I:

- The extent of Govt./Forest Land in this area is 72 ha., Community land is 102 ha and Private Land is 521 ha.
- There are 11 villages in this watershed, 1 Watershed Association, 10 Village Development Committees (VDCs) and 1 Watershed Committee (WC).
- The total number of households are 295 with a male population of 841 and 761 female, about 35 families fall under the Integrated Rural Development Programme (IRDP) category (also referred to as Below Poverty Line families)
- Although the HP Forestry Department has initiated a participatory forestry programme known as “Sanjhi Van Yojana” in 1998, in this area the programme has yet to be implemented.

The following sections outline the socio-economic profiles of the three villages undertaken in this study and present the perceptions of various stakeholders on forest-water-watershed-livelihoods linkages based on discussions with the villagers and the government line departments connected with watershed development work in Hamirpur.

3. VILLAGE CHARACTERISTICS IN CHABUTRA NULLAH I

3.1 Livelihood Profile

Baseline socio-economic data collected for the three villages of Banal, Chowki and Pastal provides a snapshot of the livelihood options, landholdings, cropping patterns and access to land (including forests) and water resources. This data was collected using a short household questionnaires and focus group discussions (FGDs). Table 1 provides a summary of the data on livelihoods collected for the three villages. These are relatively small villages with the total number of households ranging from 17 to 24. Based on the household questionnaire (covering 100% of households in all 3 villages) it was found that in terms of caste composition, the three villages were largely homogenous, that landholdings range from 0.14 to 3 acres (marginal to medium farmers) and there are few landless households in the area⁴, and that the occupational profiles across the villages are similar. The livelihood portfolio of most families has at least 2 options and some households even have 3. The most common livelihood combination is that of agriculture and wage labour, though a number of households also have members who are government / private employees. Agriculture is an important livelihood option though it is practiced primarily for subsistence and very few farmers actually sell their produce. Almost all households have some livestock, but very few generate any income through them⁵ – livestock rearing, like agriculture, is again largely a subsistence option for the people. Enlisting in the army is and has been quite a tradition for the young men in the Hamirpur area. There are a number of pensioners in the village as well – which is an important source of income.

3.2 Land & Water Use

The area is rainfed and the farmers have two cropping seasons in a year: *kharif* (rains) and *rabi* (winters). Without access to any means of irrigation the number of crops per season are also limited. The most widely cultivated crop during *kharif* is corn while some farmers do grow some paddy and pearl millet alongside. Wheat is primarily cultivated during the *rabi* season. As is generally the case in the hills, farmers have pieces of land in different parts of the village. Crops are planted on land where the soil moisture / moisture retention capacity is high enough to support crops and the other patches of land are left fallow. Grass that grows naturally on the latter is harvested as fodder for livestock.

⁴ Under the Village Common Land Act 1972, *shyamalats*, or village common lands, were taken over by the state and divided among all the landless households in the area.

⁵ The local community reported that there had been a substantial decrease in livestock holding over time due to the growing unavailability of fodder from forests. This decrease in fodder was attributed to the infestation of forest and agricultural lands by a weed, locally known as *Congressi boti*, whose seeds the people feel were introduced by the flocks of the *Gaddis*, nomadic graziers, who used to pass through their forests in the winters.

All three villages have drinking water supply schemes that have been installed by the government along with their traditional sources of water. Government schemes include lift schemes that provide public standposts and private connections, and handpumps. The traditional sources of water are *baudis* (springs), shallow dugwells and *nallahs* (watercourses). FGDs revealed that handpumps and public standposts have improved the communities' access to water and reduced the time spent in water collection since most of the *baudis* and dugwells are generally situated at some distance from the residential areas. However, handpumps are not always successful and water supply in the public standposts is time-bound and intermittent. Though the purpose of installing public standposts is to provide drinking water to the village, the people do not drink water from this source as they feel that this water is not 'clean'. Drinking water is collected from either handpumps or *baudis*. Water from public standposts is used for other domestic chores (e.g. washing) and for consumption by their livestock.

Overall, the people have had to diversify their livelihoods as, with an increasing population and greater land-fragmentation, the returns from agriculture are no longer sufficient to support them. Dependence on the government for the supply of basic amenities, including water, has increased and traditional sources are becoming backup systems.

3.3 Forest Use

The data collected from the household questionnaires showed that forests continue to be an important source of subsistence for the people. Table 2 illustrates the pattern of extraction of forest resources, land use patterns and people's perceptions on the role of forests in their lives. Forests in this area are a source for timber, fuelwood and grass for the people. With improved access to and adoption of cylindered cooking gas several households now use this as a fuel option. However, traditional stoves and fuelwood continue to be used, as the latter is viewed as a free resource. Looking at the number of households that regularly collect fuelwood for cooking and heating purposes across the three villages, it is interesting to note that in Pastal, where almost all households fall within the schedule caste category, the number is the highest (over 80% of households in this village, whereas in the of Banal and Chowki it is 29% and 41% respectively). With Banal and Chowki being predominantly *Rajput* (upper caste) villages belonging to the 'general' category, the skewed relationship between caste and dependence on forest and the socio-economic status can be considered.

However, according to discussions with the local forest department officials revealed that they feel that the communities' dependence on forests has reduced substantially over the years (e.g. cooking gas has reduced dependency on fuelwood⁶). In addition, they mentioned that 'communities are not poor and therefore are not interested in forests' thus establishing a link between poverty and dependence on forest resources. This reduction in dependency on local resources (forests) has been accompanied by a parallel increase in seeking livelihood avenues outside the village.

⁶ The data in Table 2 shows that this is not necessarily true – the case of Pastal.

Each household has timber distribution (TD) rights allotted to them by the State, which they exercise to collect regulated amounts of timber from forests for construction purposes and marriage and death ceremonies. However, currently the TD rights of several households have been frozen due to a change in the government in the past year⁷. However, timber is still extracted though unscrupulous means have to be adopted at times.

Like in the case of timber, plots in the forest area have been allotted to each household⁸ from which they are allowed cut grass. The dried grass is used as livestock feed during the winter months, and at times these rights are sold to other villagers. People also collect grass from their fallow lands.

In examining changes in land use patterns, the case of use of land brought under plantations provides an insight into the matter. Comparing land uses before plantation activities to usage patterns post-plantation, a great difference does not emerge. Grass and fuelwood collection and grazing used to and continue to be the major extractive activities on lands under plantations. However, there does seem to be a drop in the number of households that graze their livestock on this land. The household questionnaires and the FGDs show that the general perception among the people is that plantations have not been successful. The reasons for the high mortality rates of saplings were forest fires and unavailability of water. Plantations therefore, have had little or no impact on the lives of the people.

⁷ The previous government had passed a bill to regularize all encroached land. What ensued was a flurry of applications to the village revenue officer requesting the regularization of the lands that had been encroached upon. Almost all the households submitted such applications. The government changed hands and this bill was scrapped and the TD rights and the right to contest elections of the applicants were taken away. Only once the encroached lands are vacated will the TD rights be restored.

⁸ Household here refers to those registered in the records of the village revenue officer. This is a traditional right recognised by the government.

Table 1. Village Characteristics

		Banal	Chowki	Pastal
Nos. of Households		24	17	18
Caste Composition		Largely homogenous Rajput – 23 HH; SC – 1 HH	Largely homogenous Rajput – 16 HH; SC – 1 HH	Largely homogenous SC – 17 HH; Rajput – 1 HH
Occupational Profile	Agriculture	<i>Subsistence only:</i> 22 HH <i>Subsistence & Sale:</i> 2 HH <i>Max annual income:</i> Rs. 5,000	<i>Subsistence only:</i> 12 HH <i>Subsistence & Sale:</i> 2 HH <i>Max annual income:</i> Rs. 3,000	<i>Subsistence only:</i> 18 HH <i>Subsistence & Sale:</i> 0 HH <i>Max annual income:</i> (NA)
	Wage labour	<i>Within the village:</i> 5 HH Max annual income: Rs. 64,800 Min annual income: Rs. 12,000 <i>Outside the village:</i> 5 HH Max annual income: Rs. 70,000 Min annual income: Rs. 6,000	<i>Within the village:</i> 3 HH Max annual income: Rs. 25,000 Min annual income: Rs. 21,800 <i>Outside the village:</i> 1 HH Max annual income: Rs. 18,000 Min annual income: -	<i>Within the village:</i> 9 HH Max annual income: Rs. 30,000 Min annual income: Rs. 3,600 <i>Outside the village:</i> 1 HH Max annual income: Rs. 8,100 Min annual income: -
	Livestock rearing	<i>Source of income:</i> 5 HH Max annual income: Rs. 6,000 Min annual income: Rs. 450	<i>Source of income:</i> 0 HH Max annual income: (NA) Min annual income: (NA)	<i>Source of income:</i> 0 HH Max annual income: (NA) Min annual income: (NA)
	Service	<i>Private / Govt Employees:</i> 7 HH Max annual income: 60,000 Min annual income: Rs. 16,800	<i>Private / Govt Employees:</i> 3 HH Max annual income: Rs. 144,000 Min annual income: ??	<i>Private / Govt Employees:</i> 4 HH Max annual income: Rs. 120,000 Min annual income: 48,000
	Business	<i>Nos. of households:</i> 2 Max annual income: Rs.36,500 Min annual income: ??	<i>Nos. of households:</i> 2 Max annual income: Rs. 48,000 Min annual income: Rs. 18,000	<i>Nos. of households:</i> 0 Max annual income: (NA) Min annual income: (NA)
	Pensioners	<i>Total nos.:</i> 5 HH Max annual income: Rs. 48,000 Min annual income: Rs. 30,000	<i>Total nos.:</i> 7 HH Max annual income: Rs. 84,000 Min annual income: Rs. 24,000	<i>Total nos.:</i> 1 HH Max annual income: Rs. 60,000 Min annual income: (NA)

		Banal	Chowki	Pastal
Land Ownership (in Acres)	Max. land owned	3	3	2.6
	Min. land owned	0.3	0.14	0.4
	Mean land owned	1	0.8	1.5
	Nos. of landless HH	0	3	1 (but has leased in 0.6 Acres)
	Type of land	<i>Rainfed:</i> 24 HH <i>Irrigated:</i> 0 HH	<i>Rainfed:</i> 16 HH <i>Irrigated:</i> 1 HH	<i>Rainfed:</i> 18 HH <i>Irrigated:</i> 0 HH
Livestock Holding	Composition	All HH own some livestock. Buffaloes are the most commonly owned livestock <i>Others:</i> bullocks (3 HH), cows (3 HH), goats (2 HH), sheep (1 HH)	All HH (except 1) own some livestock. Buffaloes are the most commonly owned livestock <i>Others:</i> bullocks (6 HH), cows (2 HH), goats (1 HH)	All HH (except 3) own some livestock. Buffaloes and bullocks are the most commonly owned livestock <i>Others:</i> cows (1 HH); goats (3 HH); sheep (2HH)
	Grazed livestock	Most livestock are stall-fed. 2 HH graze livestock in the forests	Most livestock are stall-fed. 5 HH graze livestock in the forests	Most livestock are stall-fed. 5 HH graze livestock in the forests
Cropping Pattern	Kharif crops	<i>Most cultivated crop:</i> Corn (23 HH) <i>Paddy:</i> (1 HH) <i>Only Corn:</i> 11HH <i>Corn & Pearl millet:</i> 2 HH <i>Corn & Grass (from fallow land):</i> 10 HH	<i>Most cultivated crop:</i> Corn (14 HH) <i>Only Corn:</i> 11HH <i>Corn & Paddy:</i> 2 HH <i>Corn & Pearl millet:</i> 1 HH <i>Corn & Grass (from fallow land):</i> 5 HH	<i>Most cultivated crop:</i> Corn (18 HH) <i>Only Corn:</i> 12HH <i>Corn & Grass (from fallow land):</i> 6 HH
	Rabi crops	<i>Most cultivated crop:</i> Wheat (24 HH) <i>Only Wheat:</i> 19 HH <i>Wheat & Grass (from fallow land):</i> 4 HH <i>Wheat & Mustard:</i> 1 HH	<i>Most cultivated crop:</i> Wheat (14 HH) <i>Only Wheat:</i> 10 HH <i>Wheat & Grass (from fallow land):</i> 3 HH <i>Wheat & Mustard:</i> 1 HH	<i>Most cultivated crop:</i> Wheat (18 HH) <i>Only Wheat:</i> 17 HH <i>Wheat & Grass (from fallow land):</i> 1 HH

		Banal	Chowki	Pastal
Cropping Pattern (contd.)	Irrigated crops	None	Wheat with vegetables on the fringes of the field (1 HH in 0.2 Acres)	None
Sources of Water	Domestic use	<p>Most common source: Handpump (24 HH) Other sources: Private connections (7 HH) Average collection time: Summers: 20 minutes Rains: 15 minutes Winters: 15 minutes</p>	<p>Most common source: Dugwell (12 HH) Other sources: Spring (6HH); Handpump (4HH); Private connection (2HH) Average collection time: Summers: 1.9 Hours Rains: 1.2 Hours Winters: 1.2 Hours</p>	<p>Most common source: Handpump (17 HH) Other sources: Spring (5HH); Public standpost (2HH); Private connection (2HH) Average collection time: Summers: 1.4 Hours Rains: 1 Hour Winters: 1 Hour</p>
	For livestock	<p>Most common source: Public standpost (15 HH) Other sources: handpump (9 HH); private connections (5 HH); Spring (3 HH) Average collection time: Summers: 40 minutes Rains: 25 minutes Winters: 25 minutes</p>	<p>Most common source: Public standpost (14 HH) Other sources: handpump (1 HH); dugwell (2HH); Spring (2HH); Nullah (1HH) Average collection time: Summers: 1.2 Hours Rains: 54 minutes Winters: 51 minutes</p>	<p>Most common source: Public standpost (13 HH) Other sources: handpump (2 HH); dugwell (1HH); Private connection (1HH) Average collection time: Summers: 56 minutes Rains: 40 minutes Winters: 40 minutes</p>

Legend:

1 Pound Sterling = INR 80

'??' – Not known

'HH' – Households

'SC' – Scheduled Caste

'Qtl.' – Quintals

Table 2. Forest Use

		Banal	Chowki	Pastal
Forest Products Extracted	Timber	14 HH for personal use only Average extraction in a year: 2.4 Qtl	6 HH for personal use only Average extraction in a year: 10 Qtl	3 HH for personal use only Average extraction in a year: 10.5 Qtl
	Fuelwood	7 HH for personal use only Average extraction in a year: 2.25 Qtl	7 HH for personal use only Average extraction in a year: 2 Qtl	15 HH for personal use only Average extraction in a year: 1 Qtl
	Grass	19 HH for personal use only Average extraction in a year: 4 Qtl	4 HH for personal use only Average extraction in a year: 3 Qtl	4 HH for personal use only Average extraction in a year: 0.7 Qtl
Land Uses of Plantation Area	Pre-plantation:	<i>Grass collection:</i> 10 HH <i>Fuelwood collection:</i> 10 HH <i>Grazing:</i> 13 HH	<i>Grass collection:</i> 8 HH <i>Fuelwood collection:</i> 14 HH <i>Grazing:</i> 1 HH	<i>Grass collection:</i> 10 HH <i>Fuelwood collection:</i> 18 HH <i>Grazing:</i> 0 HH
	Post-plantation	<i>Grass collection:</i> 20 HH <i>Fuelwood collection:</i> 15 HH <i>Grazing:</i> 0 HH	<i>Grass collection:</i> 6 HH <i>Fuelwood collection:</i> 12 HH <i>Grazing:</i> 2 HH <i>Prevents erosion:</i> 1 HH	<i>Grass collection:</i> 2 HH <i>Fuelwood collection:</i> 14 HH <i>Grazing:</i> 0 HH
Impact of forests	Positive impacts	<i>Most common responses:</i> <ul style="list-style-type: none"> • Availability of wood / fuelwood • Availability of grass / fodder 	<i>Most common responses:</i> <ul style="list-style-type: none"> • Availability of wood / fuelwood • Availability of grass / fodder <i>Other:</i> <ul style="list-style-type: none"> • Ensures water availability / attracts rain 	<i>Most common responses:</i> <ul style="list-style-type: none"> • Availability of wood / fuelwood • Availability of grass / fodder <i>Other:</i> <ul style="list-style-type: none"> • Attracts rain
	Negative impacts	<i>Most common responses:</i> <ul style="list-style-type: none"> • No negative impact • Reduction in pastureland • Crop depredation by wild animals 	<i>Most common responses:</i> <ul style="list-style-type: none"> • No negative impact • Forest fires • Crop depredation by wild animals 	<i>Most common responses:</i> <ul style="list-style-type: none"> • No negative impact • Forest fires • Crop depredation by wild animals
Change in forest cover	Increase	16 HH	9 HH	0 HH
	Decrease	4 HH	8 HH	16 HH
	No change	6 HH	0 HH	2 HH

		Banal	Chowki	Pastal
Impact of change in forest cover on water availability	Water availability is proportionate to forest cover	0 HH	2 HH	4 HH
	Forests attract rain	0 HH	1 HH	1 HH
	No connection with forests	24 HH	15 HH	14 HH
	Increase due to improved access (e.g. handpumps)	4 HH	0 HH	0 HH
	Decreased due to poor rainfall	4 HH	1 HH	4 HH
	No change	15 HH	6 HH	4 HH

Legend:

‘HH’ – Households

‘Qtl.’ – Quintals

4. STAKEHOLDER PERCEPTIONS

4.1 Perceptions on Forests – Water Linkages

Correlating the information gathered through questionnaires to the people's responses regarding their perceptions on forest-water linkages (through FGDs) it was found that their perceptions regarding the positive and negative aspects of forests are related to their extraction practices of forest resources. Availability of wood (fuelwood and timber) and grass (for fodder) are the major positive aspects of forests that people perceive. Another, less-mentioned, advantage is that forests attract rain – greater the forest cover, more the rainfall. Most people felt that there were no negative impacts of forests, though forest fires, decrease in pasturelands and crop depredation by wild animals (e.g. wild pigs) were mentioned as some of the disadvantages.

The query on people's perceptions regarding change in forest cover over the past decade generated varying responses across the three villages (see Table 2). In Banal the over 65% of the households felt that forest cover had increased, in Chowki the matter stood undecided, and in Pastal 88% felt that forest cover had decreased. Linking these perceptions to the impact on water availability brought out a very clear response from the people – the majority, across the three villages felt that there is no connection between forests and water available within the village. Increase in water within the village was attributed to improved access, through handpumps especially, and people clearly felt that this had nothing to do with forest cover. As mentioned above, in some cases the link between forests and water was made through rainfall patterns. However, many people who responded that the forest cover had increased in the past decade could not provide a reason for the decrease in rainfall over the years. Climate change was blamed for this changing scenario.

Among the other perceptions gathered from the community through FGDs regarding forest-water linkages, one was that trees 'soak' up most of the water and by doing so reduce the volume available in traditional sources (e.g. *baudis*). This was found to be the case, especially during consecutive years of poor rainfall, as has been the situation in the past few years. It was also felt that changing rainfall patterns and increasing forest protection were aggravating the shortage in water at the village level. An antithetical perception to the one just mentioned was that forests reduce runoff and replenish the groundwater, thereby increasing the water in traditional sources and handpumps.

During FGDs a change in cropping pattern over time was also reported. Earlier the people could grow more of dry-land paddy as moisture levels used to be favourable. However, now soil moisture has reduced to a level where it has become difficult to grow any paddy. This decrease is attributed to changing rainfall patterns and not to changes in forest cover.

A point made by both the community and the local officials was regarding the role that the geology and gradient of the land played in the availability / non-availability of water resources. The geology in the area is known to be highly fractured, making it difficult to predict groundwater flows. Similarly the gradient plays an important role

in determining the flow of the surface water. Therefore, the type of soil and water treatment works necessary need to take into consideration these two factors. However, discussions with district level forest department officials revealed that they are very clear on the issue of forest – water linkage; more forests lead to more water availability. It was also mentioned that forest cover leads to an increase in soil moisture, whereas grasslands lead to a drop in the same. Water is recognized by the forest department as an important service provided by forest systems⁹.

There is a case from Banal that raises some questions regarding forest – water linkages. Above the village of Banal and close to the forest area there is a *baudi* that does not dry up even during the summer months when the other *baudis* in the village dwindle away. The possibility that due to its proximity to the forest area the water in this source remains plentiful was considered. However, the villagers also pointed out that as this source was situated at a greater distance from the village than the other *baudis* it was less frequented. Now with handpumps that do not dry up during the summers, installed at convenient locations across the village, people have not needed to use water from this *baudi*. The question whether this source of water actually demonstrates a positive linkage between forests and water flows remains.

Summary of Perceptions on Forest-Water-Watershed Development Linkages

1. The local communities' perceptions regarding the role of forests are related to their extraction practices of forest resources
2. Majority of the local communities do not perceive any linkage between forests and water availability - increase in water availability at the village level is attributed to improved access rather than change in forest cover
3. There exists the perception among the local community that there is a positive correlation between forests and rainfall – 'forests attract rain'
4. Forests 'soak up' water, especially during periods of poor rainfall, thereby reducing water availability in the village
5. Forests reduce runoff and replenish groundwater
6. The geology and gradient of the land to a large extent determine in the availability / non-availability of water resources
7. Forest department officials perceive a positive correlation between forests and water

4.2 Perceptions on Watershed Development and its Impacts

The understanding among the communities about watershed development, its functioning and benefits is poor. Without this background knowledge it is difficult for them to grasp the linkages between watershed development activities and their livelihoods. For example, most people felt that handpumps have reduced their drudgery in water collection and provides them with more time to pursue income-generating activities. However, they fail to make the connection between watershed treatment and groundwater recharge that could increase the water availability in their

⁹ This is reflected in the Himachal Pradesh Forest Sector Review, 2000 as well

handpumps¹⁰. Awareness about such linkages and developmental programmes that aim to improve the natural resource base and livelihood opportunities in the villages is low and greater efforts in this direction are needed – a fact that local government officials also admit to.

The community's perception regarding the impacts of watershed development on downstream areas is also limited due to the facts that the treatment activities within their villages are as yet at an initial stage and therefore they have not experienced its benefits, and secondly, because there are no villages situated below them – their watershed drains into the Salasi Khud. These limitations hamper their understanding of the larger picture of catchment / river basin hydrology. On the other hand, the officer in charge of watershed development in the district has a clear opinion on this matter. According to him the motto of their watershed programme is to 'make our *nullahs* perennial sources instead of them being seasonal'. He reasoned that if this were achieved, there would be a constant water flow into the river systems thereby maintaining their hydrological systems. This would then need to be followed by interventions targeted at the socio-economic development of local communities. Though this approach seems to deal with the major issues at hand there are several unanswered questions and the achievements to date do not indicate much success along these lines.

4.2.1 Institutional Coordination

Among the various government line departments involved in soil and moisture conservation there is not always a common agreement on how such activities should be undertaken. For example, some officials in the agriculture department feel that fewer, but bigger check dams are necessary to most effectively conserve soil and water resources. While the officer in charge of the watershed programme at the district rural development department is of the opinion that smaller, cheaper and several *nullah bunds* will be more effective. A lack of dialogue and coordination between line departments leads to each one carrying out soil and water conservation activities according to their own understanding and is not informed by scientific guidelines. The success of such initiatives is therefore often limited.

Politics also plays a key role in projects related to land and water resource development. Some local officials reported that watershed committees are getting politicised since sizeable funds are routed through this body, which often makes it difficult for implementing agencies to function. The addition of politics into watershed development activities tends to exclude certain factions within the village and affects the equity aspect in benefit distribution. However, political will can work to the benefit of such programmes¹¹ as well, if awareness generation at this level were to be undertaken. Political will is therefore an issue that needs to be addressed.

¹⁰ However, one person from Chowki reported that the water in a shallow dugwell, which lies in proximity to the check dam constructed within the village, had increased after the construction of this structure.

¹¹ For example, many of the handpumps installed in the villages are sanctioned by local MLAs (Member of the Legislative Assembly), who use this as a strategy to gain the goodwill of the people.

4.2.2 Community Participation

Government officials from the various line departments are of the opinion that the local communities have become totally dependent on the government to provide every service gratis and are not willing to contribute anything (e.g. operation and maintenance of a water supply scheme¹²) towards any of the developmental efforts. For example, engineers at the Irrigation & Public Health Department (IPH) reported that communities have become very dependent on them for water supply¹³, which has led to the negligence and deterioration of traditional sources of water (e.g. *baudis*). Biophysical criteria along with shortage of funds and manpower were the stated reasons for the IPH department's inability to provide an assured supply of water. This has only led to the further degradation of the water supply situation in these villages.

This dependency syndrome is reflected in the watershed development programme in Chabutra Nullah also where the community refused to contribute the mandatory percentage of the total project outlay (between 5 and 10%) towards the project. This lack of willingness to participate in and contribute towards the watershed development programme among the communities jeopardizes the success of the initiative, thereby limiting the benefits (and thereby livelihood opportunities). Poor community mobilization is also one of the reasons for this lack of cooperation.

Summary of Perceptions Watershed Development and its Impacts

1. Poor understanding among village communities regarding watershed development and its potential impacts on their livelihoods
2. Communities are unwilling to contribute towards the WSD project
3. There is no common agreement among government line departments regarding the most effective manner of watershed treatment – this is based on individual understanding and experience rather than on a scientific system
4. Limited understanding among communities about impacts of WSD activities on downstream areas
5. Politics and political will need to be accounted for while designing watershed development projects
6. 'Dependence syndrome' is high among local communities, which leads to the deterioration of traditional sources of water

¹² IPH officials reported that AusAid had agreed to fund an INR 540 million water supply project on the condition that the local communities bear the O&M costs. The PRI representatives apparently did not accept this condition and this project was shelved.

¹³ In focus group discussions with the people, the solution to their water problems was the installation of a lift irrigation scheme from the Salasi Khud. IPH was expected to install it as well as maintain it.

5. MAPPING INSTITUTIONAL STAKEHOLDERS

5.1 The Major Stakeholders

There are several institutions involved in the implementation of watershed development activities in the state of Himachal Pradesh. At the implementing/funding level these are the Department of Rural Development & Panchayati Raj (through DRDAs at the district level), the Forest Department (FD), the Department of Agriculture (DoA), the Irrigation & Public Health Department (IPH), and bi-lateral and multi-lateral agencies (though these do not come under this study). Institutions at the watershed and village level include the Panchayat, Watershed Association, Water Committee and Village Development Committees (VDCs)

Among other rural development activities at the district level, **DRDAs** are the sole government agency that has a project dedicated to watershed development. Other line departments undertake soil and water conservation activities under a larger mandate. As has already been mentioned earlier, in the case of Hamirpur, the DRDA is implementing a watershed development programme through appointed PIAs (BDOs in this case) who mobilize the community to form a Watershed Association, which comprises of a representative from every household in a given micro-watershed, and a Watershed Committee, which is the executive body of the WA.

Soil and water conservation is an important activity of the **FD**. Under the Sanjhi Van Yojna (2001 Notification), Participatory Forest Management Rules (2000), and the “purpose of the Grant-in-Aid” a fair reference has been made to activities such as “water harvesting and its use for irrigation/drinking purposes’ as a means of income generation and soil and water conservation. The HP Forest Sector Review 2002 (FSR) recognizes water and watershed services as important environmental services that forests provide. The FSR mentions that “there is a need for specialized watershed management knowledge and financial incentives to pay for management”. Under the FD’s programmes village institutions such as Village Forest Development Committees are formed that implement activities at a local level.

The **DoA** also has been involved in WSD activities in this region for the past decade. Among the other functions of the Department of Agriculture there are two that state:

- To educate the farmers about soil and water conservation technologies.
- To create irrigation facilities for farmers through minor/tank irrigation schemes so as to obtain maximum returns from their land

Of the total Plan & Non-plan budget of the DoA, almost one fourth (22%) is allocated to soil and water conservation. In addition, one of the priority and thrust areas of the DoA is ‘conservation of natural resources like land and water by adopting a watershed approach’. This seems to indicate that the DoA places substantial emphasis on this activity.

The main function of the **IPH** Department is to provide drinking water supply schemes to rural and urban areas. In addition to this, its responsibilities also include the infrastructural development of sewerage systems, and irrigation and flood control

works. Therefore, along with managing water resources, it has to deal with land resource management as well.

Then there is the **Panchayat** to which the state government has devolved powers, functions and responsibilities relating to 15 departments, which include forests, water and agriculture¹⁴. Panchayats are the contact agencies between the community and the various line departments and it is through this institution that developmental activities at the village level are to be implemented¹⁵. However, in the case of the watershed development programme the panchayat is bypassed.

The **WA** is the “general body” within a micro-watershed. It is supposed to be the platform for every household to voice their opinion on the watershed development activities being undertaken in their villages. The **WC** is the executive body of this association and its members are elected by the WA from among themselves (Chairperson, Secretary, Treasurer, Members). The WC is responsible for supervising the WSD activities within the micro-watershed.

At the village level there are also the **VDCs** that are similar to the “general body” of the village. Like the WA, the VDC is a platform for the communities to discuss developmental works in the village by the panchayat and other agencies. The institution of the VDC overlaps with the WA in the case of WSD projects – the VDCs of all the villages within a micro-watershed form the WA – however, these are technically distinct institutions.

5.2 Stakeholder Dynamics

Discussions with the various line departments involved in watershed development and other related activities revealed that there is little or no coordination amongst themselves. Each department has its own defined functions and thrust and priority areas, which even if they overlap with those of other line departments, are pursued individually. Within WSD projects attempts have been made to improve this coordination by having multi-disciplinary teams. Coordination between line departments therefore seems to be limited to single projects and not at the overall level of day-to-day functioning.

At the village level there are several institutions whose members overlap. For example, often panchayat members are part of the WC and other similar decision making bodies. Parallel institutions at the village level are created with every new project that is introduced and existing institutions are not capitalized on.

The panchayat technically has the responsibility to supervise projects related to land and water management but they are not involved in WSD interventions. The Panchayats are generally concerned with basic development needs such as development of roads, schools, health centre's etc. One of the major reasons for

¹⁴ As of 31st July 1996

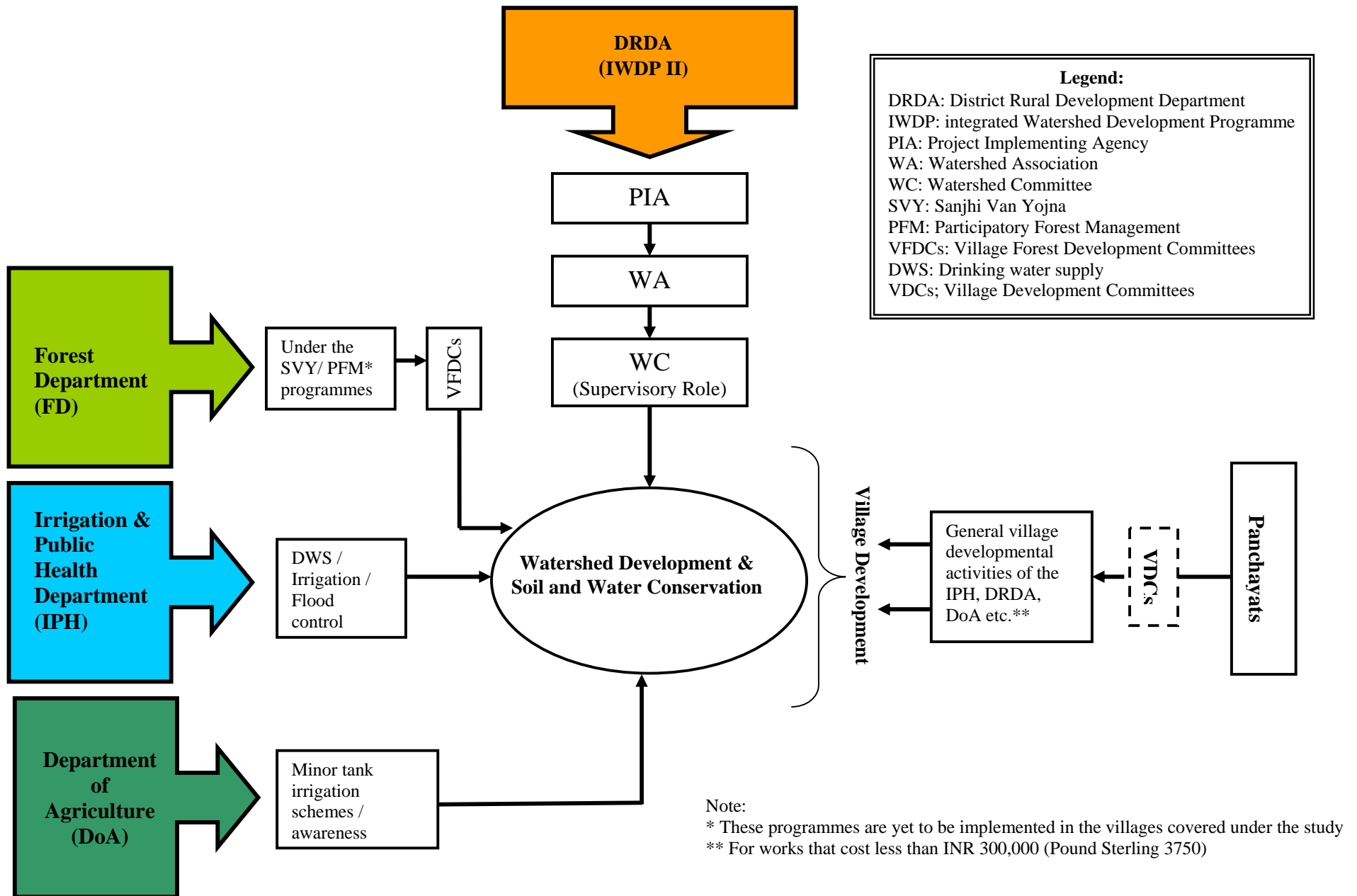
¹⁵ “It has also been decided that development works costing up to Rs. 3,00,000/- will be executed by the Gram Panchayats” & “Gram Panchayats have been empowered to supervise the implementation of IRDP/ DWCRA/ TRYSEM and to implement the central and state rural sanitation programmes” - Panchayats (Extension to the Scheduled Areas) Act, 1996 vide The Himachal Pradesh Panchayati Raj (Second Amendment) Act, 1997

bypassing Panchayats is because these are politicised institutions, however with WCs getting politicised too this reason becomes a non-issue. The Panchayats have several powers that can be harnessed for improving the results of projects like WSD. This is a debated issue and experiments are being tried out in other parts of the state to increase the involvement of Panchayats in watershed development initiatives.¹⁶

The local people also perceive this lack of coordination between line departments and within institutions at the village level. According to the people there is little duplication of work though, as the Panchayats are generally aware of the various activities being undertaken. However, they feel that it would be more fruitful if there were better coordination between the departments and the various institutions.

¹⁶ In the Indo-German Changar Eco-development Project a Panchayat based approach to WSD is being attempted.

Figure 4. Institutional Diagram: Stakeholders in Watershed Development & Soil and Water Conservation



6. CONCLUSIONS & KEY LEARNING

6.1 Conclusions

Within the villages covered under this study, and in Himachal Pradesh in general, there is a growing deviation from traditional, land-based avenues of livelihoods. More and more people are seeking employment outside their villages. Despite this trend, agriculture, which is rained in the area, continues to be practiced mostly as a secondary occupation, as was found in all the three villages. Dependence on forests varies according to the socio-economic standing of households. In the case of better off households, this dependence has reduced with changing livelihood patterns and access to cylindered cooking gas. For the marginalized and the poor, forests continue to be an important source of sustenance in terms of wood for cooking, heating and construction and grass as fodder for their livestock, as seen in the case of Pastal.

There are no irrigation facilities in this area and water for domestic purposes is collected from traditional sources, and government-installed handpumps and piped water schemes. The latter have supplemented the traditional sources of water, which often dry up during the summers and have, as in the case of Banal, improved the communities' access to water. The traditional sources of water, which include *baudis* and shallow dugwells, and handpumps rely on the groundwater available in the area whereas the piped water is mechanically lifted from a stream and transported over several kilometres to the village.

An observed trend among the three study villages was a strong 'dependence syndrome' on the government to provide services free of cost, some of which, traditionally, the communities had been appropriating and managing on their own. Most communities, for example, expect the government to provide water supply while their traditional sources of water are being neglected and are deteriorating. This 'sit-back' attitude of the communities makes it difficult even for the government line departments to implement their developmental projects, many of which stipulate the active participation and monetary contribution from these communities. None of the households in the three villages of Banal, Chowki and Pastal have contributed anything towards the watershed development project and nor do they seem to be willing to do so. Greater efforts towards community mobilization are therefore required within the Chabutra Nullah I micro-watershed.

In spite of the commonly acknowledged relationship between forests and water, the majority of the communities in the three villages did not perceive any linkage between forests and the water available in their *baudis*, shallow dugwells or handpumps. However, some respondents felt that forest cover affects the quantum of rainfall in the area. On the other hand, in Banal, where there is a general consensus that there has been an increase in forest cover largely due to improved protection services, the fact that the area has received poor rainfall in the last few years is an occurrence that does not tally with the above notion. The local community pins the cause for this discrepancy on changing climatic conditions. Overall, across the three villages, the local communities'

perceptions regarding the role of forests are related to their extraction practices of forest resources.

On the matter of forest–water linkages, government line departments such the forest department, department of agriculture and the district rural development agency stick to the conventional understanding and believe that forest cover improves water availability. This perception is found in government documents as well. For example, the Himachal Pradesh Forest Sector Review 2000 states water as an important environmental service that is provided by forests. However, there does not seem to be a common thinking among these line departments on how best to ‘harness’ these resources. Such, often divergent, approaches naturally affects the manner in which programmes such as watershed development are implemented, especially in a state like Himachal Pradesh where the geology and gradient of the land play a key role in determining the availability / non-availability of water resources.

Watershed development is being implemented in HP under several centrally sponsored schemes (DDP, IWDP, DPAP). However, this is clearly being done on a piecemeal basis. Within the micro-watersheds that are carved out of larger milli-watersheds, treatment activities are generally limited to areas around villages within the micro-watershed. The hydrological function of the entire micro-watershed and therefore that of the milli-watershed is only partly addressed. Under this village-centric approach to WSD, a mechanism for monitoring the impacts of such interventions is limited to the number of structures installed and to some extent the change in the socio-economic status of the local communities. The larger ramifications of WSD are not looked at as they are not taken into account while designing the projects. This, in a sense, is expected, as this case study indicates that there is very little common understanding on how different components within a watershed (forests, water resources, pasture lands) interact and affect one another. The various stakeholders from the village communities to the government line departments have their own understanding of these linkages- e.g. communities feel that there is no connection between forests and water, while the FD claims that water is an important service that forests provide. Among line departments also each have their own ‘solution’ and mode of implementation that are developed individually even though the broad objectives are common. Greater coordination is therefore not only required at the implementation level but also at the levels of project design and policymaking.

6.2 Key Learning

- The perceptions regarding the linkages between forests, water resources, watershed development and livelihoods clearly vary from one stakeholder to another. The communities’ and the line departments’ views regarding forest-water linkages are antithetical – the former feel that there is no linkage while the latter work on the principle that a positive correlation exists. This makes the success of any collaborative effort, such as the participatory approach to WSD, that attempt to build on /create a synergistic relationship that would be beneficial in every aspect (social, economic, environmental) largely dependent on trial and error rather than on an informed understanding.

- Institutional mechanisms necessary for implementing WSD projects need closer examination. In the case of IWDP II, as is being implemented in Hamirpur district, Panchayats are being bypassed in the implementation of WSD programmes and parallel institutions being set up for the purpose. With the increasing politicisation of WCs under the WSD programme, one of the main arguments for not involving Panchayats becomes redundant. Using the Panchayats as institutional building blocks could provide greater institutional and financial sustainability to the watershed development programme.
- Greater inter-institutional coordination is necessary – among line departments such as the FD, DRDA, DoA and IPH, and between these departments and community-based organization such as the Panchayats – in order to strive towards sustainable land and water resource management practices in a focused and effective manner.
- There is need for a scientific understanding of the interactions between various forms of land use and water resources and their implications on the livelihoods of the local communities. This learning would then need to be widely disseminated among all the stakeholders – policy makers, government line departments, communities, other practitioners – so that there is a common and informed understanding on these linkages. This would help in the design, planning and implementation of WSD programmes.
- Watershed development programmes are designed on a piecemeal basis and do not take into account the larger ramifications that these interventions could have. The micro-watershed approach is primarily village-centric and the design of the WSD programme does not examine the implications at the milli-watershed level, which is the larger hydrological unit. For example, the main drainage line that runs through the Salasi milli-watershed is an important source of water for a number of villages, especially during the lean periods. The impact that the WSD programme in this milli-watershed will have on this stream is not anticipated in any manner in the design of this project – it could increase the water flows or decrease it. If the latter were to happen, a number of villages could possibly be worse off than before the WSD intervention. Therefore a complete understanding of the hydrological system is important while administering WSD programmes.
- There is no appropriate framework to evaluate the impacts of WSD in terms of the resources that it aims at regenerating (e.g. water resources). Such a framework is necessary to have an improved understanding of the interactions between the different systems involved so that future interventions can be better designed.
- Based on this informed and holistic understanding of the functioning of different systems awareness generation campaigns are necessary at all levels – from communities, to implementing agencies (government line departments, external funding agencies, other practitioners), to policy makers and politicians.

APPENDIX

1. Fieldwork Personnel & Schedule

The fieldwork for this study was conducted between the 12th and 23rd of October 2003 and was preceded by a two-day pilot survey in August (11th-12th Aug 2003). The National Institute of Technology, Hamirpur and a local NGO, Sandesh, assisted Winrock International India professionals in the selection of the study villages and in data collection. The team members involved in the pilot survey were:

Winrock International India:

Sunandan Tiwari, Programme Officer, Natural Resource Management
Sharmistha Bose, Programme Officer, Natural Resource Management

Indian Institute of Technology, Delhi

Achraj Bhandari

National Institute of Technology, Hamirpur:

Dr. Virender Kumar Sarma, Professor, Department of Civil Engineering

Sandesh:

Pawan Rana, Director

The team that carried out the main fieldwork in October consisted of:

Winrock International India:

Sunandan Tiwari, Programme Officer, Natural Resource Management
Sharmistha Bose, Programme Officer, Natural Resource Management

National Institute of Technology, Hamirpur:

Munish Sharma, Research Assistant

Sandesh:

Pawan Rana, Director
Ms. Anita

Sandesh had been the project implementing agency (PIA) in six of the eleven micro-watersheds in the Salasi milli-watershed, including Chabutra Nullah I, the study area. Sandesh has constructed the soil and water conservation structures in this micro-watershed. However, during the interview with the Block Development Officer, Hamirpur we were informed that Sandesh was no longer the PIA and that the Block Office will be implementing the WSD programme on its own in the micro-watersheds allotted to Sandesh. As Sandesh staff had an established rapport with the communities in the selected villages, they assisted in data collection and in coordinating focus group

discussions. A Research Assistant from NIT also helped in data collection at the village level and in organizing meetings with district level government officials. WII professionals collected household data through questionnaires along with the other team members and conducted the focus group discussions and the semi-structured interviews. The questionnaire and the checklists for the focus group discussions and semi-structured interviews were prepared by WII.

2. Methodology

The Chabutra Nullah I micro-watershed within the Salasi milli-watershed was selected on the following basis:

- Sandesh, the NGO with which NIT is collaborating for this study, had done some WSD work here in the past couple of years
- NIT and Sandesh had short-listed two micro-watersheds in which they would collect biophysical information for the technical component of the project – one of them is Chabutra Nullah I
- Of these two micro-watersheds, more structures had been constructed in Chabutra Nullah I than in the other where most of the works were still proposed

Within Chabutra Nullah I two villages, Banal and Chowki, which could potentially benefit from the check dams constructed in the previous year and a third village, Pastal, where no structures had been constructed as yet were selected. Pastal, was like a control village, though, considering that the soil and water conservation structures had been constructed only in the past year no significant impact was expected in Banal or Chowki. The main purpose of this fieldwork was therefore to collect baseline socio-economic data in these three villages and to gather the perceptions of these communities on forest – water – watershed – livelihoods linkages.

In order to achieve this, a household questionnaire and a checklist for different sections of the community were prepared. The questionnaire was administered to 100 percent of the households in the three villages. A list of all the households in each of the three villages was prepared based on information collected by Sandesh in 2001-02. These lists were double-checked and modified as necessary on the field. A copy of the questionnaire is attached. Group discussions were held in each of the three villages based on checklists that had been prepared in advance (attached below). One of the limitations of the study was that the period of the fieldwork coincided with the sowing season – a very busy period for the villagers. Therefore, the fieldwork had to be moulded to the availability of the village folk.

Semi-structured interviews were held with officials from various, relevant government line departments at the district level.

The line departments covered were:

1. Irrigation & Public Health (Executive Engineer / Junior Engineer)
2. Forest Department (Ranger)

3. District Rural Development Agency (Assistant Project Officer, IWDP / BDO)
4. Department of Agriculture (Agriculture Development Officer)
5. Revenue Department (District Revenue officer / Village Revenue Officer)

Further, semi-structured interviews were also held with Secretaries / senior officials of the following departments at the state level:

1. Irrigation & Public Health (Mr. Shashikant Gupta, Engineer in Chief & Mr. Lalit Kapoor, Superintendent Engineer)
2. Forest Department (A.K. Gupta, Acting PCCF / J S Walia, CCF (Projects) / Archana Sharma, CF (Sr. Forestry Advisor PAPU) / Mohinder Pal, CF (Projects) / G S Goraya, CF (PFM))
3. Department of Rural Development & Panchayati Raj (Mr. Deepak Sanan, Secretary)
4. Department of Agriculture (Mr. Deepak Sanan, Secretary)

The checklists for the district and state level officials are attached below.

3. Survey Tools

Given below are the various tools that were utilised for data collection from the village level to the State level.

3.1 FGDs checklist

Farmers / Women:

- Perceived benefits of the watershed development programme
- Contribution made towards the watershed development programme
- Dependence on forests
- Access to forests and other common property resources, current management practices
- Issues pertaining to encroachment of common lands
- Traditional management practices and history (related to forests, water and common lands) – landless?
- Rules for distribution and sharing of water and other resources / usufructs-landless?
- Changes in livestock population, composition, sources of fodder over time – Graziers? Changes?
- Currently operational local institutions (role, membership etc.) and linkages with Panchayati Raj Institutions (PRIs)
- Perceptions of forest-water linkage:
 - forest increase rainfall
 - forest increase runoff
 - forest regulate flows (sponge effect)
 - forest reduce erosion
 - forest reduce floods
 - forest improve water quality
 - agro forestry systems increase productivity

Watershed Committee:

- History (Year of constitutions, method of selection)
- Main roles / functions & responsibilities
- Sources of revenue
- History of the watershed development intervention – process, benefits, lacunae
- Systems in place for operation & maintenance of watershed development intervention
- Conflicts over water & conflict resolution
- Current practices / rules / regulations for both demand and supply side management of water
- Linkages with PRIs

3.2 Checklist for District Level Government Officials

The semi-structured interviews focused primarily on perceptions on:

- Communities' dependence on forests
- Forest – water linkages
- The impact of watershed development on the hydrological cycle and the livelihoods of rural communities
- The existing institutional mechanisms and the need for change / improvement – role of Panchayats
- Soil and water conservation programmes being implemented by them
- Changing land use patterns

3.3 Checklist for State Level Government Officials

3.3.1 Department of Agriculture

1. Among the other functions of the Department of Agriculture there are 2 that state:
 - To educate the farmers about soil and water conservation technologies
 - To create irrigation facilities for farmers through minor/tank irrigation schemes so as to obtain maximum returns from their land

How does the department implement these? Does the DoA coordinate its activities with other relevant line departments that are involved in similar works (FD, DoRD, IPH)? If yes, how? If not, what is preventing inter-departmental coordination?

2. Of the total Plan and Non-plan budget, almost one fourth (22%) is allocated to soil and water conservation. In addition, one of the priority and thrust areas of the DoA is 'conservation of natural resources like land and water by adopting a watershed approach'. This seems to indicate that the DoA places substantial emphasis on this activity. Considering that these activities are similar to those carried out by the FD and IPH, which are the areas where the DoA perceives policy overlaps with these two departments so that there could be a concerted effort towards soil and water conservation rather than individual ones?
3. What are your perceptions on:
 - the role of forests in watershed projects (forest hydrology)
 - relationship between water, forests and livelihoods
 - forests and rainfall
 - forests role in regulating water flow
 - forests role in improving water quality
 - Forests role in maintaining agricultural productivity
4. Do you think the institutional mechanisms that are currently in place are for managing land and water resources are effective? e.g. Panchayats, Village Development Committees, Mahila Mandals
5. What policy changes do you think are necessary in Himachal Pradesh to improve land and water management?

3.3.2 Forest Department

1. Under the *Sanjhi Van Yojna* (2001 Notification) and Participatory Forest Management Rules (2000), the purpose of the Grant-in-Aid a fair reference has been made to activities such as ‘water harvesting and its use for irrigation / drinking purposes’ as a means of income generation and soil and water conservation.

Therefore does the Forest Department recognise a clear relationship between forests and water? To what extent does the FD coordinate with other relevant line departments (IPH, DoA, DoRD) in such activities? If yes, how? If not, what is preventing inter-departmental coordination?

2. The H.P. Forest Sector Review recognises water and watersheds as important environmental services that forests provide. How does the forest policy address this and are any steps been taken by the FD to capitalise on this service?
3. The FSR mentions that ‘there is a need for specialised watershed management knowledge and financial incentives to pay for management’. What kind of ‘specialised watershed management’ and ‘financial incentives’ does the FD envisage? Has any action been taken in this regard?
4. What are your perceptions on:
 - the role of forests in watershed projects (forest hydrology)
 - relationship between water, forests and livelihoods
 - forests and rainfall
 - forests role in regulating water flow
 - forests role in improving water quality
5. Do you think the institutional mechanisms that are currently in place are for managing land and water resources are effective? e.g. Panchayats, Village Development Forest Societies, Mahila Mandals
6. What policy changes do you think are necessary in Himachal Pradesh to improve land and water management?

3.3.3 Department of Rural Development & Panchayati Raj

1. The State government has devolved powers, functions and responsibilities relating to 15 departments to PRIs, which include forests, water and agriculture. How effective have PRIs been in shouldering the responsibilities vis-à-vis land and water management: successes – failures?
2. Does the DoRD coordinate its activities with other relevant line departments that are involved in similar works (FD, DoA, IPH)? If yes, how? If not, what is preventing inter-departmental coordination?
3. Watershed development is being implemented in HP under several centrally-sponsored schemes (DDP, IWDP, DPAP). However, there seems to be a lack of a framework to evaluate water resources at the level of watershed development projects and of mechanisms that scale this up to catchment / basin level. Is there a need for such a framework and should it reflect in the guidelines / policy?
4. What are your perceptions on:
 - the role of forests in watershed projects (forest hydrology)
 - relationship between water, forests and livelihoods
 - forests and rainfall
 - forests role in regulating water flow
 - forests role in improving water quality
5. Do you think the institutional mechanisms that are currently in place are for managing land and water resources are effective? e.g. Panchayats, Village Development Committees, Mahila Mandals
6. What policy changes do you think are necessary in Himachal Pradesh to improve land and water management?

3.3.4 Irrigation & Public Health Department

1. Does the IPH coordinate its activities with other relevant line departments that are involved in similar works (FD, DoRD, DoA)? If yes, how? If not, what is preventing inter-departmental coordination?
2. What are your perceptions on:
 - the role of forests in watershed projects (forest hydrology)
 - relationship between water, forests and livelihoods
 - forests and rainfall
 - forests role in flood control
 - forests role in regulating water flow
 - forests role in improving water quality
3. Do you think the institutional mechanisms that are currently in place are for managing land and water resources are effective? e.g. Panchayats, Village Development Committees, Mahila Mandals
4. What policy changes do you think are necessary in Himachal Pradesh to improve land and water management?

3.4 Household Survey Questionnaire (Himachal Pradesh)

1. Name of village:
2. Name of respondent:
3. Caste:
4. Occupational profile:

Sources of Income	Primary / Secondary Source (P/S)	Annual Income	
		Current year	Last year
Agriculture			
Wage labour in the village			
Wage labour outside the village			
Livestock rearing			
Service (specify)			
Business (specify)			
Village artisan (specify)			
Other			

5. Land ownership:

Landholding Categories	In Acres
Total area	
Irrigated area	
Rainfed area	
Land leased in	
Land leased out	

6. Cropping pattern:

Crops	Pre Watershed Intervention		
	Area (acres)	Subsistence / Cash	Income per year
<i>Kharif:</i>			
<i>Rabi:</i>			

7. Irrigated crops:

Crops	Total nos. of wettings required	Pre Watershed Intervention		
		Area irrigated (acres)	Mode of irrigation	Nos. of wettings made
<i>Kharif:</i>				
<i>Rabi:</i>				

8. (a) Domestic water:

Use	Pre Watershed Intervention			
	Source	Time taken in collection / day		
		Nov-Feb	March-July	Aug.-Oct.
Domestic purposes				
Livestock				

(b) Do you buy water? (Y / N)

Purpose:

Amount spent / year (in Rs.):

(c) Do you sell water? (Y / N)

Purpose:

Amount earned / year (in Rs.):

9. Livestock:

Livestock Composition	No s.	Grazed Live-stock	Season	Avg daily Time spent	Grazed Where?	Condition: Adequate/ Inadequate	Change in grazed livestock in last 5 years
			Summer				
			Rains				
			Autumn				
			Winter				

10. Forests:

Forest Products	Pre Watershed Intervention			
	Qty. extracted / yr.	Use/ Product	Subsistence/cash	Annual Income

11. (a) List the uses made of the land on which plantation activities have been carried out

Sl. No.	Pre Plantation	Post Plantation

(b) Have been positively or negatively impacted by the plantation? How?
 (Note: Encourage the respondent to consider all benefits and losses)

12. (a) Has there been a major change in the forest cover? (Increased / Decreased / No change)
 (Note: Use a major event that affected the forests around the village as appoint of reference)

(b) Has the change in the condition of the forest affected water availability? How?

13. Have the plantation activities affected water availability?