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**The State, the Village and the Commoner:
Interactions in the Management
of a Western Himalayan Commons**

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**Shastri Project on Sustainable Development of
Mountain Environments in India and Canada**

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Sustainable Development of Mountain Environments in India and Canada

Project Overview

Sustainable Development of Mountain Environments in India and Canada is a project based at the University of Manitoba, the University of Delhi, and the Indian Institute of Science, and is carried out in cooperation with the International Institute of Sustainable Development, based in Winnipeg. The study team is led by F. Berkes, Principal Investigator; R.B. Singh, Chief Co-investigator; J.S. Gardner, Senior Investigator; and M. Gadgil, Senior Investigator.

The objective of the project is policy development for the use of mountain watershed ecosystems in ways that are environmentally and socially/culturally sustainable. More specifically, the goals of the project are:

- 1) To develop integrated methodologies best suited for the comparative study of land resource management policies in forested mountain watersheds;
- 2) To study the successes and failures of mountain environment resource management policies and their social, economic, and historical context as revealed in case studies;
- 3) To develop cross-cultural criteria for assessing sustainability in mountain environments;
- 4) To interact with policy-makers in resource management and sustainable development, so that policy implications of the study are communicated to the appropriate agencies.

In 1994, the project analysed land and resource use patterns in selected watersheds in the Upper Beas River valley in the Himalayas of Himachal Pradesh. The joint Canadian-Indian research team, which includes expertise from natural resources, geography and anthropology, has investigated the sustainability of mountain environments and the local socioeconomic system, at a time of rapid economic change in which agriculture, grazing land and forest resource use patterns are adapting in response to various factors, including commercialization and regional/global economic integration. To analyse sustainability in its three major dimensions (ecological, economic and social), the interdisciplinary research team attempted to identify the most important factors and to develop indices that may be applicable in other geographic areas, including the Canadian Rockies.

The research on which this report is based is funded by the Canadian International Development Agency (CIDA) through the Partnership Programme of the Shastri Indo-Canadian Institute. Neither CIDA nor Shastri necessarily endorses the views herein expressed. The present report is the fourth in the series. The others are:

"Sustainability of a mountain watershed ecosystem in the Himachal Pradesh Himalaya: Background and overview", by F. Berkes et al., Tech. Rep. No. 1 (Feb. 1995).

"Tourism and risk from natural hazards, Manali, Himachal Pradesh, India", by J.S. Gardner, Tech. Rep. No. 2 (March 1995).

"Gender, class and the commons: A case study from the Indian Himalayas in natural resources management", by Kerril Davidson-Hunt, Tech. Rep. No. 3 (May 1995).

Summary

This report presents the results of several weeks of field work in the Kulu Valley of the State of Himachal Pradesh, India, undertaken during the summer of 1994. It contributes to the on-going debate within natural resources management over the ability of local collectives, villages or user-groups, to manage common property resources. It demonstrates that in spite of property regimes established in Law, which limits the ability of users to manage common property, local collectives have continued to negotiate access and influence management of resources important for customary subsistence strategies.

The research findings included the identification of ten land use types known to local villagers, seven of which could be identified as having elements of common property. Property rights which did not exist in Law (*de jure*) were claimed by the villagers and existed in custom (*de facto*). These findings established that the commons in the study area were complicated, due to the interplay between *de jure* and *de facto* property rights, and confounded a simple application of common property theory to resource management analysis. It was also found that a village institution, the *mimbers*, still existed, alongside with the *Mahila Mandal* and *Village Panchayat*, and performed a number of duties such as dispute settlement between villagers and between villages regarding resource use.

The common property of the study area included a substantial portion of grazing land. This land was used by animals, and was part of the transhumance system of sheep, goat and water buffalo herding. The grazing system provided a case study of how agriculturists interacted with village pastoralists and water buffalo herders over the use and management of the pastoral commons. It was found that a system of common property management was embedded within seasonal migration cycles and grazing management decisions based on local knowledge. However, the number of village pastoralists was found to be decreasing as the social relations between agriculturists and pastoralists changed in response to an emerging orchard economy, privatization and/or closing of grazing grounds, and pressure from regulations regarding forestry.

1. Introduction

Local, collective management of common property resources has emerged as a challenge to the dominant paradigm of natural resources management which proposes private or state management as the sustainable solution for natural resources management. Common property resources, or those resources for which exclusion is difficult and use leads to subtractability (Berkes and Farvar 1989), pose a special dilemma for natural resources management. Exclusion is difficult because more than one person may have an established right to the resource. Use leads to subtractability because if one person consumes the resource it is no longer available for use by another person. In economic terms, common property resources are those resources for which property-rights are not clearly defined so that an individual cannot exclude other users (non-exclusive) and the use of the resource by one person prevents the use by another (rival) (Randal 1987). The common property dilemma hinges on the recognition that when more than one individual has access to a resource that individual is able to obtain benefit while the collective bears the cost. As noted by Hardin (1968), the individual benefit is greater than the individual cost which provides incentive for individuals to overexploit resources held in common.

Collective management theorists (see for example Berkes 1989; BOSTID 1986; Bromley 1992; Ostrom 1990) do not disagree with Hardin's analysis of the commons dilemma but with his assumption that the institution of private or state property is the only solution. Longhoffer (1993:384) summarizes the position of collective management theorists as having charged Hardin and other private property proponents with a fundamental "teleological fallacy" and "...claim there exists no inevitable or unidirectional 'tendency' ... for common property to be replaced by private property." In a similar vein, Bromley (1992:4) notes that "There is no such thing as a common property *resource*', there are only resources controlled and managed as common property, or as state property, or as private property." The commons dilemma is not about the inherent nature of a resource but about the institutions which are utilized to manage the resource. The primary institution is property rights which establishes who holds the rights of access to and use of a resource, to manage the resource, to exclude other users and to sell or

lease the preceding rights (Schlager and Ostrom 1993). The private property solution of Hardin vests all the rights in an individual, or, in economic terms, the individual holds the 'full bundle' of property rights. The other dominant solution, during the colonial period, was to vest the full bundle of rights in the crown or state, justified with the same reasoning that local collectives could not sustainably manage common resources.

The dominance of the private property and state solutions to the common property dilemma has resulted in a dualistic landscape, whereby in Law, resources are held as private property or state property. Through the process of colonialism and subsequent formation of nation states, local collectives ended up with greatly abridged rights in Law which limited their ability to openly manage natural resources. Local collectives have been shown to manage resources as private or common property (Netting 1981). The debate is not solely about the ideological significance of private versus collective management of natural resources, but the ability of the local collective to influence the property rights regime under which a resource will be managed.

Netting (1981) demonstrated that a Swiss village managed the same land, at different times, as private or commons. The village alternated the two types of management depending upon historical circumstances such as village demographics and the main product being produced for the market. Resources are managed under flexible and changing tenure arrangements within local collectives but the collective is able to influence the property rights regime which will be utilized. An imposed private property or state solution appropriates the ability of the local collective to define the property rights regime. In spite of the definition in Law of resources as private and state, local collectives have still acted to influence the management of local resources. Often the management or action of the local collectives has occurred at an informal or customary level and has been seen by state resources managers as evidence of the inability of local collectives to manage resources (Agarwal 1994). It may, however, represent the attempt by local collectives to negotiate alternate resource use outcomes with the state and among local collectives (Peluso 1992).

Collective use of common property resources is mediated by social relations between individuals within a collective, between collectives, and between collectives and

the state (Behar 1986; Longhoffer 1993). A visible sign of the ability of individuals, collectives and states to translate their interests into rights are property rights and institutions (Bromley 1992). Property rights exist in Law and custom or as defined by Schlager and Ostrom (1993) as *de jure* and *de facto*. Intra and inter collective redefinition of property rights occurs within a context of state Law and simultaneously pushes the boundaries of Law in response to new economic, social and ecological realities. The result is a complex and dynamic web of interacting forces between individuals, collectives and the state which influence the outcomes of natural resources management. As Bandyopadhyay (1992:298) notes: "...forest conflicts are not necessarily based on a consciousness of ecological sustainability as superficial environmental literature often tends to indicate. The conflicts over forest resources in Tehri-Garhwal remained for a long time as basic economic conflict over access to resources and right to survival." Indeed, the Indian experience shows that the major tension is between local and state control (Guha 1989; Gadgil and Guha 1992) and the influence of the market in changing existing production strategies and thus interests in resources.

The purpose of the present study was to document the ability of a local collective (village) to influence the management of the Kulu Valley commons within a framework of state ownership and Law in the State of Himachal Pradesh, India. The specific objectives were to:

- 1) Identify the property rights regime at the level of Law and custom under which natural resources were held in a sub-watershed of the Kulu Valley;
- 2) Identify the resource users of a bounded common property resource;
- 3) Describe the collective management of a common property resource; the grazing commons; and
- 4) Identify intra and inter collective interactions over resource use and between collectives and between collectives and the state.

The research findings are presented in this report beginning with a brief overview of the study, location and methods, in section 2. The existence of customary use and rules is demonstrated by comparing the rights held by villages in Law (section 3), with the

access, use and management occurring 'on the ground' (section 4). Section 5 then moves to a more detailed case study through an examination of the pastoral commons. This section demonstrates that the commons is managed through a system of customary knowledge and rules which limits the use of the commons but that this in turn is influenced by the interests held by other groups using the common resource. Section 6 concludes by showing that the commons is not a static land use type but the dynamic outcome of social relations between different social entities, economic change, and the ability of local collectives to negotiate their interests over natural resources.

2. Study Area and Methods

The study location, biophysical characteristics and socio-cultural characteristics are described in more detail in Berkes et al. (1995).

The villages of the study. This study was carried out with the people of two villages in the upper Beas watershed, Kulu district, State of Himachal Pradesh, India (See Figure 1). The villages of Goshal and Chachoga were included in the study were chosen on the basis of advice from governmental and non-governmental institutions and through contacts with local villagers. The forestry department facilitated the initial meeting with the Mahila Mandal of Chachoga. After being informed of the purpose of the study, the Mahila Mandal subsequently consented to participate. The village headman (*pradahn*) was then contacted to inform him of the purpose of the study and for his consent. Work in Goshal was based on a contact with a translator who was a member of the village. As in Chachoga, the village headman was informed of the purpose of the study and approached for consent to undertake the study. Each participant in the study was informed of the purpose, assured of personal confidentiality and given the opportunity to not participate.

Study methodology. The field portion of this study depended on both qualitative and quantitative methods drawn from ethnographic research. The basic format of ethnographic research is a dialectic process rather than linear in which "...data collection and analysis are done concurrently rather than being separately scheduled parts of the research." (Agar 1980:9). As research questions were defined through qualitative

research, an informal unscheduled interview, focused on quantitative data, was developed in conjunction with the translator.

Key consultants or local knowledge experts were identified in each village and within government institutions. The analysis of property rights held in Law utilized a process of reviewing historical documents and interviews with key consultants in government. Property rights held in custom were understood through interviews with village elders and headmen. Elders who had been shepherds, and practicing shepherds, were interviewed to understand the system of pastoral management of the grazing commons.

Triangulation was utilized to cross-check information from consultants¹. The initial consultant was the translator who provide a basic outline of the property rights held in Law and in custom and of commons management. On the basis of this knowledge, informal, unscheduled interviews were formulated which allowed consultants to elaborate on specific topics. Findings were repeated back to the same or other consultants to check the accuracy of researcher interpretation and where necessary corrected. Results obtained in one village were cross-checked with the other study village. Midway through the study a quantitative, household survey was prepared and undertaken with seven scheduled caste and twelve upper caste households of one study village, to check the accuracy of qualitative information.

3. Village Forest Rights in the Kulu Valley

The 1886 Anderson settlement report. The 1886 Anderson settlement report established the rights of villagers to the forest in Law. As opposed to other areas in India, it has been suggested that village rights in the Kulu district may have been generously defined. As noted by ODA (1994) "Contrary to indications from other areas in India the process of settlement of rights in Kulu and Mandi did not result in the termination of local people's rights, but rather their acceptance and formalisation." The forest settlement officer, Anderson, revealed a concern for village rights in his writing of the settlement

¹ Village consultant or consultant refers to people of the village who were interviewed during the course of the study. The term consultant has generally replaced the term informant in most anthropological literature.

report. He notes early in the settlement report that forest rights are important to the livelihoods of villagers: "The people are dependent on these rights for their very existence, and the extinction of the rights would be the most unjustifiable expropriation." (Anderson 1886:7) Furthermore, he expressed the view that rights previously recognized during the revenue settlement should not be abridged, "these rights were recorded at the Revenue Settlement and that settlement was accepted on the distinct understanding that the rights were to be respected." (Anderson 1886:3).

In spite of Anderson's concern for village rights he still had to operate under the framework of the 1878 Indian Forest Act which was intended to clearly demonstrate state ownership of Indian forests and abridge village forest rights (Gadgil and Guha 1992). In order to respect village rights and conform with the 1878 Indian Forest Act, Anderson divided the demarcated protected forest into first class protected and second class protected. First class forests tended to be nearer to villages and/or contained more valuable timber and imposed a greater restriction on village rights. Second class forests allowed for the protection of valuable tree species while permitting the continuance of customary village forest rights. The creation of two demarcated protected forest categories allowed the Forest Department to gain control over village forest lands and to curtail rights, but at the same time, it permitted Anderson to record village rights to the forest. The outcome of the forest settlement in the Kulu district was a diminished reserved forest, a greater forest area with recorded village rights compared to other Indian forest districts, and the division of the forest into four categories (ODA 1994):

1. Reserved Forests;
2. Demarcated protected forest (Class I);
3. Demarcated protected forest (Class II); and;
4. Undemarcated protected forest (Class III)

The village forest rights were based on the precolonial rights of the village to forest areas subject to interpretation by the settlement officers. The recorded village forest rights were summarized by the ODA (1994) and are shown in Table 1. Not only did Anderson allow a generous settlement of village forest rights but he also veered from standard colonial practice by recognizing three 'great rights' (ODA 1994). Village forest rights were to be established on the basis of then current (1886) practices. However,

Anderson identified three rights which he felt should be allowed to increase and called these the 'great rights'. They were the right to manure, leaves (dry and green); the right to building timber; the right of grazing. These rights were not to be restricted to 1886 harvest levels but were to grow with the growth of the village population. The Anderson settlement report generously defined village forest rights and established those rights in Law.

The Anderson settlement report of 1886 was exceptional in its support of village forest rights in India, but by defining the rights as individual and usufructuary, it also weakened the ability of villages to manage the forests. Precolonial villages, based on a tributary mode of production and organized as dynamic lineage collectives, became fixed landholders and organized into villages through the revenue settlement process (Wolf 1982). Figure 2 demonstrates the lineages which became the village of Goshal. Each village was then assigned a forest area based on precolonial tributary use areas. However, the forest rights were vested in the individual landholders, recorded at the time of the revenue settlement, and not the village. The vesting of forest rights in the individual, rather than the village, made it difficult for a village to regulate the activities of their members (Gadgil and Guha 1992; Guha 1989; ODA 1994). In Law, the village was given a portion of a state forest, within which each land holder of the village could exercise recorded forest rights, but management, regulation and enforcement was to be carried out by the Forest Department. The result was a state forest divided into village forest right areas, to be utilized as recorded by villagers, but managed by the state, as determined on the basis of the *de jure* property rights established in the 1886 Anderson forest settlement report.

4. Land Use and Property Rights in the Kulu Valley - Village Perspectives

4.1 Types of land use and property-rights

Overview. Table 2 provides an overview of the types of land use found in the study villages and the property rights held by villages in Law (*de jure*) and custom (*de facto*). The division of land use into categories was an arbitrary reduction in order to clarify the property rights analysis. Agricultural, forest and grazing lands are an integrated

system of mountain land use by villages and defy easy reduction into categories (Moench 1989). The simplest reduction, on the basis of Law, was into privately held agricultural land and state forest created by the revenue and Forest Departments' settlement reports. Interviews with villagers and government officials did not reveal a clear categorization of land into private, state, commons or open-access. The fuzzy boundaries between land use categories was a result of the interplay between custom and law, the articulation of local collective interests within a framework of Law determined by state interests, and the influence of the market in changing production strategies and resource interests. The specifics of each land use type presented in Table 2 are explained in more detail below. The initial interview with consultants were undertaken in Goshal and corroborated in Chachoga, although Table 2 presents the results of Goshal. When differences existed between the two villages they are noted below. The types of property found in the study villages included private, *natour*, *kuth*, *paht*, *thach* and *theli*, undemarcated protected forest, demarcated protected forest, and reserved forest.

Private property. The revenue settlement clearly defined agricultural land (irrigated - *ropa*; non-irrigated - *chait*) as private. The full bundle of property rights were vested in the head of the household using the land at the time of the settlement report and were heritable. In the past, the transfer of land from one generation to the next was mediated by the formation of joint-households which provided for the growth of the family and prevented the immediate division of land into small plots. The rights to the unit of 'private' land were then mediated by the joint-family on the basis of customs developed within the Pahari culture. Consultants in the village, however, noted that the holding of land by a joint-family had decreased since The Himachal Pradesh Common Land Vesting and Utilisation Act (HPCLVU Act)(1974). Redistributed land was given to an individual who owned less than 5 bigha² of land so joint families divided up their land among individuals in order to qualify. The result was the diminishment of the institution of joint families. However, some consultants pointed out that it was possible to divide the land on paper but still hold land as a joint family. Private land provided a clear land use category in Law. The study demonstrated that at the village level, even private land is not exempt

² Bigha is the local unit of land measurement. 12 bigha = 1 hectare

from a dynamic process of local institutional reconfiguration in response to and within the framework of Law.

Natour Land. The HPCLVU Act (1974), also known as the Natour Lands Act, was enacted to redistribute land to the landless or land poor but was discontinued by 1980. The redistributed land was granted from land classified by the revenue department as 'wastelands'. Consultants categorized this land differently from privately held irrigated and non-irrigated land because it carried a number of restrictions on its use. Natour land must be cultivated by the grantee and cannot be sold for 15 years. After the 15 year period it was considered to be the same as other agricultural land.

Kuth. *Kuth* was identified by consultants as distinct from agricultural land. This category of land use was described by consultants of Goshal, although recognized by consultants in Chachoga, *kuth* did not exist in Chachoga. The customary property rights for *kuth*, as shown in Table 2, were mainly *de facto*. *Kuth* was held by a collective, Goshal lineages, and each lineage paid taxes to the revenue department for their *kuth* land. A focus group interview with village elders of Goshal revealed the following explanation for *kuth* land. In the past, when the local population was greater, forest land at a higher elevation than agricultural land was cleared and utilized as cultivated land. That land was known as *kuth*. The story told to the consultants by their grandfathers was that disease and a large earthquake greatly reduced the village population and it was no longer necessary to cultivate *kuth* land. The land was allowed to revert to pasture and trees but was recorded as land belonging to individual land holders at the time of the revenue settlement. It was also interesting to note that *kuth* was the name of a root crop grown as a cash crop in the past and utilized by the British in the tanning industry. This crop was mostly produced in Lahul and Spiti which are at a higher elevation than Goshal. Land may have been cleared at a higher elevation in Goshal to produce the cash crop. When the market demand for *kuth* declined the land may have been allowed to revert to pasture and trees since it was no longer a viable cash crop.

The emergence of *kuth* as an identifiable land type is linked to social and economic forces external to the village but created fluid and dynamic property rights within village lands. The development of property rights for *kuth* should have followed the path of the

irrigated and non-irrigated land. The difference was that agricultural land was split among the descendants of the person in whom the right in land was originally vested. As *kuth* ceased to be cultivated, it was retained by the lineage and not split among the descendants. Lineages became responsible for setting the rules on exclusion, management and alienation, access having been determined by the original settlement report.

In custom, *kuth* became the common property of a collective defined as a patrilineal descent group. This was, however, changing as orchards became established in Goshal. Some lineages divided the land among all the male descendants so that each could plant orchard on their share of the land. Land which was held in common by lineages is now under going a process of converting to private land. As the property rights in Law are not clear, the process is occurring within the village and among villagers. It was not clear how the Forest Department would rule on the ownership of *kuth*. Some consultants mentioned that they could not sell this land because the Forest Department planned to turn this land into demarcated forest. Other consultants felt that they did have the right to sell the land and planned to sell it to a hotel developer. *Kuth* provided an example of the dynamic and fluid nature of customary property rights working within a static framework of Law.

Paht. As described by village consultants, *paht* was an area of land over which members of a lineage held rights to cut grass for fodder, commonly known in English as hay. Village haying areas were mentioned by consultants in both Goshal and Chachoga but results from Goshal will form the focus of this discussion. Haying lands were found to provide a parallel to *kuth* as the right to cut grass was held by a lineage. Haying lands were different from *kuth* because *kuth* is a right in land as settled under the revenue settlement, whereas *paht* was settled under the forest settlement as an individual usufruct right to cut grass on forest lands where a customary right previously existed. The haying right was recorded as an individual right but became a collective right as the lineage increased in number.

Whereas the emergence of orchards has led to the re-emergence of private property rights for *kuth*, the orchard economy has resulted in a diminishment in the use of haying areas. People with large orchards were able to meet their hay needs from their

orchards instead of the haying areas. In the past, consultants suggested that the haying areas were strictly managed by the lineages and the village. The village would set an opening date for grass cutting, while lineages would determine how the grass was to be shared among the lineage members. Since people had begun to collect grass from their orchards, the village consultants felt that it was no longer necessary to manage the haying areas. *Kuth* moved from private to common to private, while *paht* has changed from a private right to a lineage right to a village right of access and use. Both demonstrated the active participation of villagers in determining how land was used and managed.

Thach and *Thehi*. Two types of grazing lands were identified by shepherds of both Goshal and Chachogga. *Thach* refers to a forest meadow, or a clearing in a forest which is used for grazing and acts as a campsite for shepherds. *Thehi* refers to alpine meadows. The right to graze in the forest and on alpine meadows was recorded as an individual usufruct right under the forest settlement. Although the grazing right was recorded as one of the 'great rights', village consultants said that the right was limited and extinguishable. The original right holder was given the right to graze a fixed number of sheep in the village forest, in a summer grazing area and a winter grazing area based upon a pre-colonial practice of such a right. The permit was then split among the descendants. The permit was extinguishable once the shepherd family stopped grazing sheep. These two factors led to a situation where the property rights over the grazing land were more dynamic than any of the previously mentioned land use types.

Pastoral families interviewed felt it was better to manage the permit as a collective and not as private households. When a permit was split among the descendants of a right holder, the name was changed on the permit record and each permit allowed for a smaller number of sheep to be grazed. If one of the descendants decided to quit the pastoral livelihood it was impossible to change the name on the permit as it was extinguishable. Instead of recording names with the Forest Department, the pastoral families felt it was better to leave the permit intact and decide as a collective how the permit should be utilized. The property rights for grazing areas were often held by an individual but managed by a lineage. Interviews with shepherds revealed that although the *dejure* rights were curtailed, shepherds and villages did try to exercise some of these rights and

influence management of the grazing lands. The results of pastoral management of the grazing areas are described in greater detail in section 5.

Undemarcated Protected Forest (UPF), Previous to The HPCLVU Act (1974), the 'wastelands', as classified by the revenue department, were consider as *shamlat* land or village commons by the village. The land was not utilized for agriculture because it was of poor quality and was best suited for grazing village animals and collecting firewood from the scrub forest. The same land was considered as UPF (Class III) by the Forest Department after The HPCLVU Act (1974). Under The Act, shamlat land was classified as allotable land to be given to the landless, or non-allotable land to be given to the Forest Department Non-allotable land was that "...on which tree growth is thick..,"(ODA 1994). This process was not completed so ownership remained vested in the revenue department for those lands not allocated to the landless. UPF or 'wasteland' was partially privatized and partially made into open-access as neither the village, Forest Department or revenue department had clear rights to the land.

The villagers did mention two areas, however, which were still managed by the village and which form part of the UPF lands. In Goshal there were 5 sacred trees which were not to be utilized by villagers or the village and a grove of trees along the river which was retained for village use such as building a temple or fixing a bridge. Grazing on the UPF land was regulated through the practice of moving all cattle except milk cows to higher grazing grounds in the summer. The government effectively created a situation of open-access upon heavily used land and at the same time limited the ability of the village to regulate the use of UPF land. In spite of this, customary village property rights over sacred trees, village groves and grazing allowed the village to implement some management practices and prevent the total degradation of UPF lands.

Demarcated Protected Forest (DPF). The rights of villagers in Law for DPF products were similarly limited to a right of usufruct and held by the individual not the village for both Goshal and Chachoga. The specific rights of each village and the DPF areas to which they correspond were prescribed in the forest settlement report and vary between villages. Some of these rights, such as grass cutting and grazing were previously described above. Additional rights such as lopping of branches of trees, collection of

fodder and collection of bedding were described in Table 1, Although these rights were limited in **Law**, interviews and observation revealed a more complex picture. Two examples will suffice to demonstrate how *de facto* rights were being exercised at a village level.

The first example demonstrated how customary exclusion rights were established by villages in the Kulu Valley. Interviews with consultants revealed an area of village DPF to which the village held rights under the settlement report but which was also called by the name of a neighbouring village. Village consultants maintained that they held rights to specified forest products of this DPF by permission of the neighbouring village and not by the settlement report. If the neighbouring village chose to limit their rights then the villagers would have abided by those rules. Consultants of the same village also mentioned instances in which they allowed other villages to exercise rights in their DPF area not prescribed by the settlement report. In both cases villages were setting exclusion rules outside of the forest settlement and claiming a *de facto* right to exclude or include other villages in using their forest area.

The second example provided an example of how villages created customary village management rules for DPF lands in spite of that right being retained by the Forest Department in Law. In most villages green wood had to be cut for the winter but was not permitted by the Forest Department. The rule in a consultant's village was that four or five families could get together to cut a tree for winter fuel. Everyone in the community knew when winter fuel wood was being cut and attempted to hide it from the forest ranger. If the wood cutter was caught the fine was split among the families. If someone cut wood to sell, or which was not needed for fuel, the forest ranger was discreetly informed of this activity. Village rights in Law were limited to a usufruct right but villages were seen to be engaged in a process of resistance and renegotiation of that definition of village DPF rights.

Reserved Forest. As neither Goshal nor Chachoga held rights (all reserved forest rights were limited gathering rights for deadwood) to the reserved forest it was not possible to ascertain the customary property rights for this type of land use. Table 1 only

depicts the rights as determined in law by the Anderson settlement report of 1886 for other reserved forests.

4.2 Neo-traditional Village Institutions

Overview. As described in the previous section, most biological resources to which villagers had access (trees, pasture, hay) existed within a framework of customary use and rules. What was more difficult to ascertain was whether any remnants of village institutions had survived the colonial and nation state appropriation of the resources of the Kulu Valley from local villages. The prominent village institution was the *panchayat* (village council) but interviews with consultants suggested that the *panchayat* was not involved in the management of local resources. As explained by one *pradah*n (village headman), when the government took over the shamlat lands, they took away any authority that the panchayat had in influencing how local resources were used. At a formal level the villagers and village headmen did not feel that they had any authority to make rules about local resources use. As one village headman put it "...the government does not allow us to take any action which will improve the grazing lands or the forest." On an informal level, an institution called village *mimbers* appeared to have a role in setting some rules pertaining to village resources. Since there is no official role for the panchayat in Goshal or Chachoga all institutions or rules-in-use existed on an informal level. An exception is the Mahila Mandal which began to set rules informally but was given limited recognition by the government.

Village Mimbers. The institution of village *mimbers* was reported to exist in both the village of Goshal and Chachoga by consultants and was seen as distinct from the panchayat. The panchayat was considered to be a group of elected pradahn's who were part of national politics and responsible to higher ranking politicians. The *mimbers* were chosen by the high caste village men during a religious celebration while the pradahn was elected through an electoral process. The pradahn was responsible to obtain funding from politicians, while the *mimbers* were responsible for carrying out village works with the money and see to the daily affairs of the village. The central difference, as described by the village consultants, was that the pradahn acted as a mediator or broker between the

village and external agencies or individuals, whereas the *mimbers* were responsible for the internal affairs of the village and mediating relations between villagers and villages.

In Goshal nine mimbers were chosen whereas in Chachoga there were five. The central activities of the mimbers, as described during interviews, were village works such as building schools, repairing paths, ensuring water supply, and fixing bridges. The other main role was to settle household, and inter and intra village disputes. One example, provided by a consultant, was that mimbers determined the retribution to be paid when someone's cow ate someone else's crops. Other examples were the settling of boundary disputes with neighbouring villages; prevention of unauthorized use of village forest by non-village members; granting of grazing rights to non-villagers and collection of fees; enforcement of rules for sacred trees and village groves; and, in the past, the setting of opening dates for grass cutting in the forest and *pahts*. Mimbers tried to settle these matters internally but turned to outside authorities when necessary. In spite of not being recognized by the government, village mimbers were an informal village institution which allowed the village to act collectively in influencing the use of village resources.

Mahila Mandal (MM). The emergence of the MM (women's organization) in Chachoga provided an example of the formation of a new institution which aimed to undertake collective action in defense of village resources (see K. Davidson-Hunt 1995). The MM began influencing how village resources were used by attempting to prevent the illegal felling of trees by villagers and outsiders. They also developed a new rule which prevented the cutting of green conifer branches for bedding, but allowed the collection of fallen needles. This rule emerged as women of Chachoga became concerned about the increasing distance they had to travel to collect bedding. By preventing the cutting of branches, fallen needles could be collected yearly, whereas once a branch was cut that source of needles was gone forever. Last year the Forest Department began to support decisions made by the MM which protected forest resources. The emergence of a new institution, such as the Mahila Mandal, and the survival of a pre-colonial institution, the mimbers, suggested that villagers recognized the need to collectively manage village resources and attempted to do so through village institutions.

Summary. Local management of the resources of the Kulu Valley was seen to occur within a framework of property rights created by state Law. Law represented the colonial and nation state interests in and vision of management for the resources of the Kulu Valley. The interests of the villages and villagers were seen in the continuance or emergence of customary property rights and village institutions which sometimes were in conflict with, and sometimes worked in a complementary fashion, with state management of the local resources. Simultaneously both Law and custom were in a process of change and adaptation due to social, economic and ecological forces external to the Kulu Valley. A resource which captured the tension between state and local interests and the influence of forces external to the Kulu Valley was the grazing commons.

5. Contemporary Pastoralists of the Kulu Valley

Local management of resources within the Kulu Valley utilized the spatial and temporal diversity and energy flows found in mountain ecosystems. Over time a diverse collective emerged with different groups within the collective specializing on different products of the ecosystem. This resulted in villages composed of sub-groups represented by pastoralists, agriculturists and labourers. One of those groups, the pastoralists, focused on utilizing the grazing areas, forest meadows found within the forests, and alpine pastures found at a higher elevation but contiguous to the forests of the region. The pastoralists formed part of the village institution (mimbers) but management of the grazing resource was also seen to occur through the customary rules and practices of pastoralists. Pastoral management of the grazing resource was based upon rules and practices which were encoded in cultural practice and which were not easily interpreted by the outside observer as cognizant management decisions. The ability of the pastoralists to influence the use of the grazing areas was influenced by the framework of Law set by the state and the negotiated balance between different forest interests within the village. The interests of agriculturists were seen to be changing as the market presented new opportunities. Pastoral management of the grazing commons was observed in the customary practice of pastoralists but the customary practice was seen to be in conflict with the interests of the state and other villagers. The diverse subsistence strategies of the Kulu Valley villages

were in a process of simplification as different interests were translated into property rights.

5.1 Grazing Strategies of the Kulu Valley

The grazing resource of the Kulu Valley was used by village agriculturists, village pastoralists, Ghaddis³ and Gujjars. Each group pursued a unique herding strategy which utilized different parts of the temporal and spatial diversity of the mountain grazing resource. These strategies were categorized according to a framework developed by Stevens (1993) for Himalayan pastoral strategies which is shown in Figure 3.

Village Vicinity and Upper-lower Slope Herding. Village-vicinity and upper-lower slope herding was the predominate strategy of Goshal and Chachoga agriculturists. Village-vicinity herding depended upon pasture which surrounded the village and hay collected from fields and forests to feed the family dairy cow, the bullocks during plowing season and the odd sheep or goat which was kept around the house. Lower-upper slope herding was also practiced by village agriculturists. This herding strategy utilizes lower pasture areas near the village, or hay during the winter, and pastures at a higher altitude during the summer. In the spring, after plowing has occurred, the village agriculturists of Goshal and Chachoga move the bullocks and heifers to the village's higher pastures. While the animals were in the high pastures a number of families combined their herds and shared the duties of looking after the animals. The bullocks and heifer were brought back down to the village for the fall plowing and remained in the village area until the following spring.

Long-distance Herding. Village pastoralists and Ghaddis both practiced long-distance herding of sheep and goats. The difference was that village pastoralists are considered to be transhumant herders while Ghaddis are nomadic or semi-nomadic herders from the Kangra valley. Transhumance is a grazing strategy "...in which the livestock is generally accompanied by hired men but also by owners and their relatives, but rarely by a whole family, on a long migration or transit between two seasonal ranges" (Rinschede

³ Village pastoralists are also referred to as ghaddis; this is a small 'g' ghaddi and is generically used to mean shepherd, as opposed to Ghaddi which refers specifically to the tribal group. In order to avoid confusion the term village pastoralist is used to distinguish ghaddis from Ghaddis.

1987). The herding strategy of Goshal and Chachoga pastoralists was specifically intermediate stationed transhumance as the village was located between the summer and winter grazing ranges.

Ghaddis were considered to be semi-nomadic, and not nomadic, because they obtained permanent dwellings in the Kangra valley from a government sedentarization programme. Whereas nomadism is defined as a grazing strategy in which "...the livestock is herded by a whole social group (e.g., a family) as owners on their permanent and periodic movement from range to range. Nomads live all year round in mobile tents, yurts, or huts, and rarely in permanent settlements.", semi-nomadism "...combines the seasonal movement of livestock with seasonal cultivation On their seasonal migrations—largely with small livestock—the social group lives in mobile camps but also in permanent settlements"(Rinschede 1987:97). Although Ghaddis kept permanent dwellings the herding unit was still composed of the entire family unit.

Upper-lower Valley Herding. Gujjars were the main group which focused on upper-lower valley herding. Gujjars were previously nomadic waterbuffalo herders but were considered to be semi-nomadic as they received permanent homes through the sedentarization programme of the Indian government. The Gujjars move up the Beas river valley in the spring to graze in the village forest areas of the Kulu Valley and down to their villages in the fall where the waterbuffalos are stall fed during the winter.

The long-distance or transhumant herding strategy of the village pastoralists formed the focus of the present study as they were found to be the major users of village forest areas. Gujjars were also included as they used the village grazing grounds during the summer months. Ghaddis were not part of the study because they did not use the grazing area of Goshal or Chachoga during the year of the study.

5.2 Characteristics of the Major Herding Groups

Village Pastoralists. The village pastoralists formed a sub-group of Goshal and Chachoga. Out of approximately 130 families in Goshal seven were presently recognized by the pastoralists and other villagers as being pastoral families. Likewise in Chachoga there were three pastoral families out of 80. Table 3 presents the data for the pastoral

families of Goshal and Chachoga based upon estimates provided by village pastoralists during a focus group session and checked individually with each major shepherding family. Although pastoral families were a small segment in terms of numbers they still formed an important part of the village as can be seen in Table 3. Approximately half of the sheep which village pastoralists took to the summer grazing grounds belonged to other village members or people from other villages in Mandi district. Village pastoralists undertake this service in return for a *nana* (fee).⁴ The economic value of the herd which village pastoralists take to summer grazing areas demonstrates the importance of the pastoral families to the local economy.

During interviews with village pastoralists the following estimates were offered. An average sheep (35kg) was worth 800.00 Rupees (Rs)⁵ and an average goat (40kg) was worth 1,000.00 Rs. In addition sheep produced 3.5-4.0 kg of wool yearly worth 50.00 Rs per kg or 175.00-200.00 Rs per sheep per year. The estimated standing stock value of the animals for Goshal was 1,763,000.00 Rs while it was 800,000.00 Rs for Chachoga. The value of the wool per year from the village pastoralists' sheep was 102,725.00 Rs - 117,400.00 Rs. The value of the pastoral activity for only Goshal and Chachoga was 2,563,000.00 Rs which made it an important part of the village economy in terms of capital directly held by villagers.

Generally, each pastoral family owned their own animals and herded as independent units. Pastoral families did form joint herding groups: when the family herd was small in number; if one family did not own a grazing permit and had to work under another families permit; and during the summer and village grazing periods. Group numbers in Table 3 indicate those families which combine their animals into joint herds for the village and summer grazing periods. Group 3 is an example of two families who combined their herds because one family did not hold a winter permit. Village pastoralists formed a sub-group, organized along family lines, but who worked in cooperation with other village pastoralists and village agriculturists.

⁴ The fee paid by Goshal villagers to Goshal pastoralists was 2 kg rice, 1 kg wheat and 1kg salt per sheep or goat. The fee paid by people from other villages was 5 Rupees per head to village numbers and 25-30 Rupees per head to the Goshal shepherd plus 1 kg of salt.

⁵ In 1994, 22 Rupees (Rs.) = 1 Canadian Dollar.

Gujjars. In Goshal it was found that there were eight Gujjar families which utilized the village grazing areas. Table 4 shows the characteristics of the Gujjar herding families. Gujjars were also organized as independent family herding groups but sometimes joined their animals into a joint herd as shown by group 3. The Gujjars of Goshal were part of an extended family with seven out of eight families from Mandi district, and one from Kulu district. Some of the extended family would stay in the home village to cultivate crops during the summer or they would share the grazing duties so that each family could spend some time cultivating crops. The mainstay of the Gujjar herding economy was waterbuffalo milk which was sold in the villages surrounding Manali although some of the families kept goats, cows and bullocks (Table 4).

As with village pastoralists, the value of the Gujjar herding was an important addition to the regional economy. Each water-buffalo was estimated, by the consultants, to produce between 3-4 kg of milk per day. The Gujjars, which utilized the grazing grounds of Goshal, grazed 37 waterbuffalo (Table 4) which resulted in a total milk production of between 111 - 148 kg of milk per day. Waterbuffalo were grazed in the Goshal grazing grounds for approximately 150 days each year which results in a total production of milk during the summer grazing period of 16, 650 - 22, 200 kg of milk per summer. Milk was sold in Manali and other villages, during the summer of 1994, for 8 Rs per kg. The value of the summer grazing to the Gujjars was estimated as 133,200.00 Rs - 177,600.00 Rs per year. Profit from the waterbuffalo herding was only realized during the summer grazing as during the winter, the cost of fodder, increased costs which only allowed milk sales to meet the cost of animal maintenance. In addition, the village of Goshal collected a fee of 150 Rs per waterbuffalo per year for a total of 5,500.00 Rs, while the Forest Department collected 8 Rs per waterbuffalo per year for a total of 296.00 Rs. The grazing of waterbuffalo in the village forests thus provided milk to the local villages, a modest income to the village, and an income for the waterbuffalo herders.

Transhumant Cycle of Village Pastoralists. The transhumant cycle of the pastoralists of Goshal and Chachoga provided an example of the ways in which management by pastoralists was encoded within their cultural practices. Customary rules, although less visible than formal institutions, did provide pastoralists with a set of rules

which regulated the use of the grazing commons. The details of the transhumant cycle are shown in Figures 4, 5 and 6.

The key to the transhumant cycle was the movement from areas of low elevation in the winter to areas of high elevation in the summer. This allowed the pastoralists to take advantage of spatial differences, grazing resources of different ecological zones due to vertical differences (see Figures 4 and 5), and temporal differences, grazing resources at different times of the year (see Figure 6), thus maximizing the production of their animal stocks. The pastoralists were found to utilize the spatial and temporal diversity found in mountain ecosystems to maximize production and to follow a rotational grazing system which allowed the pasture a chance to rest and recover. The greatest vertical difference for the pastoralists of Goshal and Chachoga was found to be approximately 4,000 meters (Figure 5) as the pastoralists moved from the semi-tropical climatic zone of Bilaspur to the cold arid zone of Lahul. The basic cycle of all pastoralists, from both villages, was similar with the exception that Goshal had its summer grazing in Lahul while Chachoga had its in Spiti. This cycle was codified by the British during the forest settlement so that permit areas and timing of movement were specified. In addition to this macro-cycle, pastoralists also practiced a micro-cycle of rotation within their village forest areas.

The micro-cycle of shepherds followed the same pattern as the macro-cycle in that it was a rotation which utilized the vertical difference between lower forest grazing areas and higher alpine pastures. As shepherds moved up from the winter grazing areas they usually travel rapidly until they reach their village area. Once at the village, the shepherds spent about five days around the village on the way up in the spring and on the way back down in the fall. This allowed them time to do chores around the household and pick up sheep from other villagers. After they moved from the village they used the lower forest meadows, then moved up to the upper forest meadows and finally moved to the alpine pastures before they went to Lahul or Spiti for a part of the summer (Figure 6). Each village forest area contained a number of forest meadows and alpine pastures which are recognized by name as shown in Table 5 and Figure 7. This cycle is then reversed on the way back in the fall. Although the cycle was codified in Law, the shepherds also revealed a number of reasons which influenced their decisions to move between these grazing areas

and which were considered as management decisions. Before considering the grazing management decisions, the Gujjar cycle will be discussed to show how most pastoral systems work from the same premise.

Gujjar Herding Cycle, The Gujjar herding cycle, as shown in Figures 5, 8 and 9 was essentially the same cycle that the village pastoralists followed but at a compressed scale. The Gujjars also utilized the spatial and temporal differences of mountain grazing resources to maximize their production of water buffalo milk. The major difference is that the Gujjars did not have permits or customary grazing rights in any forest areas of the Kulu Valley. They were dependent upon negotiating grazing rights from other villages. Villages, such as Goshal and Chachoga, appeared to have more grazing areas in their forests than they utilized, so they said they allowed Gujjars to graze in certain forest meadows and alpine pasture areas. This allowed the Gujjars to move up to higher grazing areas in the summer. This was advantageous as the water buffalo suffered from the heat and were less productive at lower elevations in the summer. Once in the village forest they followed a similar micro-cycle as the village pastoralists (Figure 9). The major difference between village pastoralists and Gujjars was that Gujjars stall-fed their water buffalo in the winter. As grazing resources in the winter grazing areas were in short supply it was impossible for the Gujjars to negotiate grazing rights with any of the customary right holders. The grazing cycle of the Gujjars was thus a unidirectional cycle, up to summer grazing areas in the upper Kulu Valley village forest areas, and back to their homes in the fall.

Grazing Management Decisions, The primary decisions made by pastoralists revolved around decisions on how to move the herd from one grazing area to another in a way which protected the condition of the grazing resource but allowed the maximization of animal production. The most intensive pasture management was found to occur in the winter grazing areas. While in the winter grazing areas the pastoralists would utilize rotational grazing. Rotational grazing was not preferred by the pastoralists because it required a greater investment in labour and time. The herd was watched constantly and kept to a defined grazing area, once that area was grazed it was moved to another

Consultants felt that this maximized the utilization of pasture as it decreased trampling and prevented the animals from grazing selectively.

By comparison, free range grazing was utilized in both the village and summer grazing areas as pasture was considered abundant. The other management practice followed in the winter grazing areas was the cutting of branches to feed the sheep. This was done through an agreement with a village right holder in the winter grazing area whereby the sheep would be penned in a field and fed branches in return for the sheep manure. Both of these intensive management practices were followed by village pastoralists in an attempt to maximize the amount of animals they could keep in the winter area so that they could fully utilize the grazing resources of the village and summer grazing areas. Since the pasture shortage occurred in the winter grazing areas, intensive management was followed to try and increase the productivity of the grazing resource, while in the village and summer grazing areas, free range grazing was practiced as the number of animals did not require an intensive management regime. In the case of winter grazing areas, there was pressure to move the animals in the spring, because of a scarcity of pasture, up to the village meadows.

The primary constraint, reported by consultants, in moving the herd from the winter pastures to the village pastures was snow cover. It was impossible to move the herd to a higher pasture area while the grass was covered with snow. It was also not considered a good idea to move the herd too quickly after the snow melts for a number of reasons, such as: if a herd was moved before the grass had a chance to grow, there would not be enough pasture and the herd would wander; when a herd wandered it increased the effort required on the part of shepherds and increased sheep losses; bloating and diarrhea which would occur when the sheep grazed fresh grass. These constraints, in effect, protected the pasture resource as it kept sheep from tearing up wet pastures which would have allowed unwanted plants to invade and decreased the quality of the pasture.

Pastoralists were also conscious of changing their grazing practices depending on the quality of a particular grazing area. Consultants revealed an extensive knowledge of the plants of the forest and of plants which were good for grazing. Table 6 presents a list of plants, which village pastoralists and Gujjars, recognized by name and which were good

pasturage for animals. In addition to good plants, the pastoralists also recognized plants which caused harm to their animals. One such plant, *loshri*, caused *trengridi*, which was a disease which caused the sheep to pant due to blood filling the lungs. The lungs turned black and the sheep would die. When these plants began to appear the pastoralists would not graze those areas allowing the good plants to reestablish.

The timing of movement within the herding cycle was observed to match the timing of the agricultural cycle. One example was the timing between sheep grazing of forest meadows and grass cutting. The sheep grazed the lower forest meadows in May while grass was cut in August. The sheep grazed the early growth of grass, the grass then regrew and was cut for hay as it was going to seed. The sheep returned to graze the same grass in November after it had a chance to regrow in September and October but before the snow fell. The integration of the herding and agricultural cycle allowed for three cuts of grass and allowed both pastoralists and agriculturists to meet their needs from the same resource.

The final management decision, which was noted, was the decision to take the sheep and goats to Lahul and Spiti for 1-2 months of grazing in the summer. The reason that the effort was made to travel to Lahul and Spiti was on account of *Nehru* grass. This grass was noted by pastoralists as the 'strongest' grass for sheep and goats and the one which made the animals 'healthy'. As goats were sold during the return trip and sheep were sheared, the weight gain and wool growth were reported to more than compensate for the travel effort. The major constraints, which limited the time spent in the summer grazing grounds were high pass closure from snow and snow on the high pastures. Moving to the summer pastures was not possible until snow left the high pass melted off the high pastures. The return trip had to be made before snow closed the high pass and left the pastoralists, with their herds, stranded. This limited grazing in the summer pastures to a maximum of one to two months. In spite of the risks and short available grazing period, the trip to Lahul and Spiti was seen as a way to maximize animal production and an important part of the grazing cycle for village pastoralists.

The grazing cycle and the decisions embedded within the cycle represented knowledge built up over generations of herding sheep, goats and water buffalo In the Kulu

Valley. The culturally encoded management decisions were not arbitrary but represented an attempt to maximize the production of animals while protecting the grazing resource.

Informal Rules. The management of the grazing commons of the Kulu Valley occurred within a formal system of property rights, permits and rules which determined who could graze sheep, where they could graze them, how many they could graze and when they could move from one grazing area to another. A more direct form of management utilized by the Forest Department—was the closing of certain grazing permit areas in order to establish a forest plantation. Along side of the government regulated system was a set of informal rules utilized by pastoralists as they interacted with agriculturists, government officials and other pastoralists. Although there were many such rules, only three are presented to demonstrate the types of customary rules which have emerged in the Kulu Valley and which influenced the management of the pastoral commons.

The heaviest fines faced by a shepherd occurred when the sheep or goats strayed unto an agriculturist's private property, such as an orchard or crop land, and damaged the plants. When this occurred it was understood by the pastoralists that the owner could confiscate the animals and demand compensation. A bargaining process then ensued between the shepherd and the agriculturist. This occurred to a shepherd from one of the study villages during the year of the study. The agriculturist demanded compensation of 500 Rs. but settled for 250 Rs. Neither the shepherd or the property owner wanted to involve the police or panchayat leaders due to the hassle and propensity of having to give them a cut of the compensation. In order to avoid official involvement the agriculturists and shepherds attempted to settle these problems on their own.

Pastoralists also faced other situations when it was necessary to negotiate directly with government enforcement officials and avoid the formal bureaucracy. Shepherds sometimes found it necessary to graze their sheep in a closed forest. It was possible to ask the Forest Department to enter a closed forest for temporary grazing but that was time consuming and permission was not guaranteed. One pastoralist recounted the story of entering a closed forest with 70 goats and 230 sheep. As he was leaving the forest he was approached by the forest guard. The official fine was 5 Rs/animal but the pastoralist and

the enforcement officer negotiated a direct fine of 250 Rs. A general practice had emerged which allowed pastoralists to negotiate solutions to problems and influence management practices in concert with local enforcement officials.

Within the village forest there were both customary rules which excluded outsiders and which created exclusive grazing grounds for groups of village pastoralists. Village pastoralists did not consider all grazing areas, or thaches, of equal quality. The best thach was the one in the middle of the village forest, surrounded by open forest and close to firewood and water. Each group of village pastoralists preferred to have access to the highest ranked thach. This has resulted in a set of customary rules, followed by village pastoralists, which determines exclusive use for a thach by a pastoral group for a given grazing period. The customary rule of access for thaches was one of first Comer's rights. The group which arrived at the thach first claimed it for the grazing period. The timing of movement required detailed knowledge on the condition of the grazing resource. If a group moved to early, and there was not enough pasture for the herd, the herd began to wander and the group was required to move back down to the previous grazing area. The timing of the move had to be such as to beat the other groups but were sure that there was enough pasture for the herd. Oftentimes a group moved at night to try and beat the other groups. The use of first comer's rights allowed the village pastoralists to turn the village grazing areas into temporally exclusive grazing areas for each grazing period.

The Diminishing Herding Economy. The most visible sign of a change in the productive strategies of the village economies was the emergence of orchards on dryland and irrigated agricultural land, and onto unprotected demarcated forest land. Initial interviews with villages consultants revealed that villagers themselves recognized this change towards an orchard economy. Consultants also noted that a concurrent decrease in the herding economy was taking place. In order to document the change from herding and the concurrent change towards orcharding two surveys were undertaken. The first survey was undertaken during a focus group sessions with village elders of Goshal and Chachoga, the results of which were corroborated in interviews with the village headmen. The results of this survey, shown in Table 7, represented the view of village elders on the

change which they saw occurring in their local villages. The visible impression of an increase in orchards and a decrease in herding was substantiated by the first survey.

A detailed household survey was then undertaken in the village of Goshal with 23% (7/30) of the Scheduled caste and 16% (12/75) of the Rajput households. The results of the household survey are presented in Figures 10, 11 and 12. Figure 12 indicates that the shift to orchards is a relatively recent activity, except for orchard established on natour land received in the early 1970s. This land was often of poor quality so households put that land directly into orchards. The household surveys also revealed an increase in the establishment of orchards and a decrease in herding by Goshal households. The changing visible landscape, a survey with village elders and headmen, and a detailed household survey all suggested that the local economy was in a process of change from a mixed agropastoral toward an horticultural economy based predominately on apple orchards.

During household interviews, and interviews with pastoralists, consultants were asked why they felt that less households were engaged in the herding economy. The answers revealed a number of different factors which made it difficult to pursue a herding livelihood in the Kulu Valley; the primary factor being the lack of grazing land in the winter due to Forest Department closure of winter grazing permits in order to establish plantations. Households in both Goshal and Chachoga mentioned that they had quit herding due to the loss of their winter grazing permit area to a forest plantation. As it became more difficult to pursue a herding livelihood, and more attractive to engage in orcharding, pastoralists also mentioned how they had converted their capital in animals into orchards. They felt that this provided a more secure future for their children as herding would become more and more difficult in the future. As more households changed from herding to orcharding this changed the interests of villages in the forest resource and the social relations which influenced how the forest resource was shared between pastoralists and agriculturists.

As orchards expanded they moved onto land previously used for grazing during the migration cycle of pastoralists. When pastoralists moved their herds from winter to summer grazing areas, and vice versa, they utilized grazing lands which surrounded villages in exchange for providing manure for the agricultural fields. As all villages

contained a pastoral component, and at some point in their migration cycle depended upon another village, there were social relations of exchange which solidified pastoral access to grazing lands while in transit. Villages which abandoned transhumance pastoralism, in favour of horticulture, were able to break the social relations of exchange which previously existed. A village which no longer contained a significant pastoral component was no longer obligated to allow pastoralists to graze sheep in their village grazing areas. As orchards moved onto the undemarcated protected forest land and were established in the agricultural fields the damage to the trees from sheep and goats became more costly to the villages. The interest of the emergent horticultural villages became the exclusion of sheep and goats from their village lands and forests to protect their orchards and to favour the establishment of tree plantations to produce products upon which they were still dependent. This was pursued in conjunction with the Forest Department as villages would ask the Forest Department to establish tree plantation within their village forest areas and exclude pastoralists from those lands.

As the village economy changed from mixed agropastoral to horticultural it changed the interests of the village in forest lands. When the number of pastoral families in a village decreased, it reduced the pastoral interest and social obligations of a village to other village pastoralists. The new horticultural and forest interests of a village were established by extending their property rights over forest areas in conjunction with the Forest Department which resulted in a decrease in available grazing land. The Forest Department was able to establish a plantation and close a grazing area in a relatively short period of time. A pastoralist had to sell a herd and establish an orchard which could take up to ten years. In the short term, as pastoralists adjusted to the changing regional economy, the remaining grazing lands experienced heavy grazing pressure and degradation. This brought pastoralists into a conflict with both the horticultural villages and the Forest Department. The outcome of changing village interests, and their translation into property rights, was a decrease in the number of village households which pursued a pastoral livelihood in the Kulu Valley.

6. Some Final Thoughts on Interactions in the Kulu Valley Commons.

The Kulu Valley commons was found to be a nexus of competing and complementary interests between the state and local and between different local collectives. The intersection of complementary interests led to alliances while competing interests led to conflict and resistance. These conflicts and alliances were not static but were dynamic and reconfigured as outside influences, such as the market, changed the interests held by the state and local collectives. Interests in the grazing resources were translated into claims through property rights and institutions. The interest of the state in managing and appropriating the benefits of the forest resources, including the grazing areas, was instigated in Law through the process of forest settlement in the 19th century. The interests of local collectives were translated through a system of customary property rights, social relations and institutions. These two systems, Law and custom, often resulted in conflict when they represented competing interests but at times worked in concert when the interests were aligned. Conflict also occurred at the local level as different collectives held different interests in the forest resources and alliances with the state were formulated to change local interests into new property rights arrangements. The village pastoralists, with an identifiable interest in the forest resource, grazing areas, were in relationships of conflict with the state and agriculturists; resistance against the state; and, a process of change as the market changed the production strategies of the Kulu Valley.

Conflict. At the village and regional level the predominant conflict was between pastoralists and agriculturists. Pastoralists preferred an open forest while agriculturists favoured a "dark" or closed forest. An open forest was characterized as a mosaic of open canopy forest, which allowed light to penetrate the forest and grass to grow, and open forest meadows. A dark, or closed forest, favoured the production of trees and tree products. Although different interests were represented by the agriculturists and the pastoralists, customary institutions, such as the mimbers, gave both groups a voice in village negotiations and influence on how the forest lands were to be utilized. Also the agricultural and pastoral livelihoods were complementary which bound agriculturists and

pastoralists in a web of social relations within the village and between different villages.

An interesting customary practice, which revealed the intertwined interests of agriculturists and pastoralists, was the lopping of the conifer trees for bedding (*rakti*). The lopping of conifer trees opened the forest and allowed grass to grow but also permitted a high tree count per unit area. Lopping did not kill the tree, which allowed it to grow, albeit at a reduced rate, and build up the long term wood stock. This form, of forest management met the agriculturists' needs of bedding and fertilizer for the fields, produced a wood stock necessary for all villagers, and opened up the forest which met the pasture need of village pastoralists. Village management of the forest resource, through customary institutions and practices, allowed different interests a voice in negotiation and resolved a conflict through a compromise on wood productivity and a mixed use of village forest lands.

The other major conflict was between the pastoralists and the state, -represented by the Forest Department. The source of this conflict was similar to the conflict between pastoralists and agriculturists, different interests in the forest resource. The interest of the pastoralists was described above. The primary interest of the state was the maximum sustainable production of timber. The Forest Department was responsible to manage the forest in a way which maximized timber production. The interests of the Forest Department and the pastoralists were totally opposed. One local forest official, who when asked what a thach was, described it as '...where nothing grows, well at least no trees grow.' Grazing areas, to the Forest Department, were areas of wasted land which should be planted with trees. The conflict was particularly bitter from the pastoralists point of view as they felt they had no say in Forest Department decisions. The Forest Department decided to establish tree plantations and close grazing areas without consulting pastoralists. The pastoralists understandably felt they were in conflict with the Forest Department, as there was no mechanism which allowed them to negotiate with the Forest Department, and they had no voice in the state institutions which closed their grazing areas and ended the livelihood pursuit which their families had followed for generations.

Resistance. Action taken by the pastoralists, which contravenes the state regulations, was often taken as proof that pastoralists could not manage the grazing

commons. However, this study, suggested that such actions represented customary forms of forest management, conflicts between customary and state systems of forest management or direct challenges to the authority of the state to regulate village resources. As the state tried to translate its interests in the forest resources—through property rights, alliances with village sub-groups, and a system of state management—agriculturists and pastoralists alike tried to resist state appropriation of the resources and the right to manage those resources. Resistance against state management of the forest resource took a myriad of forms.

One of the most innovative examples of resistance was against the regulation in the settlement report which denied pastoralists any ability to maintain forest meadows through the use of fire or cutting of shrubs. As the number of sheep declined, and the pressure on a grazing area reduced, shrubs and eventually trees became established. Since pastoralists were not permitted to cut the shrubs they had to find other means. Two strategies, to clear or maintain a forest meadow without burning or cutting, were mentioned by pastoralists. If shrubs became established in a forest meadow it was possible to clear the shrubs by allowing goats to overgraze the forest meadow. The overgrazing killed the shrubs and allowed grass to become reestablished. A forest meadow, which was no longer utilized by village pastoralists, was maintained by renting it to other pastoralists, such as Gujjars. This allowed the village to maintain grazing areas within the forest without ceding their customary grazing right. The forest settlement tried to limit the ability of pastoralists and villages to manage grass lands within the forest by restricting the use of fire and cutting of shrub. Pastoralists and villagers found ways to resist this regulation through the use of goats and by renting the grasslands to other pastoralists. Resistance, against state appropriation and management of the village forest resources, was seen as an explanation for actions taken by pastoralists and villagers in contravention of state regulations. Actions, taken by villagers and pastoralists, were not always due to an inability to manage the grazing resource but represented a different vision of management for and interests in the forest and grazing commons.

Change. The use of the pastoral commons in the Kulu Valley was found to be one strategy utilized by the villages which complemented the agricultural activities of

other villagers and provided a significant source of capital and income for the region. Management of the grazing commons was found to be based upon a seasonal grazing cycle, culturally encoded management decisions and customary rules which attempted to maximize animal productivity while minimizing damage to the grazing resource. As the government officially managed the grazing resource, the pastoralists developed a parallel system of customary rules which also influenced the management of the Kulu Valley grazing commons. The emergence of an horticultural economy changed the village interests in the forest and grazing resources and the customary set of social relations and property rights. This was reflected in the changing visible landscape of the Kulu Valley and surveys undertaken with village elders and households which demonstrated that the number of pastoral families had decreased while the number of families with orchards had increased. When it became harder to pursue a pastoral livelihood pastoralists converted their capital in animals into orchards, resulting in a positive feedback loop which favoured the horticultural economy over the pastoral economy. As the pastoralists of Goshal and Chachoga confronted the changing property rights regimes in Law and custom, and the changing set of social relations, their actions were evidence not of a transition from the traditional to modern but of a process of negotiation. The response of the village pastoralists, to the emerging horticultural economy and the continued effort by the state to control forest resources, contained elements of conflict, resistance and change as they sought a way in which to continue their pastoral livelihood in the Kulu Valley.

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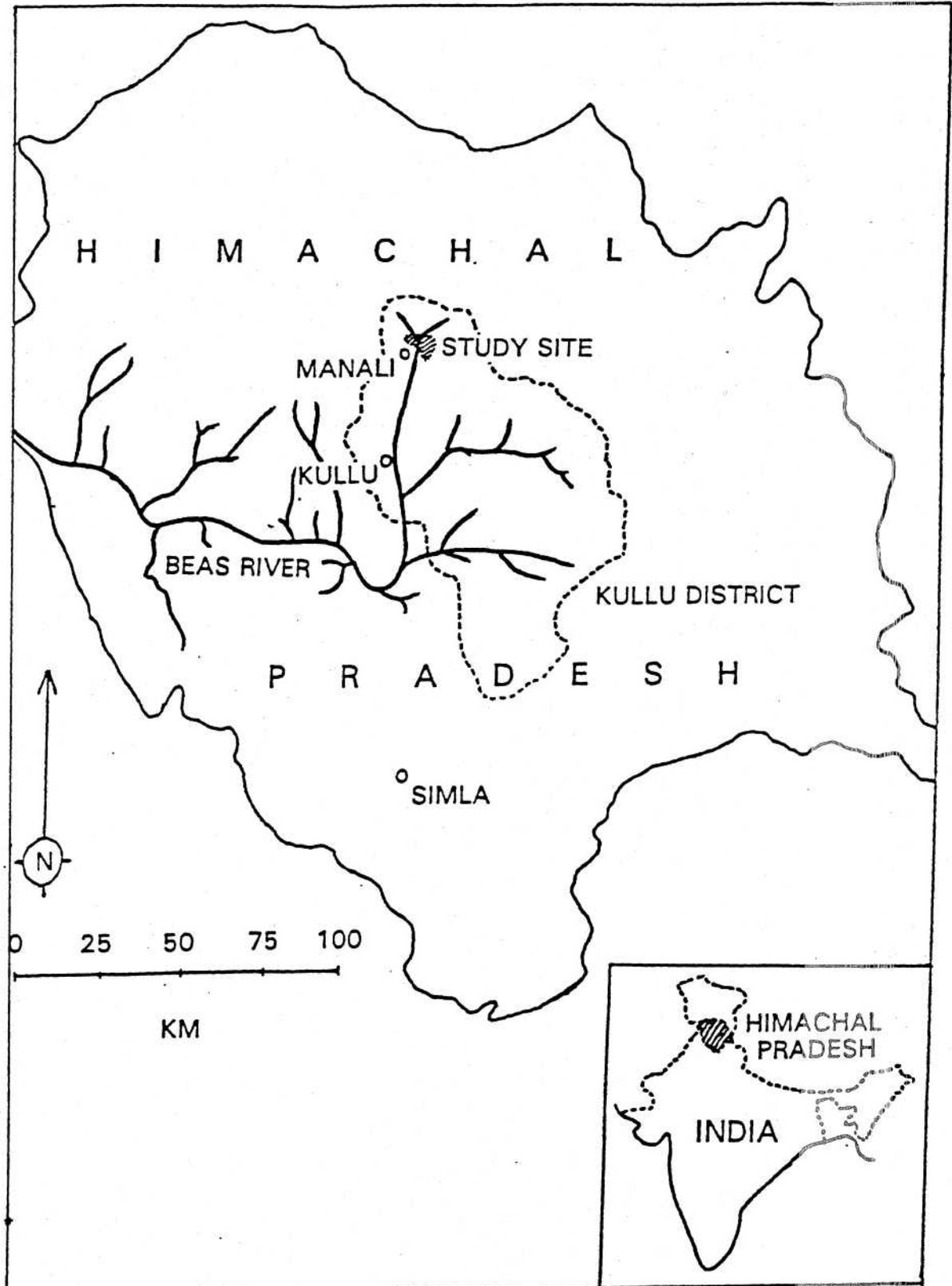


Figure 1. Location of the study site in the Kulu district of the State of Himachal Pradesh India. Study site is located in a forerange of the Great Himalayan mountains.

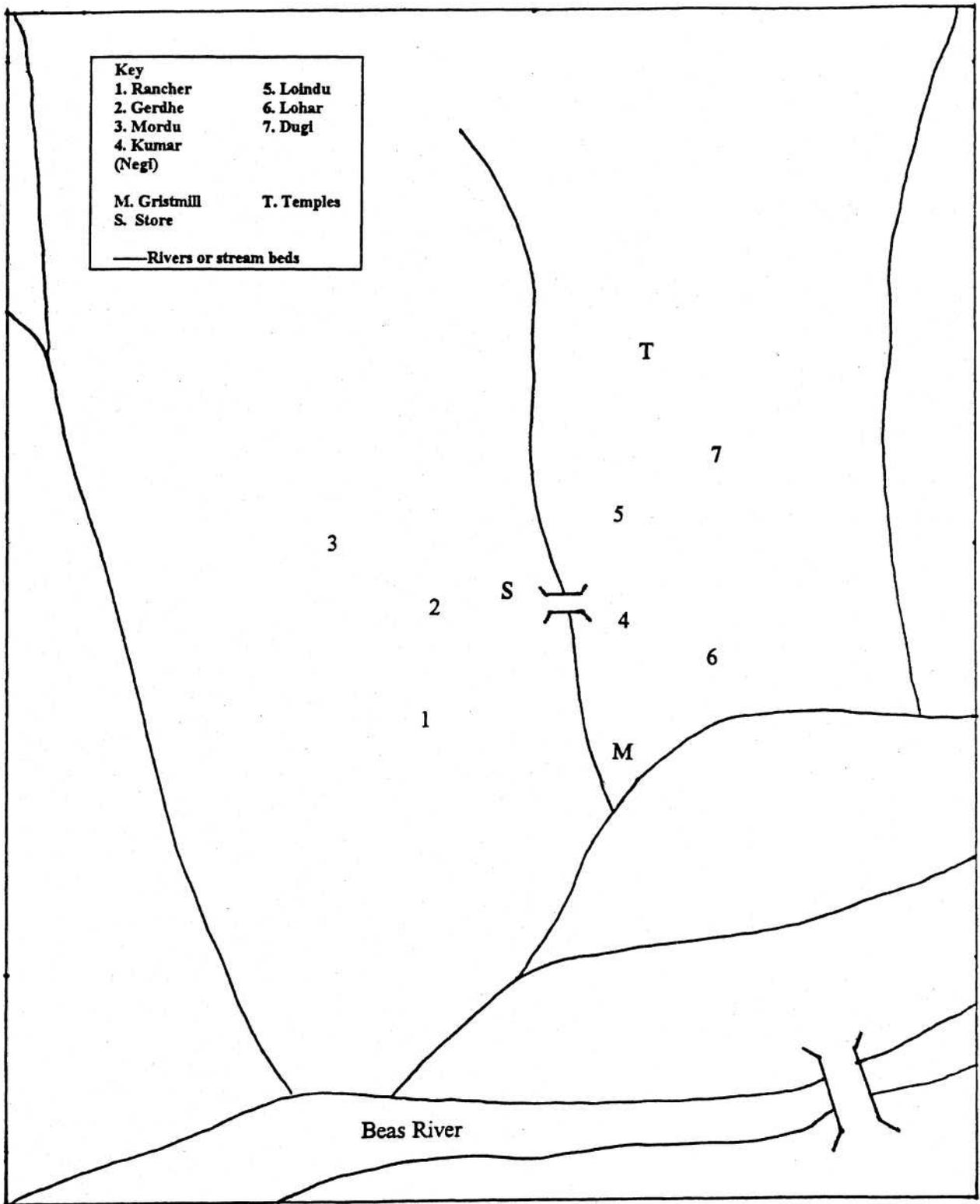


Figure 2. Spatial organization of founding Goshal lineages' households within village site as identified by village elders. (Three lineages; Pishu, Sukihe and Ruher were not identified with a specific location within the village by the consultants).

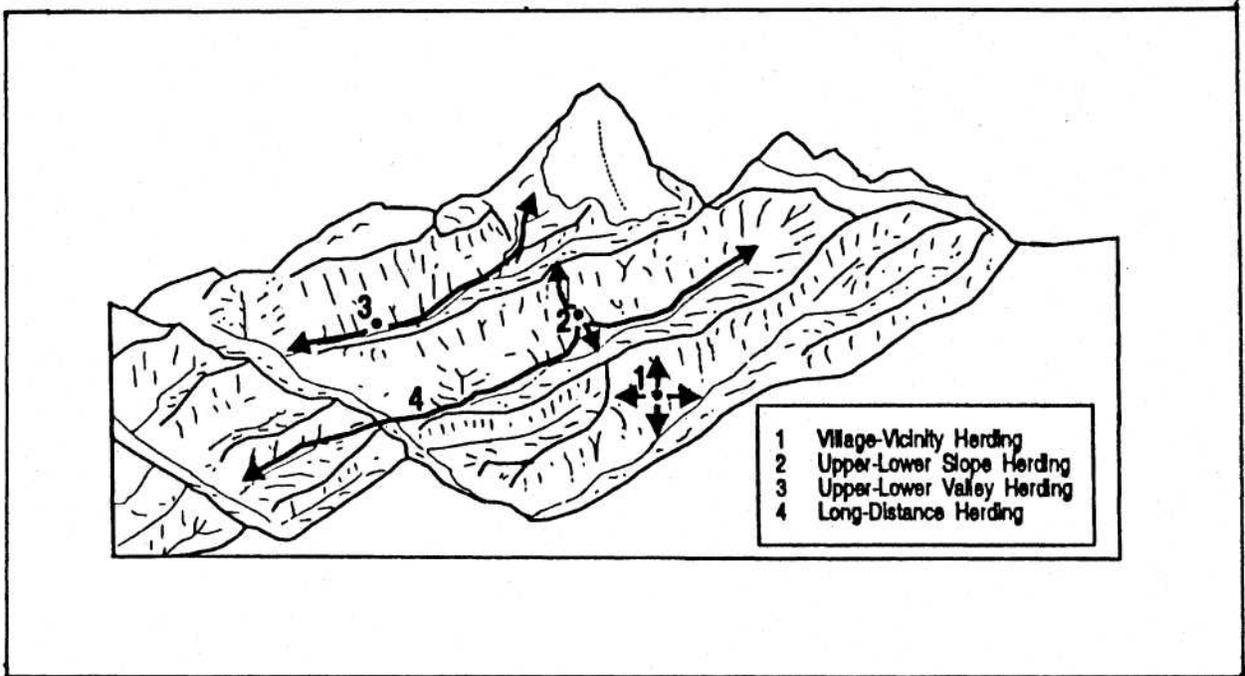


Figure 3. Grazing strategies of Himalayan, mixed-agropastoral villages.
(Adapted from Stevens 1993).

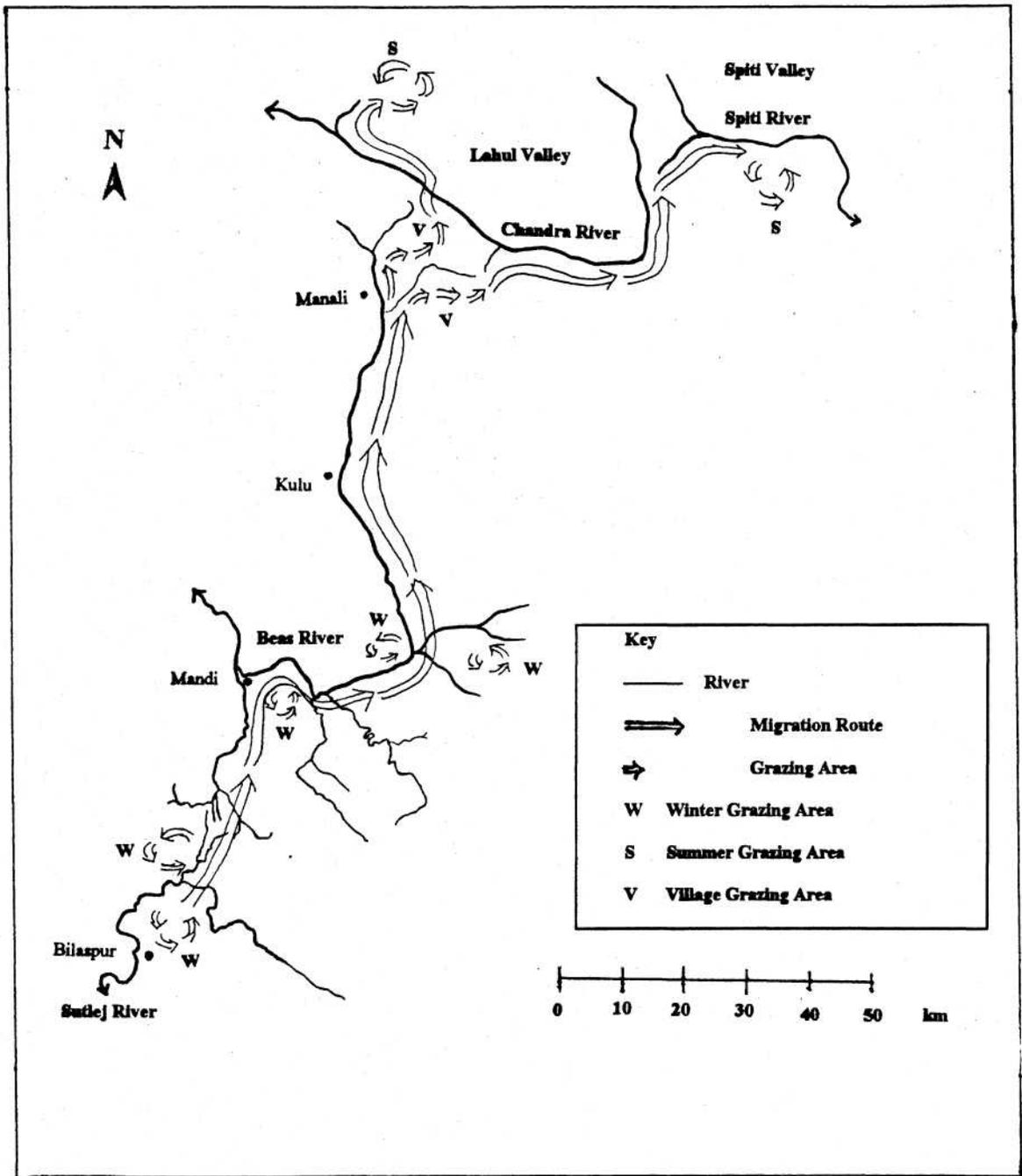


Figure 4. Transhumant migration route of Goshal and Chachoga pastoralists. The arrows show the direction of spring/summer migration. The fall migration retraces the same route. Based on interviews with pastoral families of Goshal and Chachoga.

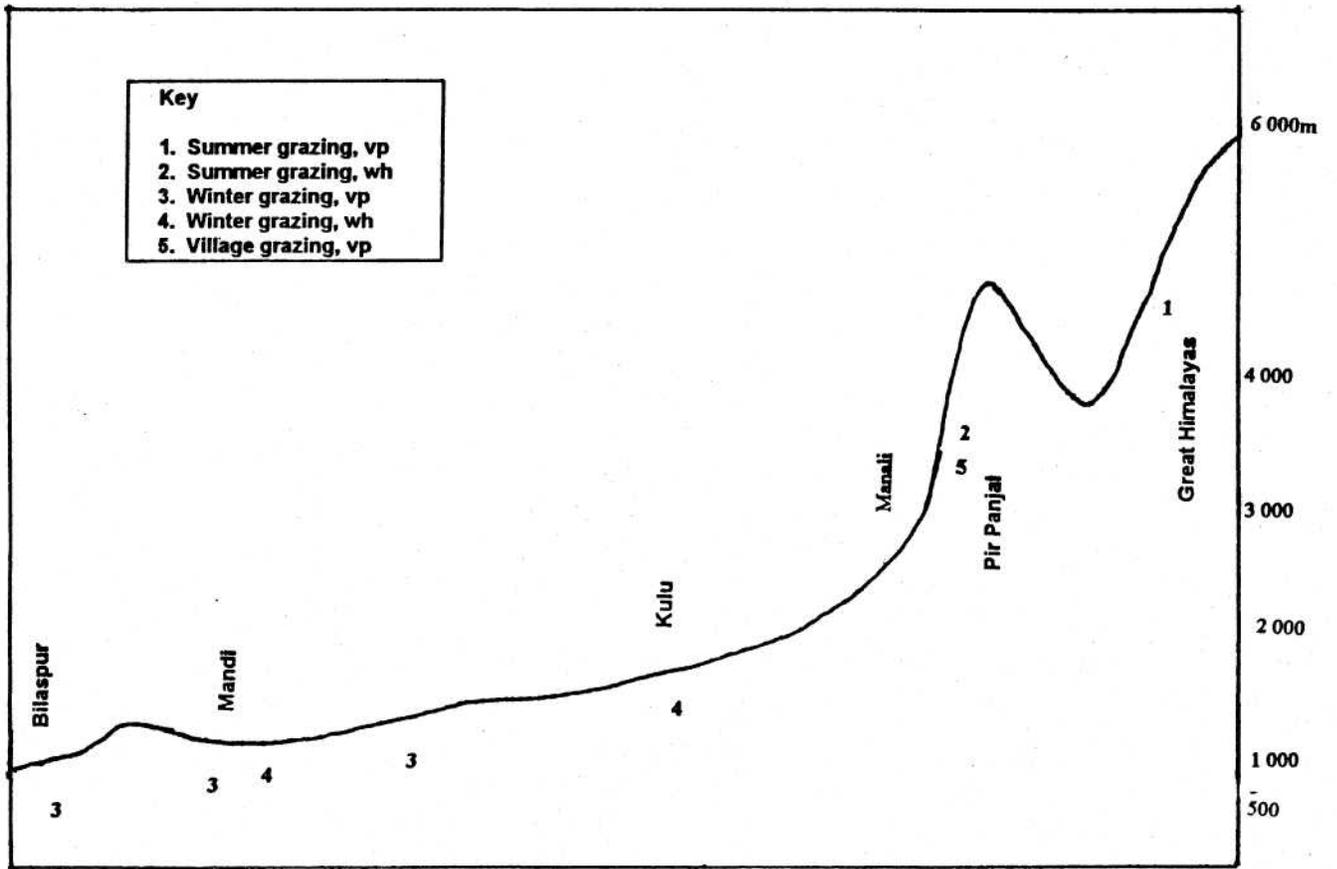


Figure 5. Altitudinal pattern of village pastoralists' (vp) and waterbuffalo herders' (wh) migration routes. The Figure displays the same seasonal cycles as in Figures 4 (vp) and 8 (wh).

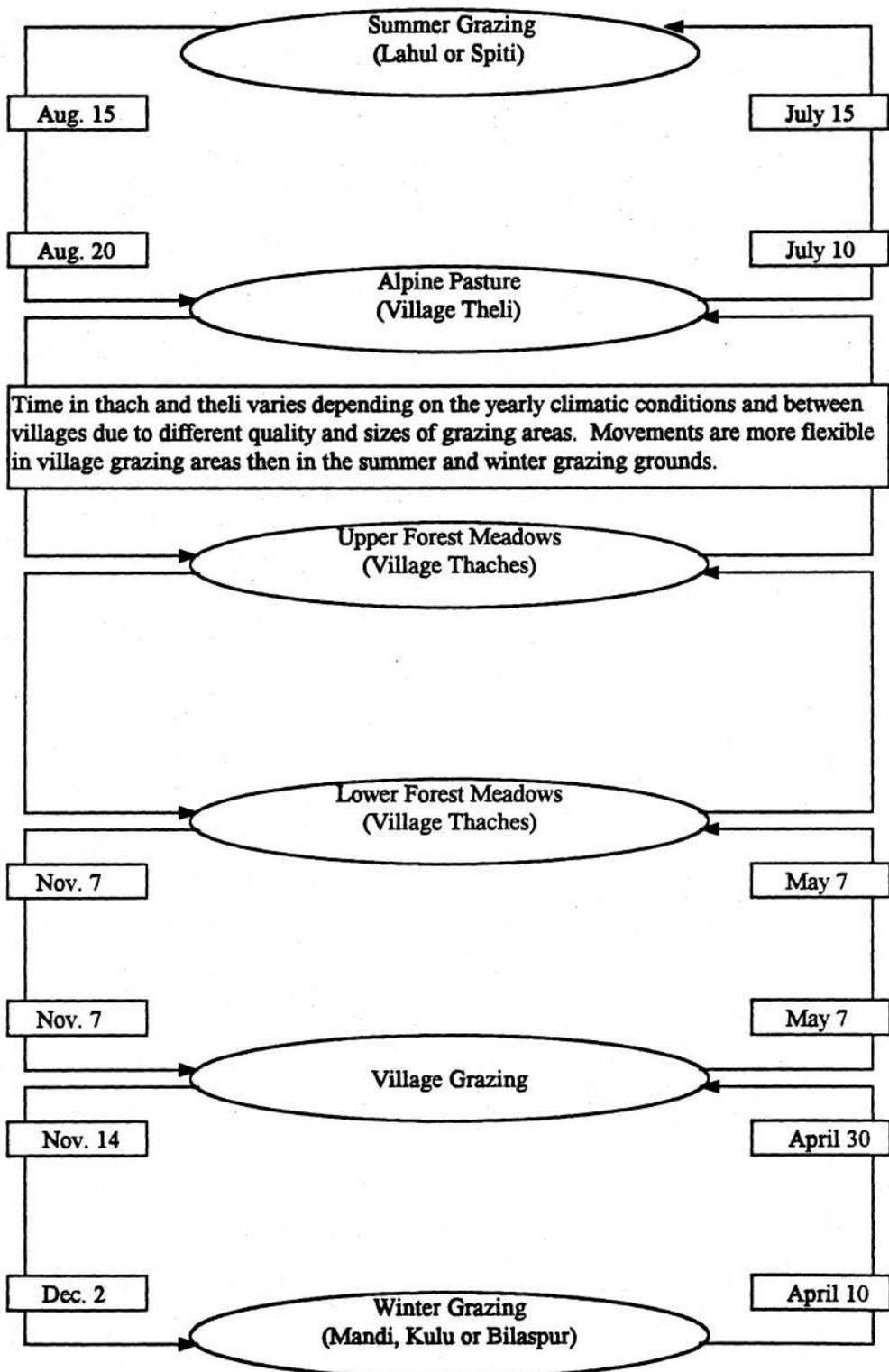


Figure 6 . An example of the transhumance cycle of village pastoralists. Based on movements made during the year of 1993-1994 of a Goshal Shephard. Other pastoral groups in Goshal and from other villages will have slightly different temporal cycles. Timing may differ from year to year.

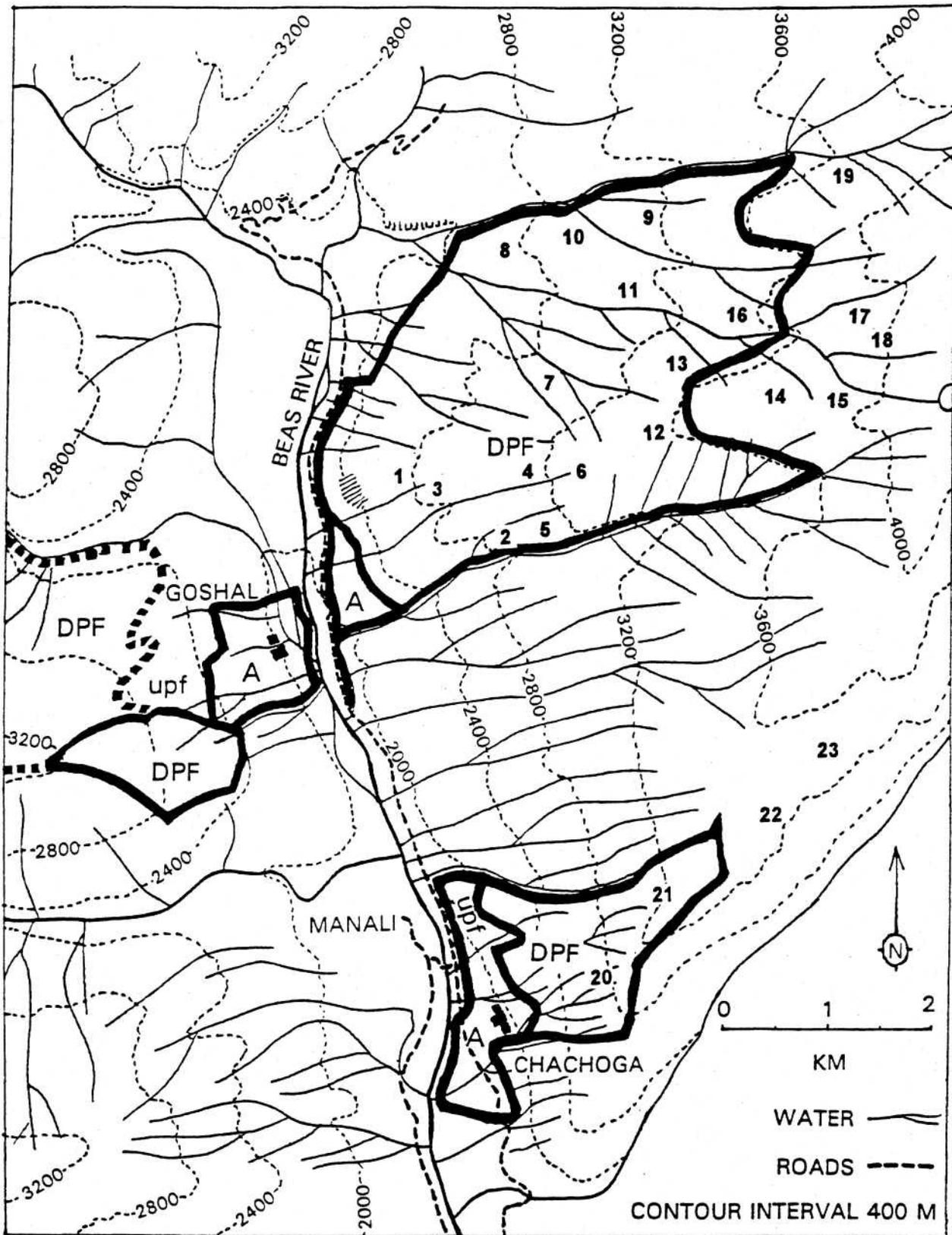


Figure 7. Village use areas of Goshal and Chachoga showing agricultural areas ('A'), demarcated protected forest areas ('DPF'), and undemarcated protected forest areas ('upf'). (Source: Technical Report No. 1) The numbers denote approximate location of forest meadows and alpine pastures utilized by Goshal and Chachoga pastoralists. (See Table 5)

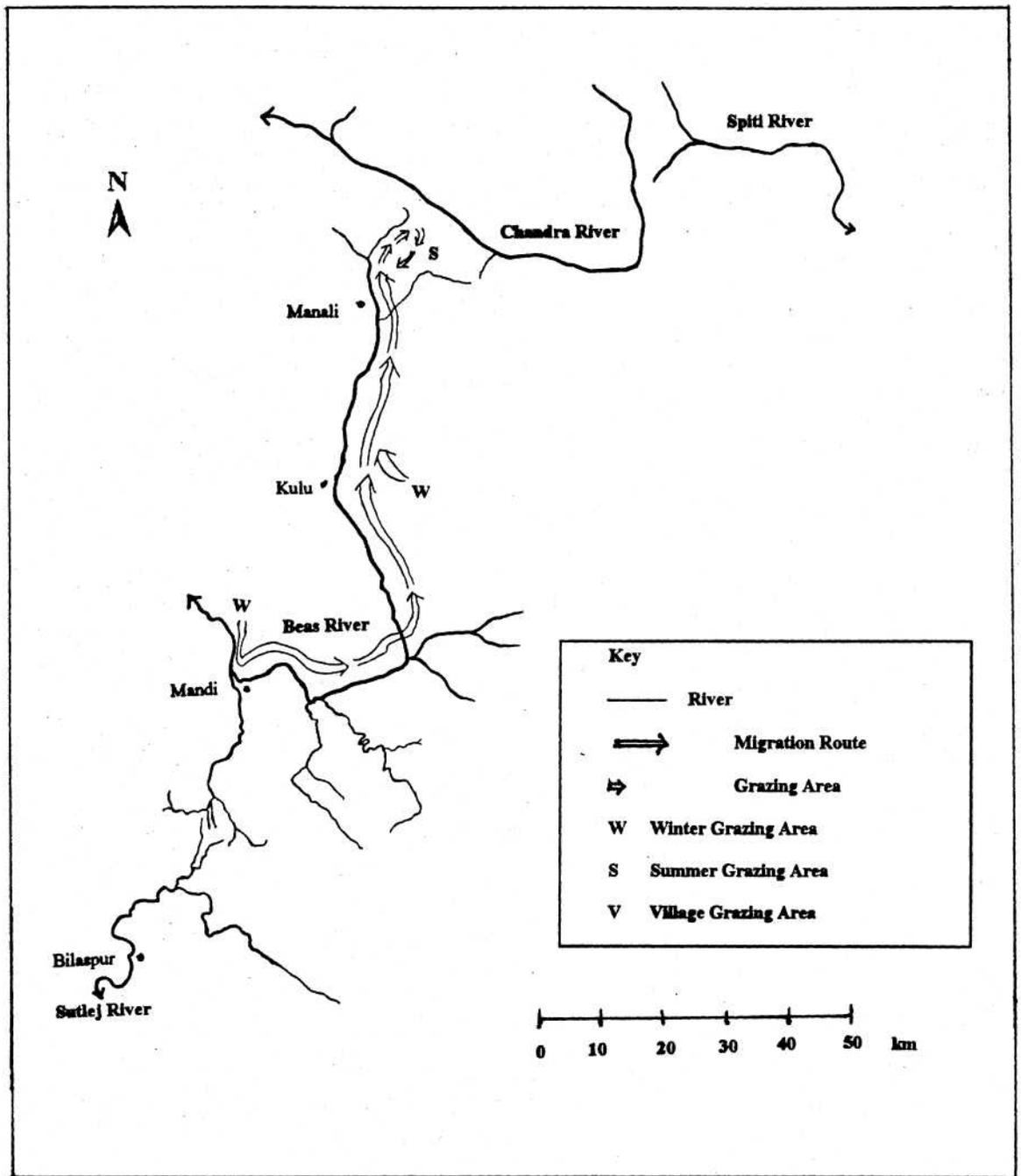


Figure 8. Semi-nomadic migration route of Gujjars (waterbuffalo herders). Based on interviews with Gujjars utilizing Goshal's village grazing areas. For altitudinal pattern see Figure 5.

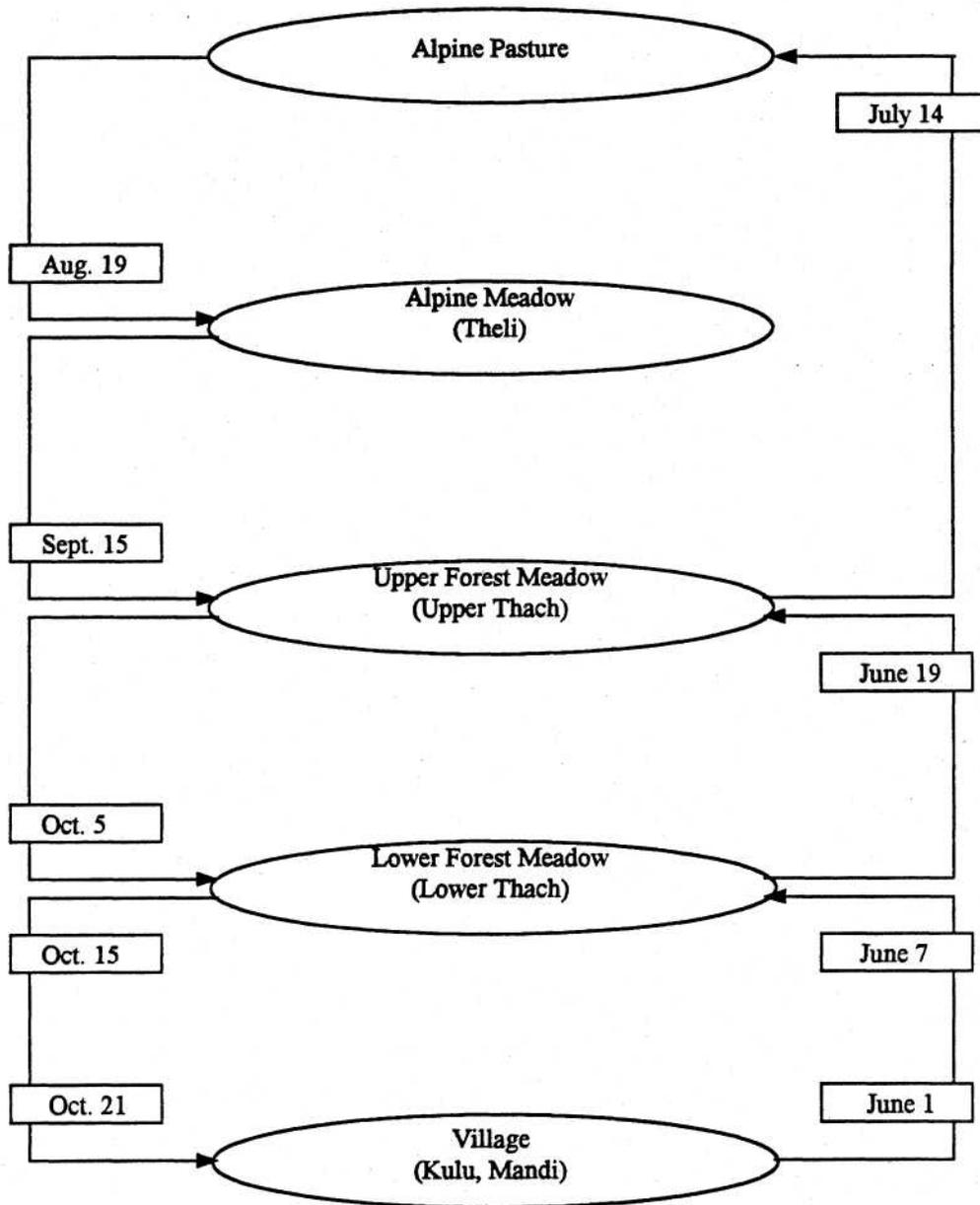


Figure 9. Temporal Cycle of Gujjar (Water Buffalo) Herders utilizing Goshal grazing grounds. Based on movements made by Gujjars during cycle of 1993-1994. Gujjars in other village grazing grounds may have a slightly different cycle and timing may vary from year to year.

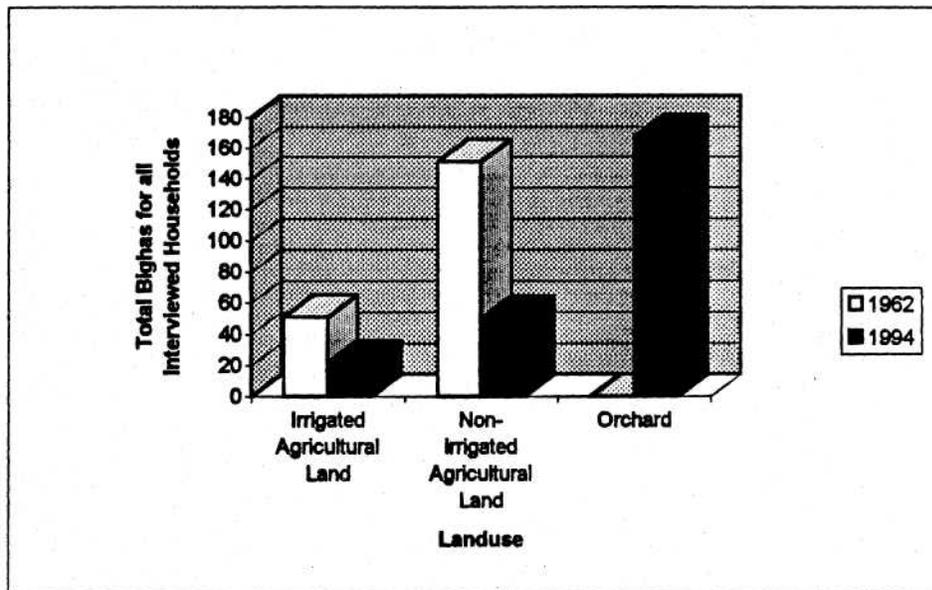


Figure 10. Change in landuse between 1962 and 1994, Goshal. Total represents the summation of the amount held by all interviewed households in 1962 and 1994. n=19. (Source: Household interviews)

Note: 12 bigha=1ha.

Land classed as orchard may still be used for growing crops until orchard canopy closes.

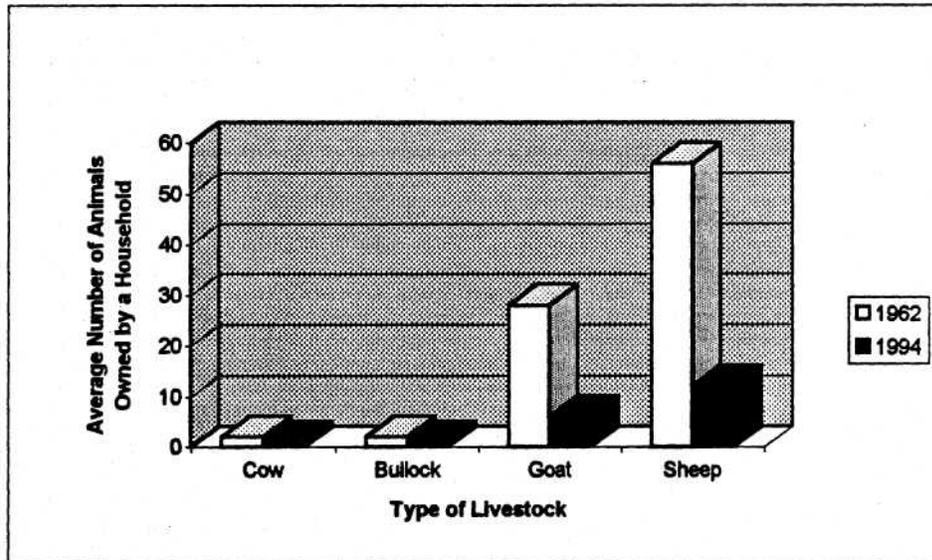


Figure 11. Change in animal ownership between 1962 and 1994, Goshal. Total represents the average held by all interviewed households in 1962 and 1994. n=19. (Source: Household interviews)

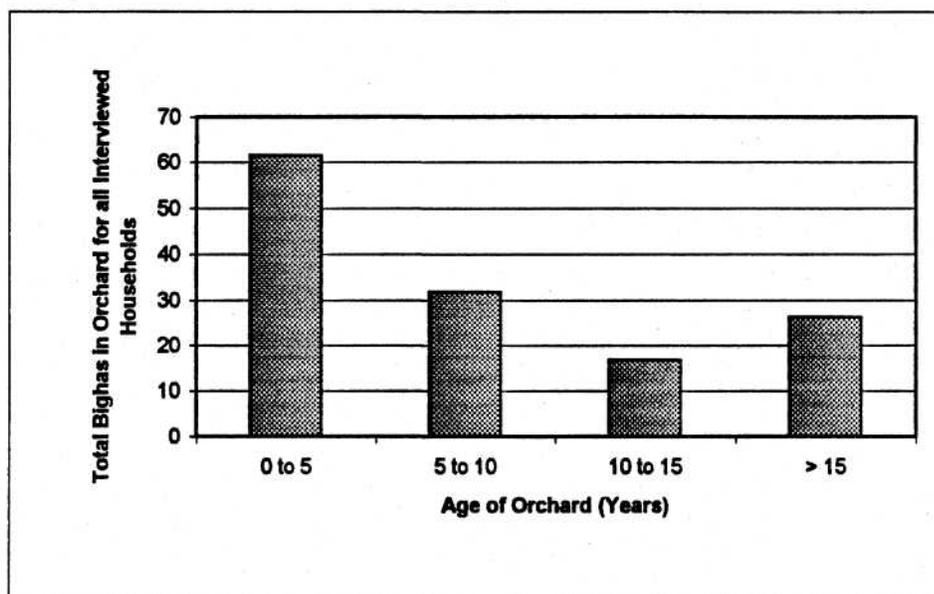


Figure 12. Age distribution of orchards, Goshal. Total represents the summation of the amount held by all interviewed households in 1994. n=19. (Source: Household Interviews)

Note: 12 bigha = 1 ha.

Land classed as orchard may still be used for growing crops until orchard canopy closes.

**Table 1. Villagers' use rights for Demarcated Protected Forests (DPF) in the Kulu valley.
(Source: ODA 1994).**

Grazing

-to graze cattle (except buffaloes), sheep and goats at the times given in the record when any limit in time has been imposed

Trees

- for agricultural implements and domestic utensils
- for the construction and repair of dwelling-houses, cattle and grass sheds, and other agricultural buildings
- for the construction and repair of temples and of dwellings attached to temples
- for the ark of the deotas (village gods) and other such purposes
- for the bier and cremation of the dead
- for fuel and charcoal for smithy purposes
- for tanning and such like purposes

Forest Produce

- grass of all kinds for fodder, thatching, rope-making and other domestic and agricultural purposes
- flowers, ferns, plants for medicinal, domestic and agricultural purposes
- brushwood for fencing and other purposes
- branches of trees of certain kinds for fodder, manure, hedges, and for making charcoal and ropes at the times given in the record when any limit in time has been imposed
- fallen leaves for manure at the times given in the record when any time in limit has been imposed
- leaves and bark of certain trees and shrubs for tanning, incense, rope-making, medicinal and other such purposes
- splinters of stumps of trees of certain kinds for torches and the manufacture of oil
- bamboos for basket-making and other purposes
- stones, slates, earth, clay, limestone for building, plastering, for the manufacturing of earthen vessels, mill-stones and other purposes
- wild honey

Table 2. Types of land use and property rights regimes in Goshal Village according to law and custom.

<u>Land Use</u> ¹	<u>Local Name</u>	<u>Village Rights to Resources</u> ²			
		<u>Access</u> ³	<u>Exclusion</u>	<u>Management</u>	<u>Alienation</u>
Irrigated agricultural land	Ropa	√	√	√	√
Non-Irrigated agricultural land	Chait	√	√	√	√
Redistributed land	Natour	√	√	√	√
Linneage based grazing land	Kuth ⁴	√	<i>De facto</i>	<i>De facto</i>	<i>De facto</i>
Linneage based haying areas ⁵	Paht	√	<i>De facto</i>	<i>De facto</i>	--
Forest grazing	Thache	√	<i>De facto</i>	<i>De facto</i>	--
Alpine grazing	Theli	√	<i>De facto</i>	<i>De facto</i>	--
Undemarcated Protected Forest		√	<i>De facto</i>	<i>De facto</i>	--
Demarcated Protected Forest		√	<i>De facto</i>	<i>De facto</i>	--
Reserved Forest		√ ⁶	--	--	--

¹ Land which is considered private may be held by an individual, nuclear family, joint family or kin group.

² Classification of rights is taken from Schlager and Ostrom (1993). Holders of the full set of property rights are considered to be owners of private property. When the property rights are distributed between different parties such as the state and village it is often a type of common property. The first step in an analysis of village common property management requires a classification of the rights a village holds. The symbol (√) denotes that a village holds *de jure* (in law) rights for that land type. *De facto* rights, although unrecognized by law, are rights that have been acquired by the community and recognized by other resource users and are considered to be held in custom.

³ Right of access to a resource also includes the right to withdraw the resource.

⁴ Kuth is a local land type surrounded by either undemarcated or demarcated forest. Its classification as private is unclear on the part of both local villagers and the local forest department.

⁵ Rights to cut grass are held by a kin group.

⁶ Some limited gathering rights (eg. deadwood) apply to Reserved Forests.

Table 3. Characteristics of transhumance herding families and groups, herd composition, summer and winter grazing permit areas of Goshal and Chachoga villages.

Group ¹	Pastoral Family and village residence ²	Family Owned ³		Other Goshal Family ⁴	Mandi Family ⁵	Flock Total	Area of Summer Permit ⁶	Area of Winter Permit
		Goat	Sheep					
1	A (Goshal)	70	90	37	0	197	Lahul	Bilaspur
1	B (Goshal)	35	45	0	0	80	Lahul	Bilaspur
1	C (Goshal)	30	60	70	50	210	Lahul	Slapper
1	D (Goshal)	70	130	20	20	240	Lahul	Slapper
1	E (Goshal)	12	78	10	100	200	Lahul	Sainj
2	F (Goshal)	30	90	390	200	710	Lahul	Slapper
3	G (Goshal)	60	40	50	50	200	Lahul	Aut
3	H (Kulu)	40	60	90	80	270	Lahul	No permit
Total	Goshal	347	593	677	500	2107		
4	I (Chachoga)	90	60	200	0	350	Spiti	Mandi
4	J (Chachoga)	30	120	50	0	200	Spiti	Mandi
5	K (Chachoga)	120	70	100	100	390	Spiti	Mandi
Total	Chachoga	240	250	350	100	940		

¹ Families combine flocks into groups for grazing within village forest area and in area of summer permit.

² Family names are represented by letters to respect consultant confidentiality. Village of residence is denoted within brackets.

³ Numbers represent animals owned by the pastoral family.

⁴ Numbers represent the number of animals (sheep or goats) owned by other Goshal families but sent with village pastoralists for summer grazing.

⁵ Numbers represent the number of animals (sheep or goats) owned by villagers from Mandi district but sent with village pastoralists for summer grazing.

⁶ Permit areas are not specifically identified in order to respect consultant confidentiality.

Table 4. Waterbuffalo herder families (*Gujjars*) and groups, herd composition, and wintering location. Families which have permission from Goshal to utilize village grazing areas.

Group ¹	Family ²	Water Buffalo	Cow	Bullock	Goats	Winter location ³
1	L	5	0	2	0	Kulu
2	M	4	0	0	0	Mandi
3	N	6	1	0	2	Mandi
3	O	5	0	2	4	Mandi
3	P	5	0	0	0	Mandi
4	Q	4	0	0	0	Mandi
5	R	8	1	2	25	Mandi
Total		37	2	6	31	

¹ In general, each waterbuffalo herder family is responsible to herd their own animals, however, three brothers had combined their animals and share the work of herding.

² Names have been replaced with letters to protect consultant confidentiality.

³ The waterbuffalo herders interviewed for this study are now settled and return to their homes during the winter.

Table 5 . Grazing areas in Goshal and Chachoga village forest areas as identified by pastoralists. See Figure 7 for location of numbers as specified in column 1.

Number	Grazing Area ¹	Classification ²	Right Holder
1	Mohri Dugh	Lower Forest Meadow	Goshal
2	Jamu Dugh	Lower Forest Meadow	Goshal
3	Khorti Dugh	Lower Forest Meadow	Goshal
4	Karmani Dugh	Upper Forest Meadow	Goshal
5	Thothi Pandhe	Upper Forest Meadow	Goshal
6	Bali Dugh	Upper Forest Meadow	Goshal
7	Nehra	Upper Forest Meadow	Goshal
8	Khanora	Upper Forest Meadow	Goshal
9	Mondrage	Upper Forest Meadow	Goshal
10	Rai Thache	Upper Forest Meadow	Goshal
11	Shedagal Dugh	Upper Forest Meadow	Goshal
12	Gogalage	Alpine Meadow	Goshal
13	Bada Thache	Alpine Meadow	Goshal
14	Gora Pandhe	Alpine Meadow	Goshal
15	Monzue Tapri	Alpine Meadow	Goshal
16	Siandhar	Alpine Meadow	Goshal
17	Thaltu	Alpine Meadow	Goshal
18	Nala Thach	Alpine Meadow	Goshal
19	Monzu Thel	Alpine Meadow	Goshal
20	Rai	Lower Forest Meadow	Chachoga
21	Dudlu	Upper Forest Meadow	Chachoga
22	Dar	Alpine Pasture	Chachoga
23	Gogle	Alpine Pasture	Chachoga

¹ Names of grazing areas are those used by pastoralists to identify an area. Usually refers to an open meadow area in the forest or an area on the alpine meadow where pastoralists will camp or have a hut. Spelling represents a phonetic approximation to English and should not be taken as a transliteration from Pahari to English.

² Classified on the basis of position of use in the transhumance cycle and altitude.

Table 6. List of plants, edible for animals¹, as recognized by village pastoralists and waterbuffalo herders.

	Cultivated Land ²	Forest ³	Alpine Meadows		
Transhumance Pastoralists	Chalata ⁴	Baza	Bodga	Masha	Narat
	Dratha	Soal	Tolda	Budhu	Nehru
	Pra	Talaba	Kathi	Molara	Leberi
	Srka	Karash	Shati	Jokdi	Kuri
	Mishen	Kuva	Kath	Nrahi	Dunu
	Bhat kuth	Peply gah	Shambli	Dudu	Losar
	Shongt	Namalugah	Bhakli	Dothele	Gadahri
	Che	Pophara	Kosh	Choda	Mingua
	Bura	Bastu	Rai	Min	Bodhi
		Chemnu	Tos	Chode	Shein
		Bandha	Kati		
		Molara	Buj		
		Mander	Panther		
	Waterbuffalo herders		Holie ⁵	Chiera	Nehru
		Masha	Kata	Chuna	
		Mashalin	Anjudi		
		Chana	Surma		

¹ These are plants which are grazed by sheep, goats and waterbuffalo. The list was generated by an elder pastoralist during an interview. Estimates on the number of plants utilized for fodder, human food, fibre or fuel varied between 150-300 plants and a list 80 such plants was generated by another elder pastoralist. Although these do not represent systematically collected, comprehensive lists, it nevertheless reveals that a diversity of plants are known and utilized by local villagers and that their knowledge cannot be easily dismissed. The ability to name plants and identify uses is an indication of an in-depth knowledge of an ecosystem. Uses of plants are not given in this document in respect of the intellectual property rights of local knowledge holders.

² Refers to plants which grow in the fields or on the field margins and which are not sown or planted in some fashion.

³ Includes leaves from trees which are used as fodder.

⁴ These are phonetic approximations of English and should not be taken as transliteration from Pahari to English.

⁵ These are phonetic approximations of English and should not be taken as transliteration from Gujarati to English. Names for the same plant may vary between Pahari and Gujarati.

Table 7. An overview of economic change in Goshal and Chachoga. The change in the number of households which use different kinds of land, animal ownership and orchard ownership from 1962 to 1994.

<u>Year</u>	<u>Goshal Village</u>		<u>Chachoga Village</u>	
	<u>1962</u>	<u>1994</u>	<u>1962</u>	<u>1994</u>
Total No. of households	60	130	60	80
Irrigated agricultural land	60	20	40	22
Non-irrigated agricultural land	60	130	60	80
Kinship based haying land	45	90	none	none
Kinship based grazing land	45	30	20	25
Redistributed common land	0	90	0	60
Orchard	0	90-100	15	80
Cattle	60	90	60	76
> 1sheep or goat	60	40	60	20
> 20 sheep or goats	30	16	60	10
>100 sheep or goats	10	2	10	3

Note: Based on information obtained during a focus group with village elders and cross-checked during interviews with village headmen. The numbers represent the local 'best estimates' and not official data. The year of 1962 was used as a 'marker' in interviews to summarize long-term changes.

PLATES

1. Lower Forest Meadow - lower thach - (about 2 300 m).
2. Key consultant (elder pastoralist) sitting on doorstep with grandchildren after an interview.
3. Example of valley in Lahul where summer grazing grounds are located.
4. Kulu Valley looking down towards Goshal. Village grazing area (note goat) with orchards expanding upslope on the right.
5. Example of land use patterns of Goshal. Orchard, irrigated agricultural land, non-irrigated agricultural land, village-vicinity grazing, kuth and paht land types all occur within land seen in this photo.
6. Village pastoralist's herd of sheep and goats crossing Rohtang pass from Beas river valley to Lahul (4 000 m).
7. Gujjar encampment in upper forest meadow - upper thach - (about 2 900 m). 8. Water buffalo in alpine meadow - theli - (about 3100 m).

