



SUSTAINABLE MANAGEMENT OF COMMON PROPERTY RESOURCES IN UTTARAKHAND: FACTORS AT WORK

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Abstract: *Common property resources (CPRs) play multiple roles in maintaining ecological and socio-economic sustainability in mountain environment of the Uttarakhand. Life in this region has evolved through an intricate, complex and dynamic interplay between man and nature. This study gives an overview of the ongoing practices pertaining to the management of three major CPRs i.e. Forest, Pasture and water, in the mountain villages of the Uttarakhand followed by identification and analysis of various factors influencing the sustainable management of these resources. The study reveals that the management of CPRs in the mountain villages of the Uttarakhand is significantly influenced by the various socio-economic, Bio-physical and external factors. The factors influencing the management of CPRs vary from village to village. Some of the village communities have developed their own rules and regulation for managing and harvesting their CPRs in sustainable way to meet their day-to-day demands, whereas in other villages, status of CPRs is worst. However, these CPRs embrace wide possibility of being the key for sustainable socio-economy of the user community in the Uttarakhand Himalayas. Though, age old social factors inherent in communities are quite difficult to be modified for enhancing the sustainable management and equitable allocation of common resources, the study recommends emphasizing on some key areas to cope up with tragedy of the commons in the Uttarakhand Himalayas.*

Key words: *Sustainable, Management, Common Property resources, Uttarakhand, Himalayas, Panchayat.*

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INTRODUCTION

The term 'common property' has been a controversial matter in practice, partly because of differences at the philosophical basis of traditional views as opposed to western scientific resource management (Berkes, 1991). This becomes true when we talk about the property rights regarding the natural resources. While defining the term 'common property', the controversies arise through some essential elements. Firstly, the ownership or control to access, secondly, the type of resources, which can be considered as common and third, is the matter of substractibility.

The common property resources may be placed within three property right regimes i.e., Open access, Communal property and State property. Berkes (1989) has mentioned the characteristics of these property right regimes with the help of Grima & Berkes (1989), Regier *et al*, (1989) Gibbs & Bromely (1989), Jacobs & Munro (1987), Bromley (1985), Ostrom (1986) and Wantrup & Bishop (1975) in following manner;

1. Open access Free for all; resource use rights are neither exclusive nor transferable; These rights are owned in common but are open access to everybody (and therefore property to no one).
2. State property Ownership and management control; is held by the nation, state or crown; public resources to which use-rights and access rights have not been specified.
3. Communal Property Use rights for the resource are controlled by an identifiable group and are not privately owned or managed by governments; there exists rules concerning who may use the resource, and how the resource should be used; community based resource management system; common property.

Although, the issues related to the importance of CPRs are not new, yet the proper attention by the academicians and scientific community in this direction has been paid in late sixties and particularly after the write up of Garret Hardin's (1968) *Tragedy of the Commons*. Till the date, a number of evidences have been reported about the importance and vital role played by the CPRs in economic activities of the village community and particularly in the survival strategies of the poor (Jodha, 1986; Wade, 1987). However, it has been strongly argued that management of such resources requires collective decision



making and the enforcement of agreed upon rules among group members: hence, local social organization and institutions are important (Berkes et al, 1998).

Common property resources (CPRs) play multiple roles in maintaining ecological and socio-economic sustainability in mountain environment of the Uttarakhand. Life in this region has evolved through an intricate, complex and dynamic interplay between man and nature (Mishra et.al.2001), Economy of this region is largely built around a holistic and complex network of cultivable land, forests, water and other lands. Commercial forestry, expansion of agricultural land and fuel demand has caused environmental degradation in this region (Jodha, 1992). Most of the measures adopted by different government and non-governmental agencies to tackle this problem could not address the same in an effective way. This is partly because of vast socio-economic, geographical and cultural diversity and mostly due to the development of the region based on uncritical evaluation and extrapolations from western experiences of the economic growth model with gross disregard to socio-cultural matrix of its traditional societies (Topal et al., 1998). This study gives an overview of the ongoing practices pertaining to the management of three major CPRs i.e. Forest, Pasture and water, in the mountain villages of the Uttarakhand followed by identification and analysis of various factors influencing the sustainable management of these resources .

STUDY AREA AND METHODS

The study was carried out in the Bheta Gad - Garur Ganga (BGGG) watershed of the state of Uttarakhand which lies between $29^{\circ} 50' 23''$ to $29^{\circ} 55' 56''$ N and $79^{\circ} 02' 59''$ to $79^{\circ} 30' 04''$ E. The watershed is characterized by the significant variations in term of altitude (1090 - 2520 m amsl), slope aspect, forest covers, soil characteristics and hydrological features. The entire watershed with total geographical area of 82.62 km^2 , consisting of 63 revenue villages, is mostly inhabited by the caste Hindus. The economy is characterized by the subsistence agriculture practices in both irrigated and rain-fed conditions. The village community consists of mainly three castes i.e., the *Brahmins*, the *Rajputs* and Scheduled Castes (SCs) or the *Harijans* with a number of sub-castes, which are placed hierarchically in social stratification system. Affectionate personal *Zajmani* relations based on exchange of services and goods to sustain the socio-economic life within the village traditionally mark



community composition. However, these relations are weakening day-by-day and being replaced by the impersonal dehumanized market relations (Topal, *et. al.*, 2000).

Results are based on primary survey as well as secondary data. Secondary data/information was collected from Census of India- District Census Hand Books, Office of Block Development Officer- Garur, Office of Tehsildar - Bageshwer, Local Revenue Offices etc. After a preliminary survey of the entire watershed based on secondary data, all the 63 villages were placed in 6 different strata in term of social composition of the village community, population size, literacy, altitudinal variations, geographical area, slope aspect, distance from road head, per capita cultivable land & livestock units, percentage of irrigated land, level of technological/development interventions and degree of realizations by the village community and access to essential amenities and infrastructure. After a few transect walk across the watershed, 6 villages were randomly selected from lowest to the highest elevation for the in-depth empirical investigation. Thus the selection of villages was based on stratified random sampling (SRS) method. A full household survey was carried out in these sampled villages with the help of a well-structured and pre-tested Interview Schedule to understand the general socio-economic profile of the study area. Information about the ongoing management practices with regard to CPRs was collected mainly through PRA (Participatory Rural Appraisal) techniques, whereas informal discussions, group discussions, participant & non participant observation and case study method were also applied. The status of three major common property resources in the sampled villages is presented in Table 1.

THE ON-GOING MANAGEMENT OF CPRs

Panchayat Van: In the newly formed state of the Uttarakhand, *Panchayat Van (PV)* which constitute about 7 per cent of the total forest area (Saxena, 1995), is one of the most important CPRs for 15761 villages to meet their demand of fuel and fodder. In some of the cases village community has developed and maintained their own rules, regulations and policies for managing and harvesting their CPRs, whereas in others, the CPR are in worst conditions and widely ignored, instead of having great potential. Grasses, leaf litter (pine needles), and fuel wood are the important benefits being fetched from the *PVs* being managed by *VPs* (*Van Panchayat* is a local formal institution elected at village level through democratic way). In most of the villages, the *VP* looks after all the matters related to *PV*.



This body is headed by a 'Surpanch' and the number of members may vary from five to eleven (for details- see *Panchayat Van Niyamawali, 1976* - in Hindi). This body is given legal power to develop their own rules and regulations for sharing the cost and benefit from the *Panchayat Van*. All the powers and limitations of the VP are clearly enlisted in '*Panchayat Van Niyamawali, 1976* formed under section 28 (2) of the Indian Forest Act. 1927.

Table 1

Existence and status of main CPR in sampled villages

Village	Land available under CPRs	Drinking water facilities**	Irrigation facilities and percentage of irrigated land to total cultivable land*
Lawbanj	8.094 ha. ⁻¹ 6.412 ha. ⁻²	Naula x 4, Tap x 6	Government canal 41.5
Patli	4.202 ha. ⁻¹ 5.281 ha. ⁻²	Naula x 13, Tap x 4	Government canal 25.5
Kafaldunga	0.927 ha. ⁻¹ 5.084 ha. ⁻²	Naula x 5, Dhara x 1	Traditional common Gools 89.1
Lohari Talli	13.360 ha. ⁻²	Naula x 2, Tap x 7	Government canal 11.8
Bhagartola	1.724 ha. ⁻¹ 4.527 ha. ⁻²	Naula x 2, Tap x 8	Government canal 53.0
Bimola	6.202 ha. ⁻¹	Dhara x 1, Tap x 5	Government canal 79.8

⁻¹ refer to pasture, ⁻² refer to waste lands

Naula (natural spring water stored in a traditional tank in ground)

Dhara (water flowing openly from a natural source)

Source: *Office of the Block Development Officer - Garur and **primary survey 2013 - 14.

In high elevation villages (Lawbanj, Kafaldunga and Patli) 50 - 75% of the total surface of PV is kept closed partially every year at the beginning of monsoon (mid June) for harvesting grass and usually opened during the month of September/October, after harvesting Paddy. The entire protected area of PV is divided into plots depending upon the number of households within the village. Adopting lottery system, a plot is allocated to a particular household and harvesting right is given after deposition of cost to the VP office. The cost of a plot is fixed by the VP and mentioned on the slips that may vary from Rs. 50 to Rs. 150 depending upon its size and productivity. Sometimes the slip (harvesting right) may be sold to the other household if one do not need the grasses.



This popular method of benefit sharing from PVs is also adopted for harvesting other forest produces (leaf litter and fuel wood). During the month of May, June and July each household of the village is charged equal amount (usually Rs.40 or Rs. 50) as revenue to collect the pine needles, commonly used for cattle bedding and subsequently as compost manure for agriculture fields. Usually only one member from each household is allowed to collect the pine needle at a time. However, the quantity may vary depending upon his/her labour and efficiency. VP bodies have also maintained certain rules for charging the penalties in case of any offences like illegal felling of trees. But this local authority can compound the monetary penalties only up-to Rs. 500 and if the amount exceeds, the approval must be obtained from concern Divisional Forest Officer (DFO). A few cases of charging the penalties by the VP in study villages were also noticed. Further, the villagers are also entitled to get the timber and stone/slates from the territory of PV for housing purpose that is made available on nominal cost. Trees uprooted due to natural cause/calamities are also sold through auction and the cost usually varies from Rs. 200 to Rs. 500.

Water Resources: Until 1917, water was not governed by any act or rule and had been used based on *Pahala Huq'* (prior right). The first rule enforced by the State government as '*Kumaun Water Rules: 1917* brought all the water resources under the possession of state government. After 1950, the state Government had started renovation and took over the management of the entire irrigation system. Almost entire irrigation system is the property of the state Government by ownership and the common property of the village or villages by the access. At present, the study area is governed by '*Kumaun Aur Garhwal Jal Sangrah, Sanchay Ewam Vitaran Rules: 1975* (Kumaun and Garhwal Water Collection, Storage and Distribution Rule: 1975). Farmers having irrigated land pay revenue towards using the irrigation system. However, village *Kafaldunga* is an exception where no irrigation system was developed by the state, though the sufficient water is available and the village community still follows their traditional water distribution regime called '*Sanjayati Gool'* (community canal) through *Pani Panchayat* (water committee), which works completely on mutual understanding among the villagers. Proper functioning and the maintenance of this system is a common responsibility of each household through their membership in *Pani Panchayat*. Traditional *Naula, Dhara* (natural spring) and the introduced tap supply are



cheap sources of drinking water. However, the natural sources (*Naula & Dhara*) are traditional CPRs of the entire village community.

Pasture land: Based on field observations, it was found that the land patches classified under the category of pasture by the state Government, are moderate to highly degraded areas. Further, it is very difficult to classify the pastures because both types of lands are open for grazing though out the year and no revenue is being charged for sharing this benefit. Observations depicted in table 2 shows that *Lawbanj, Patli, & Kafaldunga* have developed mutual understanding for grazing their cattle equally in community pasture land, whereas in rest of the study villages, this common property is being used by a few socially and economically dominant households. Thus, the existing rules regarding the benefit & cost sharing of CPRs are helping the village community by minimizing the conflicts/disputes among them and in fetching certain revenue. Major part of the collected revenue is utilized for management & maintenance of CPRs and a small part of it is spent on buying utensils/goods for community use.

FACTORS AT WORK

Now the prime question arises at this stage is about the vast and surprising differences in management of CPRs at village level. In some of the villages, these resources are being managed properly and in sustainable way whereas, in others these resources are worst in condition instead of carrying considerable potential. This has compelled us to look into the socio-economic and biophysical variations at village level.

Socio-economic factors: Socio-economic aspects and their indicators are relevant for a better understanding of sustainable management & utilization and dynamics of CPRs. At the same time, cultural features evolved as an adaptation to the environment of a specific locality contains complex of features that is more directly influenced by environmental factors than other. Socio-economic and cultural aspects also play a vital role in management of CPRs in traditional society. By tradition, the multi-caste village communities in which the different caste groups were linked to each other in a web of reciprocity favored sustainable use of common property resources under communal management by the Indian society until the colonial conquest (Gadgil & Iyer, 1989). Management carried out through some traditional resources of authority, religious or social, was always a success (Chopra *et al*, 1990). Since time immemorial, the CPRs in the Uttarakhand was being managed by the



traditional 'Padhanchari' system, the informal local institution, headed by the *Padhan* (village head). The office of the *Padhan* was hereditary and always held by the higher castes, containing possibilities of exploitation of the lower castes or weaker sections of the village community. The monopoly of higher castes in that traditional informal institution has weakened to some extent, after the introduction of *Panchayati Raj* system and formulation of the formal local institutions like, Village Panchayat, Van Panchayat & Block Development Council etc.

Social Structure and composition of village community: Social Structure and composition of village community differs from village to village. Some of the villages have three castes with 7 to 8 sub castes (extreme heterogeneity) whereas, a few have single caste (extreme homogeneity). Efforts were made to establish correlation between the social structure and composition of village community and common property resource use pattern (table 2). Field observations and discussions with individuals of different sub castes and groups within the villages reveals that heterogeneity in term of social structure and composition of village community leads to more efficient management and utilization of the CPRs (*Lawbanj, Patli and Kafaldunga*). The consciousness among the various sub castes and groups towards their economic interests has compelled them to develop certain rules to share equal cost & benefit from the CPRs. Contrary to these villages, the least heterogeneous or extreme homogenous villages (*Lohari Talli, Bhagartola and Bimola*) have failed to develop and enforce such rules and regulations required for proper management of CPRs and equal cost - benefit sharing. In such villages, the circle of kin and kith is so close that the system does not allow enforcing rigid rules & regulations for cost - benefit sharing as well as penalties against the individuals deviating from these rules and regulations.

Table 2

Structure & Composition of Village Communities and CPRs Use Pattern

Village	No. of castes	No. and name of sub castes	Types of benefits	Cost sharing	Benefit sharing
Lawbanj	3	8: i.e., Purohit (B), Pant (B), Mishra (B), Pandey (B), Koranga (R), Garhiya (R), Alamiyan (R) & Harijan (S)	Green grasses Fuel wood Pine needles Grazing	Equal Nil Equal Nil	Equal Unequal Equal Equal
Kafaldunga	2	6: i.e., Rawat (R), Negi (R), Bora (R), Nath (O), Giri	Green grasses Fuel wood	Equal Nil	Equal Unequal



		(O), Puri, (O)	Pine needles	Equal	Equal
			Grazing	Nil	Equal
Patli	3	6: Joshi (B), Pandey (B), Bhatt (B), Pathak (B), Adhikari (R) & Harijan (S)	Green grasses	Equal	Equal
			Fuel wood	Nil	Unequal
			Pine needles	Nil	Equal
			Grazing	Nil	Equal
Lohari Talli	3	4: i.e., Pandey (B), Joshi (B), Lohani (B) & Harijan (S)	Grazing	Nil	Unequal
Bhagartola	2	2: i.e., Baiswal (B), Bora (R) & Bisht (R)	Grazing	Nil	Unequal
			Fuel wood	Nil	Unequal
Bimola	1	1: i.e., Harijan (S)	Grazing	Nil	Unequal

B; refer to the Brahmins, R; refer to the Rajputs, S; refer to the Scheduled Castes or Harijan and, O; refer to the Other backward Castes.

Source, Field investigation, 2013 - 14.

Economic inequality: Existence of economic inequality within the village community has enforced the improper harvesting and access to the CPRs by the stakeholders. On the one hand, economically sound households started illegal purchasing of big trees twice a year from reserve forests to minimize the daily efforts in collecting the fuel wood and thus pays least interest in management of the VPs, and on the other hand, poor people started harvesting their CPRs for commercial purposes *i.e.*, by selling the fuel wood in nearest market centre. This phenomenon is common for entire mountain areas of the Uttarakhand leading to depletion and degradation of PVs.

Gender in management of CPRs: The gender issues are also crucial in managing and harvesting of CPRs. The formal and informal discussions with male and female groups of sampled villages revealed that the women folk have comparatively better knowledge regarding the management of CPRs and importance of different fodder, grass and fuel wood species, than their male counterparts. It has also been reported that the women could be better environmentalists than male (Gbadegesin, 1996). Usually, females in Indian central Himalayas become quite familiar with their forests and pastures from the childhood. Almost all the activities related to the forests, grass collection and agriculture operations are performed by the women, but their participation in term of effective and actual involvement in local Institutions as well as in decision making process at community level is almost negligible. Traditional community is dominated by male folk who do not allow their female counterpart to take active part in such matters by considering them socially,



mentally and physically inferior. Participation of females as a member in six VPs in the study area is proportionately not satisfactory, whereas, in three VPs female participation do not exist. Altogether, membership ratio of male and female is 7:1, respectively in six VPs, and this 14% participation of female is totally ineffective in decision-making processes.

Intruding and encroachment: Intruding by the non-entitled stakeholders from the neighboring villages also accounts in management of CPRs. Inter village conflicts were observed as an important obstacle in proper management of PV at *Bhagartola*, where poaching by the villagers of adjoining areas was frequently reported. Encroachment by the individual stakeholders to CPRs largely due to unclear demarcation of boundaries of resources. For example, a number of households has encroached the PV at *Bhagartola*, which has resulted into conflicts within the village. Further, doubtful and improper demarcation of PV land on map and ground, as observed and reported by the VP body of *Bhagartola*, has unanticipated consequences in term of encouraging such encroachment.

Institutional weakness: The decentralized management of natural resources in the Indian context is possible only by recognizing the significance of the concerned local institution and by giving power to the grass root level. The local institutions meant for management of CPRs which has been ignored by development planning in the past (Ostrom *et al.*, 1988), has great relevance in sustainable resource use practices since they have developed within specific historical, cultural and ecological context (Berkes, 1989). Further, it is believed that only local people are, and can be, the best managing hands for their common resources. Though, the traditional local institutions have been replaced by the modern formal institutions, most of the rules and regulations are still based on the former one. Some of the VPs which has failed in managing their PVs properly, agreed on the fact that weakness or lacunae exists within their institution (VPs) in term of illiteracy and lack of knowledge regarding government rules, official processes and various programmes, lack of understanding and related conflicts within the institution etc.

Land and soil degradation: Economy of a rural area, and particularly in mountainous terrain, is largely shaped by a set of biophysical factors, which determines the socio-economic and cultural practices in management and utilization of resources base. Over grazing and unsustainable harvesting of the produces are two major causes responsible for land & soil degradation in Indian Himalayas. *Panchayat Van* and pasturelands are highly degraded in



village Bhagartola. Though, people in this village are quite familiar and aware of the causes of degradation, but proper management and restoration activities are not on their priority list.

Infrastructure development and access to alternative sources: A number of Forest Acts, right from the Indian forest Act. 1878 of colonial period to the Forest Conservation Act. 1980, with several amendments, has been circulated by the central as well as by the state governments of India to ensure proper management and utilization of forests. Until mid seventies, cooking gas (LPG) was hardly known to the rural communities of the Indian Himalayas and people were fully dependent on forests for fuel wood. In late eighties, Ministry of Petroleum (Government of India), issued an order mentioning that the state should provide LPG to the rural communities of the region with subsidized transportation rates in order to cope up with the problem of forest destruction leading to severe ecological crises. Development of road network in the region has accelerated this process and the economically able section of the rural community largely adopted this alternative (LPG). This process has largely helped in reducing the fuel wood demand but also hampered significantly the personal interest on management of PVs by the LPG users.

Surrounding resource base:

Status of resource base at surroundings also influences the management of CPRs at village level. If the resources available outside the surface area of the village community are rich, well managed and easily accessible, villagers usually do not pay serious attention to their own CPRs. This has emerged through a number of informal group discussions with villagers of *Kafaldunga* who have rich resource base (particularly fuel & fodder) in out skirt of their village in term of reserve forests, owned & controlled by the forests department.

Top-down approach:

As one of the most highlighted weakness in Indian development planning, the top-down approach has laid its adverse impact on CPRs. Until recent past, all the Government programmes for development and up-gradation of CPRs were formulated without local participation and imposed on diverse conditions. This has resulted into failure of most of the programmes. However, these leakage are now identified by the Government agencies and some new initiation have also been taken up (*i.e.*, Joint forest management) by the state Government which are developed through PRA (Participatory Rural Appraisal) technique



and being implemented with the help of active participation of local communities including women folk.

Fund oriented programmes:

Right from the initiation of the first five-year plan, eradication of poverty from rural areas has been a challenging task in entire country. However, the improper implementation and unrealistic quantitative extension of various employments generating programs in rural areas have also affected CPRs adversely. A number of rural development programs like Employment Guarantee Scheme, Food for Work Program, Jawahar Rojgar Yojana etc. had evolved around some CPRs like *PV, Civil – Soyam, Gool, Dhara and Naula etc.* Most of these programmes are implemented by the development agencies and adopted by the villagers just to fulfill the physical and financial targets. Thus these CPRs have become mere fund generating assets to the villagers at personal level and the long-term interests were completely overlooked at community level.

Cumbersome bureaucratic system and policies:

The rights over common resources and nature of its management and utilization have largely rested with the state for last 150 years. With the decline of hereditary rights of the villagers, the political and economic supremacy of the colonial rules increased by leaps and bounds, and the common man could no longer continue to be self reliant (Pathak, 1997). Even after getting independence in 1947, most of the policies are still largely based on the colonial framework. Most of the people within the study area lack the essential and basic knowledge related to the ownership and right & obligations to CPRs. For example; they do not know whether they have any *Haq Haquq* (rights & privileges) to collect produces from the reserve forests or not ? For the first time, the provision of *Haq Haquq* for bonafied residents was made in the forest settlement of 1897 during colonial period and the amount was fixed based on number of ploughs and households at that time. After 1897 the population increased by several folds and a number of new villages/human settlements came into existence as people in groups migrated from their native village in search of sufficient resource base. Unfortunately, neither the Government is legally bound to give more than what was awarded in 1897, nor any amendment was brought in this regard. Most of such new villages which came into existence after 1897, either, still have *Haq Haquq* at their native village which are sometimes 50 to 150 km. away, or do not have any *Haq Haquq*



at all. This, not only has encouraged the local community to fulfill their needs illegally, but also led in widening the possibilities of corruption among the field based forest officials. The land under *Civil - Soyam* (certain surface of forest lying between the village boundary and reserve forests, allotted for the open access for village community) is the second example which involve contradictions pertaining to its ownership, management and sharing access. *Civil - Soyam* as a CPRs contains ideological contradiction in two ways. By ownership, it is the property of forest department and by access, it is commonly used by the entire village community without paying revenue. This unrealistic policy has led into severe degradation of *Civil - Soyam* in almost all the sampled villages.

CONCLUSION

The study reveals that the management of CPRs in the mountain villages of the Uttarakhand is significantly influenced by the various socio-economic, Bio-physical and external factors. As a result, some of the village communities have developed their own rules and regulation for managing and harvesting their CPRs in sustainable way to meet their day –to-day demands, whereas in other villages, status of CPRs is worst. However, these CPRs embrace wide possibility of being the key for sustainable socio-economy of the user community in the Uttarakhand Himalayas. The factors influencing the management of CPRs vary from village to village. As a result, some of the village communities have developed their own rules and regulation for managing and harvesting their CPRs in sustainable way to meet their day - to - day demands, whereas in other villages, status of CPRs is worst. No doubt, some of the social factors inherent in communities are quite difficult to be modified for enhancing the sustainable management and equitable allocation of common resources. Still there are many possibilities to cope up with tragedy to commons in the Uttarakhand Himalayas through following efforts.

1. Strengthening local institutions and capacity building.
2. Essential policy amendments through participatory approach by keeping in mind the present scenario of demand and conditions of resource base.
3. Decentralized policies and programme formulation at micro-level.
4. Creating awareness among the local peoples and institution through circulation of policy documents



5. Due importance to traditional practices and indigenous expertise pertaining to sustainable management of natural resources.
6. Ensuring the active, effective, massive involvement of women in local institutions dealing with CPR, and finally, the common property resource management programmes must be framed, implemented and evaluated in the light of area specific needs, socio-economic, cultural, bio-physical and external variables so that sustainable management of these resources could be ensured along with maintaining harmony between man and nature.

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