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Indigenous Knowledge and Conservation Practices in Tribal Society of Western Himalaya: A Case Study of Sangla Valley

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KEYWORD Tribal societies; indigenous knowledge; conservation practices; natural resource management; sustainable development.

ABSTRACT The tribal people of the Sangla valley of Kinnaur district of Himachal Pradesh constitute a special category of economically backward area due to its inaccessibility and inhospitable geo-climatic set-up of the region. Subsistence agriculture, livestock rearing and trading off the minor forest products are the only means of economy activities of the marginal people. The tribals have accumulated their own innovative traditional knowledge and have developed a congenial relationship with the locally available biological resources and diverse geo-climatic conditions thus, establishing a perfect harmony with the nature. These people since time immemorial are practicing the indigenous means of conservation of cultural and biological diversity. The existence of an age-old tradition of preserving forests on the ground of religious and mythological beliefs has become a key factor in the revival of degraded areas. A meaningful development of the are could only be achieved when cultural practices (based on indigenous knowledge) are synthesized with the ecological and economic development packages/programmes by involving local people of the region.

INTRODUCTION

The western Himalaya covers approximately 11 per cent of the Himalayan landmass and about 90 per cent people in these areas live in villages. People in their traditional settings are well aware of the values of conserving social, cultural and biological resources. Since generations, they have developed and accumulated knowledge and effective device and methods for conservation, protection and preservation of such value systems. The tribal society of western Himalaya is highly traditional and has characteristic manifestation of man's cultural interactions with nature. These traditional societies have, in turn, evolved multitude of strategies to make effective and harmonious use of resources. During this process, these ethnical societies have resorted to cultural adjustments for a harmonious articulation between community techniques and technologies. Indeed, culture has played a vital role in the management of at least the biological resources tuned to the region. If natural reserves do not fulfill the basic needs of the individuals then society starts changing resulting into a new phase of tribal culture. The society decides its own goals and methods ensuring sustained improvement in the quality of life without affecting the traditional values. Therefore, culture plays vital role in development and conservation of traditional society and biological resources (Pernetta and Hill, 1984; Cohn, 1988; Ramakrishnan, 1992; Scott and Walter, 1993; Davis and Wali, 1994; Singh, 2001). The interlink between culture and conservation in the Himalayan traditional society have not received any significant recognition (Singh et al., 1996). This study, therefore, mainly focuses on the cultural facets traditional society of western Himalaya where innovation of science and technology is not bringing significant change in their day-to-day life style but rejuvenation of their indigenous knowledge based conservation practices and pertaining value addition could be a viable mechanism of sharpening and strengthening of overall socio-economic condition and livelihood of the tribal communities.

STUDY AREA

Geography and Climate

The study villages are located in the Sangla valley which is nested in the Kinnaur district of Himachal Pradesh in India. It is part of the Great Himalayas conversing from 31° 6' to 31° 30' N and 78° 10' to 79° E. The length of the valley is about 65 km which covers an area of nearly 300 sq. km. accommodating approximately 9500 inhabitants. The valley comprises a number of small watersheds which find their way into the Baspa river. The hamlets are scattered all along the valley. The strips of cultivable lands in valley vary from a few hectares to a few kilometers. The

valley is relatively wider near Sangla village. Vegetation cover on the left bank of the river is, in general, very sparse. Tree species like *Quercus semicarpifolia* and *Betula utilis* are predominantly found at higher elevation. North facing slope is relatively gentle and has adequate vegetation cover, farm fields, soil cover and sporadic settlements.Upper most part of the mountain peaks are usually covered by perpetual snow cover. A major part of the valley remains cut-off from other parts of the State due to heavy snowfall during winter period. The rocks in the valley varied in age from pre-cambrian to permocarboniferous. Schists, gneisses, granites, quartzites, phyllites, conglongrates, quartzites slate, dolomite and limestone are the major rock types. Rocks have been highly exposed along the Karchham-Sangla road. Soil type is sandy to sandy loam and is highly fragile. Thus, the problem of landslide and erosion is rather very common in places where the land is not properly terraced.

There are four seasons: spring starts from middle of March to middle of May; summer from mid May to mid September; autumn from mid September to November and winter season from December to March. The summer is mild and with the on-set of monsoon there is a gradual decline in temperature. After the receding of monsoon the mercury drops further thus winter sets in. The period from November to March is of coldest. On the basis of rainfall, the district can be divided into two zones- wet zone and dry zone. Usually rainfall occurs in monsoon and winter periods.

Village and the People

There are eleven villages scattered along the Sangla valley. The houses are two storied, which are built up of stones and woods. These are either slated or flat roofed and are white washed and shining. The ground floor is used for cattle shed while the upper storey for living purpose. It is considered that people are from the Aryan stock, but a significant trace of Mongoloid feature has also been noticed in them. The inhabitants are generally of dark complexion but good looking with a well-built muscular stature. They are frank, active, generous, hospitable and highly honourable in their dealings. Two principal castes/kanets i.e., Rajput and Scheduled Castes are common. Apart from Hinduism, people mostly follow Buddism. Sheep and goat rearing is very common. The villagers believe in swears of the local deity. There is also a sprinkling of polyandry practised amongst the people. People are mostly dressed in woollen clothes. Their clothing is well suited to the climate and culture. Women wrap up a woollen shawl like garments locally known as *dohru* in a slightly different way than the *saree*.

METHODOLOGY

In an effort to document the indigenous knowledge based practices of the tribals, in general, the preliminary survey was conducted in the entire Sangla valley. After reconnaissance of the valley, three villages namely Batseri/ Bosering, Rakchham and Chhitkul at different elevation were finally selected for a thorough study. While selecting the villages it has been ensured that these villages would represent all characteristics of the valley. Equal representation was given to each village and a total of 75 per cent families from selected villages were interviewed randomly. The questionnaires were designed based on interactive discussions with individual and group of the people in the entire valley. The fields of farmers were visited and an inventory was made for crops and biological resource use and conservation practices. All the respondent farmers were categorised into three farm size classes viz., small (farm land holding < 1 ha), medium farm (1-2.5 ha) and larger farm (>2.5 ha). Most of the interviewees belong to small and medium size farm-holdings. Women were given equal preference for the purpose of collecting data. All information pertaining to the use and conservation of endowed biological resources including plants used as medicines for traditional health care system were also recorded. Further, farming practices such as factors favouring cultivation of indigenous landraces, crop diversity and cropping patterns and use of different tools and craftsmanship were extracted through a thorough and detailed discussion and filling up questionnaires over a period of entire year 1996-97. The role of deep rooted culture in eco-development and management programmes were also enquired from respondents and were recorded into ecological, social and economic development framework.

RESULTS AND DISCUSSIONS

Sangla valley covers about 0.5 per cent of the State and nearly 5 per cent of the district area (Table 1). There are 11 villages covering 1815

households and 9454 population in the entire valley. Since, there is no town/city in the valley, the total population lives in the rural areas engaged in agriculture and animal husbandry as their prime economic activity. Literacy rate is relatively poor in the Sangla valley as compared to district and state levels. Higher sex ratio of the area indicates that the number of females are relatively more than males. The sex ratio is higher in the other rural area of the Himachal Pradesh as well (Singh, 1998).

Table 1: Socio-economic attributes of administrative boundaries

Attributes	*State*	*District*	*Sangla valley*
Population	4280818	59547	9454
Area (Sq. km.)	55673	6401	300
Population density (sq. km.)	77	9	32
Sex ratio	973	885	1043
Literacy rate	42	36	33
Number of villages	18721	77	11

Source: Census of India, 1981, Himachal Pradesh District Census Handbbook (Kinnaur District), Series 7.

The salient features of the study villages are presented in Table 2. The village Chhitkul is located at higher elevation (3400m) and Batseri village is situated at lower elevation (2800m) whereas Rakchham village is situated at middle elevation (3000m). The road ends at Chhitkul, which is the last village of the Sangla valley. The area from Batseri to Chhitkul has been declared as Rakchham Sanctuary under Wild Life (Protection) Act 1972 of the Government of India. There is no vegetation cover around the Chhitkul village except stunted growth of *Berberis* species. This village remains under snow for a period of about 4-5 months. Inhospitable geo-climatic area of this village is responsible for a lower population while, higher population is noticed in the village Rakchham followed by Batseri. Similarly, restricted geographical area of the Batseri has lesser area under cultivation. Per household cultivable land holdings of the study villages is less than 1 ha which is close to the estimate reported in other studies (Singh, 1996; Singh et al., 1997a,b). The area not available for the cultivation and area under culturable waste (including common grazing lands and sacred area) are higher in Rakchham village followed by Batseri village. Rearing of the livestock is an integral component of farming system. Distress selling of sheep and goat to earn money is not uncommon. Better climate, geography and soil cover supports high varieties of crop cultivation in Batseri village as compared to other two villages. Livestock holding is higher in Chhitkul village which reveals that their economy depends primarily on animal husbandry.

Table 2: General characteristic features of the study villages at a glance

Attributes	*Batseri*	*Rakchham*	*Chhitkul*
Village area (ha)	144	194	121
Approx. elevation (m amsl)	2800	3000	3400
Number of households	115	140	95
Human population	690	885	575
Number of cultivated crops	13	9	7
Total cultivated area (ha)	81	119	85
Area not available for cultivation (ha)	26	34	15
Area under culturable waste (ha)	37	41	21
Total livestock population	1188	2006	1640

Cultural diversity, environmental complexity and precariousness in the farming produce have forced people to practice a variety of ways and means of subsistence knowledge based techniques of self dependency (Table 3). In this process, people have been utilising locally available resources in various forms. Preparation of organic manure by animals' dung and urine with forest based leaf litter, use of wild edibles and medicinal plants, trading off minor produce,

Table 3: Existence of traditional knowledge based practices in the study area.

Parameters/practices	*Response (per cent)*
Existence of traditional houses	100
Existence of skilled person (mason, blacksmith)	20
Number of hydropower operated watermills	30
Number of hydropower operated sawmills	6
Use of wild edibles	100
Use of medicinal plants	100
Cultivation of traditional crops	100
Operation of organic farming practices	100
Operation of traditional breeding patterns	65
Preparation of handicrafts	90
Wearing of traditional dresses	90
Resolution of social conflicts through informal village committee	100
Beliefs in deota/deity committee	100
Conservation of biodiversity through religious beliefs	100
Use of traditional implements/tools	100
Participation in fairs and festivals	95
Domestication of wild animals and its breeds	95

cultivation of traditional crops and artisan activities are amongst some of the common indigenous practices. Since ancient times, people have developed a symbiotic relationship between endowed biological resources and cultural diversities. Traditional ways of practising agro-ecosystem have been evolved centuries ago through a series of trial and error over a spatio-temporal scale. Indigenous method of harvesting natural water for a variety of purposes is very common. People use water for drinking purpose, irrigation of crops, running watermills to grind grains, use of sawmills to make plank etc. Incorporating the scientific inputs to modify these old systems for better hydropower use will be an asset to the tribal people. Diverting water through small canals will indeed be helpful for proper use of water rather than making big dams/ hydro-electric project which may prove to a threat to the otherwise fragile ecosystem of the Himalayan region. Use of similar traditional knowledge based practices have also been reported from other region of the Himachal Pradesh (Singh et al., 1996; Singh et al., 1997a,b). Protecting forest (sacred groves) areas on the ground of religious beliefs have also been noted in the area which is rich in biological and cultural diversity (Singh, 1997a,b; Singh, 2000). Such practices are regulated through informal committee consisting of head priest (*Talrasa*) and five other people. Similar practices were also noted from other part of the Himachal Himalaya (Singh et al,. 1996).

A total of 16 crops was being cultivated by the subsistence farmers as staple food (Table 4). All crops are locally bred. Crops like wheat, jao, ogla and phapra were cultivated as major food crops. Knowledge regarding different crops and different fields is distinct. The people commonly practice rotation of farm fields for the replenishment of nutrients. Majority of the crops were harvested during rainy season; heavy snowfall did not permit the cultivation of winter crops. Crop diversity in the study area is significantly high when compared with north-east Himalaya (Mishra and Ramakrishnan, 1982), central Himalaya (Pandey and Singh, 1984) and other mountainous regions (Garcia-Ruiz and Lasanta Martinez, 1993; Sarmiento et al., 1993; Dougherty, 1994). As compared to mixed cropping in other parts of the Himachal Pradesh (Singh, 1996; Singh et al., 1997b), single crop cultivation is quite common in the study area.

Table 4: The diversity of crops grown in Sangla valley.

Common name	*Botanical name*	*Sowing period*	*Harvesting period*
Amaranths	*Amaranthus* spp.	Apr-May	Aug-Sept
Bathu	*Chenopodium* spp.	Apr-May	Sept
China	*Echinochloa frumentacea*	Apr-May	Aug-Sept
Gobhi	*Brassica spp.*	Apr-May	Aug-Sept
Jao	*Hordeum vulgare*	Apr-May	Aug-Sept
Maize	*Zea mays*	Apr-May	Aug-Sept
Moli	*Raphanus sativus*	Apr-May	Aug-Sept
Moong	*Vigna mungo*	Apr-May	Aug-Sept
Mustard	*Brassica* spp.	May-June	Sept
Ogla	*Fagopyrum tataricum*	May	Sept-Oct
Phapra	*F. estulentum*	May	Oct
Pea	*Pisum sativum*	Apr-May	Sept
Potato	*Solanum tuberosum*	Apr-May	Sept
Rajmah	*Vigna sinensis*	Apr-May	Aug-Sept
Salgam	*Brassica* spp.	Apr-May	Aug-Sept
Wheat	*Triticum aestivum*	Mar-Apr	Aug-Sept

Landscape variability and environmental uncertainty have favoured the evolution of multiple ways of cultivation of varieties of local crops. Crop cultivation in valley and terraced lands varies and depends on field quality. However, introduction of fruit bearing tree like apple in Batseri village and in the lower areas of Rakchham village is hardly 15 years old. Large-scale plantation of apple in the area is required thorough landscape study and planning (Singh and Ram, 1997).

Twelve plant species were found to be used by local people for medicinal purposes under their traditional health care system. Some of the commonly used species were given in Table 5. The frequency of use varied depending upon the species and ailments. Technical know-how to make ingredients and doses used for respective diseases were highly praise worthy. Some of the medicinal plants were also used to cure animal diseases. Owing to high market demand of some of the medicinal plants like *Aconitum heterophyllum, Jurinea macrocephala, Picrorrhiza kurrooa* and *Podophyllum hexandrum* are being harvested and collected regularly on large scale for commercial purpose. Older people have full faith in the use of medicinal plants and also show their enthusiasm to educate the younger generation. Imparting scientific knowledge for cultivation of agricultural fields and waste lands, which are close to similar climatic regions of high altitudes, could promote

Table 5: Local knowledge related to use of common medicinal plants

Botanical name/local name	Usages	% Family used
Aconitum heterophyllum/ patish	Root powder remove colic and indigestion	100
Banium paraclum/ kala jeera	Seed powder cure jaundice, cough, cold	95
Berberis spp./Kashambal, chava	Root powder used to cure joint pain	95
Dactylorhiza hatagirea/Hathpanja	Paste of tuber is applied on cuts, wounds	100
Dioscorea deltoidea/singli-mingli	Tuber used as soap and stomach problems	100
Hippophae spp./surachu	Cures body pain	90
Jurinia macrocephala/dhoop, gugal,shur	Root used as stimulant during child birth, check excessive bleeding and fever	95
Nardostachys grandiflora/ Balchhar,khome	Root extract cure hysteria,epilepsy and root powder cures gastric problems	98
Picrorrhiza kurrooa/ karoo, kori	Root powder cures colic,bodyache, diarrhoea	98
Podophyllum hexandrum/Bankakroo	Root powder cures colic and vomiting	100
Saussurea lappa/kuth	Root extract cures cough and cold	100
Taxus baccata/Sigacha	Bark used in tea and cancer treatment	98

the economic benefit of the subsistence farmers and also could accelerate regeneration of species in their natural environment. Thus, establishing a harmonic symbiotic relationship between the locals and the natural resources seems for preservation of social, cultural, economic and natural heritage.

Indigenous knowledge pertaining to the use of various plants for different purposes has been noted among the people of the study villages (Table 6). Leaves of species of *Pinus*, *Abies*, *Picea* and *Cedrus* are collected once a year (on 25th October) for the purpose of making organic manure which is ultimately used for crop production. Whereas leaves of *Betula*, *Eugenia*, *Juglans* and *Salix* are used for fodder purposes during the lean period. The area is endowed with a rich variety of wild edible species of food value. Wild edibles are known for their high nutritive values which improve milk production of milch cattle, goats and sheep and also keeps the body warm during the chilled winter season. Hard labour and low monetary value involved in the collection of wild edibles are not yet commensurate with the market demand. Therefore, availability and growth of these plants are not limited. There is an urgent need to improve the utility value of these wild edible plants by innovating value added products so that better economic returns are ensured to the farmers.

Similarly, people have been using a number of plant species for fuel wood, timber, tools and implements making on a routine basis (Table 7). Like leaf litter collection, collection of fuel wood is allowed only for a day once in a year (in the month of November). Usually two people from a family are allowed for wood collection. Such practices are strictly observed in remotely located villages and are controlled through informal committee of the village. Such operations helped in equitable use of natural resources so

Table 6: Knowledge related to use of various plant resources

Botanical/ local name	Litter	Fodder	Fuel/ timber/ tools	Edibles	% Response
Abies pindrow/ rai,rahi	+	-	++	-	100
Betula utilis/ bhojpatra, shrabra botang	-	++	++	-	100
Cedrus deodara/ deyar,kelbangbotang	+	-	++	-	100
Eugenia spp/ jamun, krun	-	+	-	Fruits	98
Hippophae spp./ surachu	-	-	-	Fruits	94
Juglans regia/ akhrot, kachh	-	++	++	Fruits	98
Picea morinda/ tosh, pan	+	-	++	-	100
Pinus excelsa/lim	++	-	+	-	100
Pinus gerardiana/ chilgoza	++	-	+	Seeds	100
P. longifolia/ chilambotang, golda	++	-	+	-	100
Prunus armeniaca/ behmi	-	-	-	Fruits/ pickle/oil	100
P. avium/khotali, cherry	-	-	-	Fruits	98
P. persica/khurmani, chuli	-	-	-	Fruits/ pickle/oil	98
Salix spp./ willow, shon	-	++	+	-	98
Viburnum coriaceum	-	-	-	fruits	94

++, major; +, minor; -, no use

that long term indigenous conservation practices could be maintained.

People are well aware regarding the artisan work and the usage of varieties of local tools and implements to carry out their day-to-day domestic needs and activities (e.f. Table 7). Some of them are skilled in preparation of wooden and bamboo based items while a few of them for making iron articles symbolising their interdependence and self sufficiency. Low landholdings people comprising of socio-economically weaker section of the society are more dependent on such locally designed tools. However, poor people largely depend on indigenous tools to save their economy. It has been felt that there is a strong need to improve the capacity of the locally designed implements such as watermills, *raksh* and *khadi* so that small scale industry coupled with employment could be generated at the household level.

All animals in the study villages are of local breed (Table 8). Cows, bullocks, goats, sheeps, mules, ponies and yaks constitute the major livestock. Wild yak is domesticated for the breeding purposes and the offspring's of yak is used for various purposes. Bullocks are used for ploughing of farmer fields. Traditional knowledge related to preparation of milk products is very unique. Sheep and goats are domesticated in remote villages solely for wool production and distress selling. Mules and ponies are used to fulfil their transportation need and are reared usually by small landholders whose livelihood is dependent on all these wild animals as these are geo-climatically suited to the area.

CONCLUSION

The tribal people of the Sangla valley in Kinnaur district of Hmachal Pradesh have indigenously been conserving natural resources since generations and were well aware regarding environmental protection. Socio-cultural diversity and environmental complexity have favoured tribal people to develop symbiotic relationship with the locally available resources and precarious nature. Such conducive practices have helped the people for better pursuit of livelihood in particular and management of the entire watershed/landscape in general. Economy of the people could be improved by empowering the efficiency of the locally available resources, encouraging small scale industries, increasing market values of medicinal plants and food items, sensitisation of people for participation in development planning and awareness building

Table 7: Local implements and tools used in the study village.

Common/local name	*Usages*
Hal and jua/nag and gral, koal	Used for ploughing the farm fields
Gaiti and kuti/khot	Used for digging, weeding
Kulhari/lasta	Used for cutting of wood, hedges
Basula/washing	Used for wood finishing and plank making
Darat, hasia/thame and chatam	Used for cutting of hedges, crops, grasses etc.
Kilta/koting	Used for carrying of organic manure, food grains etc.
Rassi/lat	Made up of sheep hairs and used as rope
Kot/kot	Made up of akhrot tree and used as scale for grain measurement
Gharat/gandhotar	Act as watermills to grind grains
Takli/tawali	Used for spinning of wool
Raksh and khadi/phoshang and khadi	Used for preparation of shawl, pattu and patti

Table 8: Usage of different local livestock in the study area.

Common name	*Local name*	*Usages*
Bail, bullocks	Joo,gara,gira,buma	Ploughing and drought work
Gai, cow	Jomo,gare,gire,bume,brume	Milk, milk products, wool and its products
Bher, sheep	Hulas	Breeding, drought, wool, skin as baggage preparation
Bher, sheep	Khas	Milk, wool and baggage preparation
Bakri, goat	Balu	Breeding purpose, wool, drought, baggage
Bakri, goat	Bhakhor	Milk, wool and its products and baggage
Ghora/ mule	Rang	Carrying luggage, grains etc.
Gadha/ash,ponies	Phoch	Used as carrier
Yak	Yak	Domesticated wild animal act as breeder

in indigenous based packages. However, planning to improve their overall economy should be based on the cultural and social sentiments of the local people.

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