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Use and management of forest in Chakrata tribal region of Uttarakhand Himalaya: A case study of Koruwa village

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Abstract
Forests have always played an important role in the livelihood of rural mountain communities all over the word. They not only provide daily requirement of fuel and fodder for the rural households but are also the source areas of timber, medicinal herbs, grazing grounds for livestock etc. The material sourced from forests in mountains have very crucial role in economy of the village community because the primary activities of agriculture and animal husbandry cannot be carried out without inputs from forests. In mountain areas, fodder crops are not grown because of limited cropping area. The villagers visit the forest on daily basis to bring fodder leaf and grasses to feed stall fed animals such as buffalos and to provide fodder to grazing animals in the evening. The cattle, sheep and goats are generally taken for grazing to in nearby grass and forest areas. Similarly in the absence of alternative fuel source such as LPG, kerosene and electricity, the fuel wood is the only source of cooking. The village community visits the forests almost throughout the year to collect this. Forests also provide the bedding material in form of leaves for animals as in the cold mountain environment, it is a must. This material after use for sometimes is converted into compost with the mixture of cow dung. Finally the composted material is used as organic manure which is extremely crucial to maintain agriculture productivity in the fields. Thus forests are the most important resource for mountain people.
However continuous exploitation of forest resources has resulted in degradation of these resources. The forest-dependent communities have always been concerned about utilization and management of these resources in a sustainable manner. It has been observed that participation of communities in natural resource management has been crucial and necessary in order to use these resources sustainably. In Uttarakhand Himalaya, of which Chakrata region is a part has a tradition of managing the forests with community participation. This approach is popularly known as community forest management and it attempts to involve local people in the management of their surrounding forest areas.
The present study is an attempt to understand the nature of use and community management of forest, with the case study of village Koruwa in Chakrata tribal area of Uttarakhand Himalaya.

Keywords: chakrata region, forest use, forest management, community participation

Introduction
Sustainable use and management of natural resources have been recognized as an essential prerequisite in development strategies all over the world in last few decades. Continuous exploitation and degradation of natural resources has compelled the mankind to seriously think about the direction and speed of development processes. It has been observed that participation of communities in natural resource management is crucial and necessary in order to use these resources sustainably (Leach, *et al*., 1999) [10].
In India the concerns regarding deforestation and environmental degradation led to creation of mechanism to save the forest since 1980s. The Forest Conservation Act, 1980, Wild Life (Protection) Act 1972 and The Environment (Protection) Act 1986 were some of the legislative mechanism to protect the forests. But these acts could not meet all the objectives for which they were enacted. It was realized conservation of resources will be difficult without involving local communities. Thus a new strategy in the form of Joint Forest Management (JFM) was put in place. This strategy focused on involving village communities and voluntary organizations in protecting, regenerating and development of forest lands situated in the vicinity of the villages (MoEF, 2000) [4]. This initiative was in accordance of the principles joint management of natural resources evolved through a participatory mechanism by all the stakeholders (Ramachandra and Nagarathna, 2008) [6]. In case of forest village communities have active involvement in use and management of forest resources. This approach has gained importance because it was argued that management and planning of forest resources near the villages should take care of the needs and aspirations of local community (Bahuguna, 2000) [2].
The community has been actively involved in management of forests in Uttarakhand Himalaya since 1920s and is well-known for a unique forest management institution called Van Panchayat. These were constituted on the basis of rules framed in 1931 (Joshi, 2002) [3]. However there are other informal arrangements created by communities to regulate the use and management of forests in village surroundings in Uttarakhand Himalaya (Agarwal, 2002) [1]. There are community forest management arrangements such as Bhatar and Lakhamandal in Chakrata region. (RLEK, n. d.). One such arrangement is successfully managing the forests around Koruwa village of

Chakrata. The details of use and management system of this lower Himalayan village are described below.

Objectives of Study

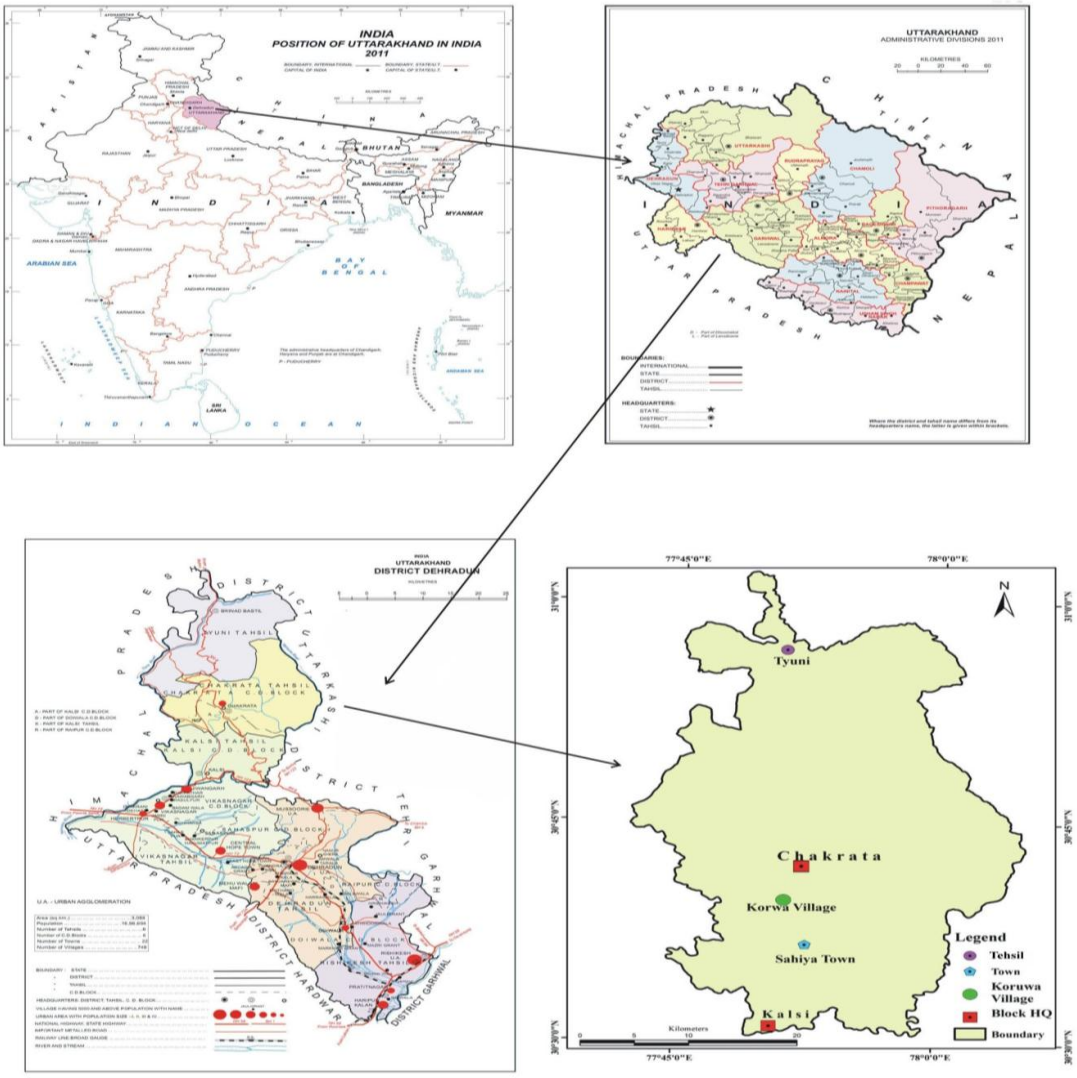
- To understand the use of forests by village community
- To understand the manner in which villagers fulfill their forest-based needs
- To understand the nature and extent to which the community is involved in forest resource management

Study Village

Koruwa village is situated in Kalsi block of Dehradun district, Uttarakhand, India (Fig.1), sourced from Census of India, 2011. The latitudinal situation of Koruwa is 30^0 39' North latitude and longitudinal situation is 77^0 38' East longitude. The village is situated at the height of 1548 mts above mean sea level. It has a population of 503 persons comprising of about 57 households (Census 2011). The village is situated on Dehradun-Chakrata road about 70kms away from Dehradun in the mountainous part of the district. It is almost in the centre of the study area. Village population comprises of 70% of scheduled tribes and 30% of scheduled castes. Situated in warm temperate zone, the village has thick vegetation cover comprising of mainly oak and deodar in the north-west direction. The dense forest is largely because of the collective efforts made by villagers.

Data base and Methodology

The analysis in the study is mainly based on primary data. The methods used for collection of data included observation and interviews with participants. Primary data was gathered through interviews of sample households, key informants and group discussions. A schedule was used in which the questions related to various forest uses and management practices were prominently included. The schedule also included the questions related to individual household characteristics so as to assess the nature of dependence of the household on the forest and their stake in management of this resource. Following the pre-testing, schedule was further discussed and necessary modifications were incorporated. The revised schedule was used to elicit required information regarding use of forest, its management and involvement of village community. A total of 30 households were surveyed. Following are the details of sample household:



***Source*:** Administrative Atlas, Uttarakhand, Census of India, 2011

Fig 1: Location Map of study Village

Salient Characteristics of Sample Households

Village Koruwa is one of the well connected village of Chakrata region. It's location on road side making accessibility of services easy for the villagers and availability of fairly good agricultural land have helped in relatively better socio-economic conditions for the residents of the village which is reflected in the following tables. Of the total sample households, male constitute 60% of the respondents. In terms of age, 40% of respondents are in the age group of 18-45 years, 20% are between 45-60 years and more than 40% are above age of 60 years. As for educational qualification is concerned, there are 30% of respondents in each category of illiterate, primary level and higher secondary level where as another 10% are post-graduates (Table 1).

The information regarding land holding of respondents reveal that there are 40% of respondents who have less than 1 acre of land and the same is percentage of households who have between 2-5 acres of land. There are another 10% of household each who own between 1to2 acres and more than 5 acres of land (Table 2). Another important information of respondents relates to their primary sources of income and it can be seen from the table below that agriculture acts as primary source of income for 40% of people while agriculture and animal husbandry together are primary sources of income for another 30% of respondents. The government service and shop-keeping comes next as sources of income (Table 3). On the whole the study village presents a picture of relatively comfortable village community in a marginal mountain area.

Table 1: Demographic characteristics (in percentages)

Number of Respondents	Gender of respondents		Age (in years)			Educational Classification of respondents			
	M	F	18-45	45-60	>60	Illiterate	Primary	Higher Secondary	Post-Gradutes
30	60	40	40	20	40	30	30	30	10

Table 2: Land Holding- Percentage of respondents in different land-holding classes

Less than 1 acre	1-2 acre	2-5 acre	More than 5 acre
40	10	40	10

Table 3: Primary source of income: Percentage of households as per different sources

Agriculture	Agriculture and animal husbandry	Government service	Shop keeping
40	30	20	10

Fuel Wood Use by Village Community

In India fuel wood is a primary source of cooking energy in the majority of households in rural areas. Fuel wood is necessary to satisfy basic household requirements for cooking and heating in the region. There seems to be no viable alternative to fuel wood as the source of basic energy as people livelihood is generally at the subsistence level. The rural inhabitants of the Himalayan region have been utilizing forest resources for their livelihood for generations (Singh, *et al*., 2010) [8]. Fuel wood is the important source of energy in the mountains of Garhwal Himalaya. Due to limited availability of alternative sources of energy, people of Chakrata region are also dependent on fuel wood resources. The remoteness, backwardness and low connectivity with the urban areas makes rural community more dependent on forests. Thus people meet most of their demands from the nearby forests.

The study about the consumption of the fuel type by the households in the village reveals that they are using three types of sources namely, fuel wood, LPG and electric stove. However fuel wood consumption accounts for the highest share as this is used by all the households in various quantities. The consumption of fuel wood was higher in case of large landholding households as they have easy access to fuel wood on the boundaries of their fields. The LPG connections are available with 50% of the sample households but they use it only for limited purpose such as preparing tea or boiling small quantity of water.

In the village fuel wood is used as main source of energy for cooking because of poor economic condition of people and easy availability of firewood from nearby forest. Fuel wood consumption varies in different conditions. In Koruwa village average fuel wood consumption in summer was less than 5 kgs per day in case of 40% of households, 5-10 kgs in case of 50% and more than 10 kgs in case of remaining 10% of households. In winter the consumption increases because of cold climate. The survey data show that it was less than 10 kgs/day in case of only 10% of household, 10-20 kgs/day in case of 80% of households and 20-30 kgs/day in another 10% of households (Table 4).

Table 4: Average Fuel wood Consumption per day

	In Summers			In Winters		
Fuel wood (kgs)	<5	5-10	>10	<10	10-20	>20
Percentage of Households	40	50	10	10	80	10

The data show that out of the total requirement of fuel wood 75% is fulfilled by forest while remaining 25% is taken care by crop-residue. The quantity of fuel wood collected by the villagers depends on the requirement which further decides the number of days they would be visit forest in a month. It was reported that 60% of the respondents visits forest for less than 10 days/month whereas 40% visits forest 10-20 days/month. A change has been noticed in fuel wood consumption from forest in last 20 years. The survey shows that fuel wood consumption has decreased primarily because of the availability of LPG and decrease in number of family members. In some cases it has reduced by more than 50%.

Table 5: Fuel wood related information of sample households (in percentages)

	Share of Fuel wood brought from forest			forest visited for Fuel wood collection (no. of days/ month)		Change in fuel wood consumption in last 20 years		Fuel wood consumption reduced by (in %)		
Forest use (in %)	25 -50	50-75	>75	<10	10-20	Same as earlier	decreased	<25	25-50	50-75
% of Household	20	nil	80	60	40	10	90	10	60	20

Forest use for Fodder

In India, agricultural practices and animal husbandry are interlinked. Agriculture is by and large based on livestock. Livestock is the essential part of mountain society and to maintain the livestock, the village community mostly relies on fodder extracted from forests, grasslands, agriculture and agro-forestry. The livelihood of hill people is mainly dependent on marginal agriculture on the one hand and rearing of livestock, on the other (Singh and Sundriyal, 2009b) [9]. In this way livestock play an important role in nourishing the economy. Livestock are considered as valuable assets of the rural poor and are critical component in supporting their livelihoods particularly during unfavorable times. Livestock existence is as much part of the hill economy as the people themselves. They not only provide much needed draught power for crop production but are the source of milk and meat products. Agriculture and animal husbandry have been the primary source livelihood for the rural Himalayan society as the terrain does not provide the scope of many other economic activities. Crops provide feed and fodder while in return livestock supply draught power and manure, as well as milk and meat as a source of cash income (Negi *et al*. 2010) [5].

Forests are an important component of the hill agrarian economy. Agriculture with animal husbandry is prime occupation of village communities of Study area. Due to small land holdings, easy access to common property resources and emphasis on food grain production, fodder cultivation is hardly practiced. Therefore fodder requirements are met from various sources such as green leaves from nearby forest area, crop residues, ground flora from the forest and cropping areas, dried grasses, which are stored on treetops in heaps and used as feed during lean periods when little fodder is available. During winter months when all other fodder sources are exhausted leaf fodder is a very useful resource.

The primary data collected about the quantity of the fodder sourced from the forest show that 10% of respondents meet less than 25% of their fodder requirement from forest. In case of 15 household, 25 to 50% of fodder demand was met from forest whereas it was between 50 and 75% in case of 45% of respondents while 30% of respondents fulfilled more than 75% of their fodder need from forest. When asked about the days for which a household member visits forest, it was informed that 10% of households visit the forest between 10-20 days whereas 90% go to the forest between 10 to 20 days. In terms of quantity of fodder collected, 20% respondents said that they collect less than 25 kgs in each trip, 40% said that they collected between 25-40kg per trip and equal number of households collected more than 40 kg per trip. It was also informed by the respondents that in case of 90% of them, primarily women do this job. When enquired about the type of forest utilized for fodder collection, 80% of respondents go to *van panchayat* (forest maintained by the village community) for fodder collection and remaining 20% families fulfill their fodder requirement from khat van (forest under the management of a number of villages).

Table 6: Fodder use by sample households (in %)

No. of Households	Share of Fodder brought from forest (in %) and Percentage of Households				Forest visited for Fodder (no. of days/month)		Quantity(in kg)			Forest used for fodder	
Forest use	<25%	25-50%	50-75%	>75%	10-20	>20	<25	25-40	>40	Khat van	Van Panchayat
30	10%	15%	45%	30%	10%	90%	20%	40%	40%	20%	80%

Community based Forest Management in Koruwa Village

Koruwa is a village where community has been fighting for its forest rights for a long time as the forest plays an important role in life of people of Koruwa. The community of Koruwa has high dependency on forest in terms of forest produce collected from the forests. According to the community members a parcel of land near the village was developed as a community forest by the earlier generations. This forest has a plenty of deodar trees. The community cared and managed this forest for many years. But after more than 10 years of its establishment the government declared that area as government property and restricted the community from collecting the forest produce without the official permission. This forest is carved out of Civil-Soyam forest on revenue land of the village. Banj (*Quarcus leucotrichophora*) and Deodar (*Cedrus deodara*) are main species of this forests. Other prominent trees include Burans (*Rhododendron arboretum*), Kafal (*Myrica esculenta*) etc. Forests are spread in about 110 hect with about 50 hect of Banj forest and 60 hect of a mixed forest including Banj and Deodar with a predominance of Deodar. This well stocked forest stands out in otherwise open forest area in the surroundings. It has been only possible because of the initiative of the community, which results in a dense canopy cover of the forest.

The people of this village have managed their forests by formulating various rules and regulation to regulate access and use of community-managed forests. These self-imposed rules and their strict enforcement have helped in maintaining the robust forest cover and its sustainability. The forest is managed by the villagers through an informal mechanism set by the villagers. The villagers organize meetings to discuss issues related to community forest whenever required. One

member from each family participates in this meeting. There is no fixed individual to chair the meeting and anyone present can do that. All members have equal status and the decision is taken collectively.

The entry to the community forest is prohibited during large part of the year and the area is opened for use during the winter months only. Generally community forest remains out of bounds for nearly nine to ten months and is accessible only during winter months of January and February. The community members usually organize the meeting in November/December to take the decision regarding opening of a certain patch of forest area to be accessed during period of forest-produce extraction. A chokidar (guard) is appointed to inform villagers about the meeting and the decisions taken in the meeting. Once the date is decided to open the forest in the meeting, the same is announced to the whole community of villagers. The meeting (informal assembly of villagers) also decides about the area of forest to be opened for extraction of fuel wood and fodder. The extraction is prohibited in areas outside the designated one. Along with the decision regarding the specific patch to be opened in a particular year, the decision is also taken about the duration of period when the forest will remain open. Lopping of the trees for fodder is allowed to all the members of the community during this specific period. The patches of forests are opened on a rotational basis and once an area is lopped, it is rested for next 4-5 years. It helps in rejuvenation and regeneration of forests. The system has helped in excellent growth of village forest and the entire community has helped in maintenance of the forests.

When the forest is opened during winter one member from each household can go to forest and can bring one head-load of green leaves every day. Villagers who have large number of livestock can bring fodder in other months also apart from January/February but for this they have take special permission from the informal committee managing the forest and one head-load can be brought on every third day. This green-leaf fodder is extremely important for the livestock population as there is no other source of fodder in winters. While lopping of the trees is restricted except during period of accessibility, the collection of fallen leaves, dead and fallen wood is allowed at other times. Dried leaves which are used as bedding for the cattle and are later utilized as organic manure are collected during early summers. It also helps in preventing of fire as the material that can help in quick spread of fire is removed to a large extent. The extraction prohibit cutting of any tree, whether green or dry, without permission of village committee. But the village committee may grant permission for cutting of dried trees from the forest but under no circumstances can a green tree be cut.

The field work revealed that the villagers are aware of their traditional rights in forests. For example all the respondents said that they have traditional rights of using Reserved forests, Civil/Soyam forest and Khat forest to collect fuel wood, fodder, timber and grazing animals. While the fuel wood and fodder collection is done by individual household from different types of forests, the villagers fulfill their timber requirement through their entitlement in the reserve forest area of Kanasar, Budiyar and Devban ranges. This entitlement is locally called 'Maafi trees', a term referring to concession granted to residents of whole of Jaunsar-Bawar according to Pannalal Settlement. People of Koruwa, like other villages in the region are entitled to a fixed number of trees for the entire village in above three ranges. They are allowed to fell 3 trees every year for all the households of the village collectively. However, as the available timber quantity is limited against the requirement, the distribution of timber quantity among the households is decided on the basis of urgency of the households. This is done in the village meeting by consensus.

The response elicited from respondents show that presently 60 % of respondents participate in forest management but only in community forests. In response to the question as to whether they would like to participate in management of other types of forests (e.g. reserve and civil-soyam), respondent answered in affirmative but would restrict their participation to plantation and protection of forest particularly from fire. This they would do in expectation of some rights to use the forest.

Conclusions

The present study has highlighted the use and management of forest resource by village community in Chakrata region of Dehradun district, Uttarakhand Himalaya. This has been done with the help of a case study of Koruwa village that has a well-managed community forest. The study shows that villagers are very much dependent on forest for their fuel wood and fodder requirements. Since fuel wood is a daily requirement and people do neither have easy access nor affordability for the commercial energy (e.g. LPG, electricity), they have to depend for arranging fuel wood on forests to a very large extent. Primary survey has sown that 80% of respondents fulfill more than 75% of fuel wood need from forest. Similarly in case of fodder requirements, an essential need of agricultural community, forests are the main source as more than 50% of demand of 75% of households is met from forest. This high dependence has resulted in community's concern for forest management. The villagers of Koruwa have framed strict rules for use and management of their community forest which has resulted in well stocked forests that meets the requirement of fuel wood and fodder of the community with ease. Thus Koruwa presents a model of well managed community forest.

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