Community forest management in Sikkim Himalaya towards sustainable development

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Abstract: Sikkim state is rich in biodiversity with a vibrant traditionally strong conservation ethics in place. This work aimed to understand the diverse systems of community forest management and their status with special reference to the nature of institutions governing them. As such, prolific and luxuriant state of the forests is perceptible through remote sensing data based on derivations of normalised difference vegetation index and land use/cover. Existing community forest management practices such as sacred landscapes/groves, *gumpa* (monastery) forests, private forests earlier managed by *kazis*/royal family members, *taungya*, *bhasme* and *dzumsa*/*pipon* system, etc. were field documented. Community management components of the state administered forests like joint forest management, eco-development committees for protected areas, watershed committees and *panchayats*/*mandals* were also observed. Practices still in existence, historical perspectives, management mechanism, administering authority, culture/tradition, forest status, traditional ecological knowledge and its constraints were assessed. Socio-economic and natural resources interlinking in all the practices was assessed which should be an important factor for environmental law capacity building. There are further scopes of carbon benefits from community forest management in the context of climate change regimes.

Keywords: community forest management; CFM; Sikkim Himalaya; carbon benefits; remote sensing.

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1 Introduction

There is growing acceptance of community forestry as a key element in the sustainable forestry in different countries. Community forestry allows people to manage forests based on local needs and objectives (Arnold, 1998; Arunachalam and Khan, 2001). There are many challenges in moving to a community-based form of forest management, such as gaining access to forest tenure, building community capacity, gaining government support, developing appropriate decision-making processes and management practices (Butt and Price, 2000; Lynch and Maggio, 2000). Sikkim state in eastern part of the Indian Himalayan Region (IHR) is rich in biodiversity and is a good case in point where there has been the co-existence of vernacular forest management systems and the state forests (Kumar, 1993). Apart from various forms of state forests such as reserved forest, protected areas, *khasmahal* forests, *goucharan* forests, slip reserve, road reserve, there are examples of community based forest management such as sacred landscapes/groves, *gumpa* (monastery) forests, private forests earlier managed by *kazis*/royal family members, *kisan vans*/community *vans* and *pipon* system, etc. (Bhasin, 1989; Sarin, 1996).

Community forest management (CFM) practices are supposed to fulfil the objectives of achieving sustainable forest development, welfare of local communities, utilisation and conservation of forest resources, prevent the overuse of resources, enable both local people and the nation to obtain goods, services and livelihoods, without compromising on long-term resource and development goals (Poffenberger and McGean, 1996; Price and Butt, 2000). It also entails intricate relationship between village groups and local institutions, between individuals and laws that govern the forest and between government

and villagers. This may further lead to reducing the size and cost of government by decentralising and devolving responsibilities and activities by achieving a greater degree of involvement and participation by local stakeholders. Chettri (2005) elaborated some of the significant aspects of community participations, benefits as well as the dependence of the community on the forests in Sikkim with reference to the protected areas (Table 1). Remote sensing (RS) satellite imageries might also be useful to detect the damages caused to forests by over extraction of the forest products in the non-community or unmanaged national forests. The present status of forest resources based on detailed ecological methods as well as their status on the ground are perceived to be reflected in the RS data based on derivations of normalised difference vegetation index (NDVI) and land use/cover (Singh et al., 2000; Chettri et al., 2006). In the Indian context, there is a paradigm shift in the way we look at forest management. As per the report of N.C. Saxena Committee on the Forest Rights Act (FRA) implementation, our model is based on the primacy of the state, but we must shift to a three-fold model of state, communities, and partnership between the two. Out of the total 70 million hectares, about 35 to 40 million hectares could be shifted to exclusive community management or partnership between the Forest Department and communities as per the preliminary estimates of the Ministry of Environment and Forests, Government of India (Anonymous, 2011).

Table 1 Dependence of local inhabitants on forest timber for house constructions, cow-shed, goat/sheep fold, cardamom curing and other purposes – an example from settlements adjoining one of the protected areas in Sikkim

Resources	*Utility*	*Requirement*
Bamboo poles (small size)	Cattle-shed construction, thatched roof making, basket, mats repairs etc.	500 kg hh^{-1} $year^{-1}$
Wooden poles (< 30 cm)		
Small size	Pillars, ceiling support, cow-shed/goat-shed repair, support to climbers in the fields etc.	1,600 kg hh^{-1} $year^{-1}$
Time interval of need	5–7 years	
Medium size	House repairs, kholma/dhiki repairs, furniture etc.	3.61–4.63 m^3
Time interval of need	10–15 years	
Trees		
Number of trees required	Planks, large, size beams, pillars for house construction/repairs, cow shed construction, etc.	20–40 trees
Time interval of need	10–15 years	
CBH		40–100 cm
Large size poles	New house construction (replacing old traditional houses), new construction for new fragmented families	
Wood volume required		6–8 m^3

Source: After Chettri (2005)

Table 1 Dependence of local inhabitants on forest timber for house constructions, cow-shed, goat/sheep fold, cardamom curing and other purposes – an example from settlements adjoining one of the protected areas in Sikkim (continued)

Resources	*Utility*	*Requirement*
No. of trees required		8–10 trees
Average size (CBH)		80–130 cm
Time interval of need	20–30 years	
Large cardamom curing		
Construction of new curing plant (traditional)	Thatched roof, ceiling support, pillars, etc.	1–3 trees
Fuel-wood requirement	For drying of per 100 kg of fresh cardamom	70–80 kg

Source: After Chettri (2005)

Laws and policies concerning the wellbeing of mountain people, conservation and sustainable development of the people and ecosystems are relatively small in number. Yet mountain areas are some of the most important regions in the world and are environmentally, culturally and economically fragile. Mountain specific approaches require an understanding of the unique characteristics of mountains more so in respect of community-based management and control of natural resources. 'Mountain Agenda' developed at United Nations Conference on Environment and Development (UNCED) in the year 1992 brought forward a new paradigm on mountain resource management. This calls for ensuring full participation of the mountain communities in decision making on the use of natural resources they directly depend on for their lives and livelihoods.

Realising the benefits of handing over the forest areas to local communities under a variety of CFM schemes, there have been government initiatives to hand over forest area to the local communities. There are such examples from Burkina Faso, Cameroon, India, Mexico, Nepal, Papua New Guinea, Peru, Tanzania and many other countries. As per an estimate, around 14% of all the forests in developing countries are under this kind of management today which is three times more than 12 years before this estimate (White and Martin, 2002). Murdiyarso and Skutsch (2006) have elaborated and emphasised on promoting carbon benefits from CFM in the context of climate change regimes. There is a strong perceived role of the community forest ecosystems as carbon sinks and carbon sources (Bajracharya, 2008). This has the potential of providing opportunities for communities in developing countries to participate in mitigating atmospheric carbon and benefit from that for which, CFM practice can very much qualify if a proper approach is adopted.

2 Physical set-up and specificities of Sikkim

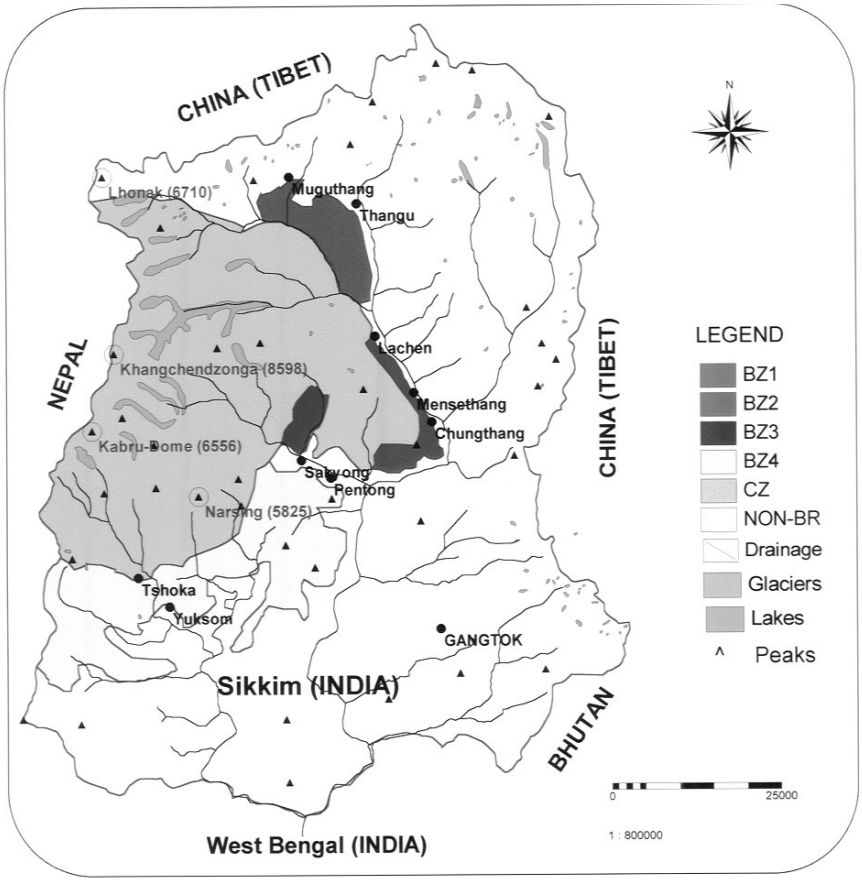
Sikkim is a Himalayan state with very steep undulating topography falling in the catchments of snow/glacier fed rivers (Krishna, 2011) such as Tista and Rangit with numerous high altitude lakes. An altitudinal range of 300 m to 8598 m within a short horizontal expanse here leads to sub-tropical through alpine climatic zones (Krishna, 2002, 2005). Physiographic units include summit/ridge, escarpments, slopes (15% to > 50%), valleys, cliff and precipitous gorges, glacial moraines/drifts and perpetual snow with snow line at 4,870 to 4,885 m. Forests of Sikkim are classified into tropical

semi-deciduous and tropical wet forests; tropical moist or broad-leaved forests; temperate broad-leaved and coniferous forests; sub-alpine vegetation and high altitude deserts (Anonymous, 1994). As per the estimate of land use of this state in the above report, areas under operational agriculture was 15.37%, forest land 36.15%, other forests 0.77%, pastures 10.28%, land under non-agricultural use 12.03% and barren 25.4%.

A later survey of December 2006 based on RS satellite data by the Forest Survey of India, Sikkim has 47.31% of the state's geographical area under forest cover (Anonymous, 2009). Out of this geographical area of the state, very dense forest, moderately dense forest, open forest, scrub land and non-forest land categories occupy 7.05%, 30.45%, 9.81%, 5.02% and 47.67% areas respectively. The location map of the Sikkim state together with areas having significant presence of CFM practices are shown in Figure 1. Protected areas (PA) such as biosphere reserves, alpine and wildlife sanctuaries, account for a large geographical area of this state. Khangchendzonga Biosphere Reserve (KBR) is one such protected area covering almost 36% of its geographical area (Figure 2). Despite this, there exists a strong community conservation ethics amongst the inhabitants as brought out through conservation attitude (CONAT) survey by Krishna et al. (2002).

Figure 1 Significant locations of the Sikkim state with existing CFM practices

Figure 2 KBR in Sikkim and its core zone (CZ), buffer zones (BZ), non-biosphere areas and associated features



Source: After Krishna et al. (2002)

3 Overview of the forests in Sikkim

For the pre-merger period of Sikkim with India in 1975 and as per the first forest working plan of Sikkim during 1951–52 to 1970–71, the legal status of the state owned forests was as follows: reserved forests, *goucharan* forests, *khasmahal* forests, slip reserves (minor type) and road reserves (minor type). In the envisaged state forestry action plan, thrust areas include survey/demarcation of forests, inventory of natural resources including working plans/management plans, grazing control/pasture development, protection/regeneration of conifer forests, control of soil degradation and reclamation/rehabilitation of landslides/landslip areas, biodiversity/eco-system conservation, biosphere reserves, wet-land conservation, eco-tourism, wildlife/protected area management, development/conservation of fisheries, forest protection including protections from forest fires, etc.

Significant state administered forest management practices involving the communities include *Joint Forest Management* (JFM) and *Eco-Development Committee*

(EDC). National Forest Policy Resolution of 1988 envisaged people's involvement in the development and protection of forest for meeting the genuine demands of fuel-wood, fodder, small timber and non-timber forest produce (NTFP) including medicinal plants for the villagers for bonafide use. Therefore, Sikkim state notified JFM in the year 1998 to ensure the active participation of villagers in the development and protection of forests. There were 155 JFM committees managing about 10,000 ha of forest area (Anonymous, 2009). This had been achieved with such JFM committees involving 46,000 families of contiguous villages which included 17,000 scheduled tribe families as well. They took care of the *khasmal*, *goucharan* areas and degraded forest lands which are sensitive to severe biotic interference and damage to the forest crops. Such committees may derive 25% of the net income from the forest crop (including NTFP and medicinal plants) so protected after meeting the genuine requirements of the local villagers in respect of fodder and firewood from fallen and dry twigs. In addition, JFM committee could also receive 25% of the income generated from the intermediate felling, i.e., thinning and cleaning, etc. JFM Committee could be formed for good forest area (except the protected area network) with crown density of 40% and above if the area could sustainably yield NTFP including medicinal plants. However, no felling was permitted in such areas to promote regeneration, development and sustainable harvesting of NTFPs and medicinal plants. Before taking up good forest areas, degraded forest areas should be covered initially by the JFM Committee. The extent of good forest areas to be allowed depends upon the number of village household restricted to a maximum limit of 20 ha and generally limited to 2 km from the village boundary. For degraded forests, JFM was supposed to be first concentrated in the areas up to 5 km from the village boundary.

Sikkim state has massive wildlife conservation and management programs through establishing a number of protected areas, viz. sanctuaries and national parks. Success of such programs depends to a great extent on the active participation and involvement of local community. Therefore, the state notified EDC in the year 2000 for protection and conservation of protected areas in a participatory manner. Members of such committees are allowed sharing of benefits, eco-development activities and ecotourism, subject to the conditions applicable. EDCs assist the forest authorities in smooth and timely execution of all forestry works taken up in their conservation area. They also involve every member of EDC in the matter of protection of forests, environment, wildlife and biodiversity as well as other duties assigned. EDCs have a greater role in ensuring smooth implementation of eco-development program so that the members of the EDC get equitable and maximum benefit out of it. They also ensure that eco-development funds provided by the government and concurrent benefits allowed by the government are not misused by EDC member(s).

In addition, there are other practices which include the watershed committees, self-help groups and watershed user groups being involved under integrated watershed development program (IWDP) as well as other centrally sponsored schemes. Such schemes have implementation arrangements with the state government departments. Other than legally classified forests, there are private state forest lands such as monastery forests as well as other community forest lands. Sikkim Forests, Water Courses and Road Reserves (Preservation and Protection) Act, 1988 has a separate chapter on Control and Management of Private Forests but the necessary implementation instruments are yet to be developed. This may have likely considerations of implementations in close coordination of forest department with district boards (Zila Parishads) and other Panchayati Raj institutions (PRIs) supporting the local self-governance.

4 Observations on the CFM practices

Observations were made on the known systems of CFM in different parts of Sikkim. Table 2 presents some of the summarised significant examples of community forests in Sikkim and their benefits at community level. There has been an attempt to look at both the vernacular systems as well as the state administered forestry management having community participation components. Details were recorded as per the available background information and field level interactions with the local inhabitants, panchayats, and concerned forest officials in the field as well as other stakeholders. This was accomplished through the focus group interviews for suitable feedback on the issues such as: historical perspective, management mechanism, administering authority, demography, socio-economy, culture/tradition, forest status, problems/constraints, traditional ecological knowledge etc. Apart from the use of RS-based observations towards understanding the spatial disposition of forests and related land use/land cover, field surveys were undertaken to generate the ground level information. Direct interviews were also conducted with each of the forest management committee members and other village elders who had close connection with the system. On top of the management system, state forest department is the highest authority to coordinate with such committees for administering various forest patches.

While attempting to find out the relevant implications of CFM in the present context, a few studies were found to have been conducted by different authors on various ecological aspects of the Sikkim Himalaya. Therefore, this study was especially attributed to a need base for comprehending the concept of old traditional methods of forest administration and conservation locally. Thus, this work should underline the ground issues and problems existing at present which may further deteriorate if not managed properly. Information thus generated gave rise to the specific understanding of the practices in the respective areas concerned. Significant CFM practices thus observed at various locations of the state were:

Table 2 Significant known examples of community forests in Sikkim and their community level benefits

Forest type	*Location*	*Owned by*	*Area*	*Benefits to the community*
Sacred groves/ devrali forests	Kabi	Community	2 sq. km	NTFP and fuel-wood
Dzumsa system	Lachen – Lachung	Community	10 sq. km	Minor forest produce, ecosystem services
Gumpa/monastery forests	Dubdi – Pemayangtse	Monastery	4 sq. km	NTFP and fuel-wood
Bhasme system	Dzongu	Community	5 sq. km	Agroforestry
Individual sacred groves	Sumin	Villagers	10 sq. km	Agroforestry, fodder, fuel-wood
Taungya system	Begha, Buriakhop and Nuntaley	Forest department/ community	4 sq. km	Settlement and livelihood
Sacred lake forest	Khecheopalri	Community	8 sq. km	Basic needs, ecosystem services

4.1 Sacred groves or devrali forests

Most prominent sacred grove or the devrali forest is situated at Kabi-Lungchok in the North District of Sikkim situated at an altitude of 1636 m amsl covering an approximate area of 6 acres (Figures 3 and 4). Mythological beliefs state that Kheybumsha, mighty King of Tibet did not have a son. Astrologers suggested him to visit one of the oldest couple of Kabi-Lungchok to seek blessings from them. After doing so, the king was blessed with a son and took oath there itself to develop a good relationship between the later king and inhabitants of Kabi-Lungchok, North Sikkim. To do this, three stones were erected at this site in the name of three communities *Bhutia*, *Lepcha* and *Limboo*. Since then, this sacred grove exists till date.

Figure 3 Sacred groves or devrali forest at Kabi-Lungchok area (see online version for colours)

Figure 4 Trees/vegetation within the sacred grove area at Kabi-Lungchok (see online version for colours)

Community management practice component has been without formal participation of the local inhabitants. Even then, the local communities took care of conservation. Thus, this sacred area forest retained its original status even in the absence of plantation etc. To reinforce the conservation, state forest department fenced the surrounding forests. It is not understood so far whether there had been usual flow of benefits to the community from that forest. Only dead and fallen trees or tree parts were collected from the forest. This sacred forest was rich, dense and continues to be in good condition due to strong community conservation ethics. *Engelhardtia spicata* is the dominant species. Besides this *Castanopsis tribuloides*, *Daphnephyllum himalayense* and *Eurya acuminata* were other tree species found. There have been no problems and constraints posed to the local inhabitants by this sacred forest.

A few private sacred groves were also observed at *Sumin in East Sikkim* at household levels. Other villagers also participated in the religious rituals exhibiting community conservation ethics. Large cardamom agroforestry in the forest-based areas were found to be the only form of community-based forestry management. Inhabitants did cardamom plantations and harvested every year along with fodder and fuel-wood. There were no other traditional ecological knowledge-based resource conservation practices in the area.

4.2 Dzumsa system

Dzumsa has been an age-old community system of Bhutia and Lepcha residents particularly of the area around Lachen and Lachung in the North Sikkim at an altitude of 2730 m amsl (Figure 5). There exists an exclusive village council known as *Dzumsa* with the head of this village council known as *Pipon*. This council has been working to make this high altitude village environment-friendly. Most of the important decisions regarding the economic affairs and strategies were taken by *Dzumsa*, such as division of cultivable land at different places, grazing facilities, seasonal migration of communities and collection of government levies such as land revenue and forest taxes. Nowadays, *Dzumsa* also regulates the collection of minor forest produces such as *Nardostachys jatamansi* and *Picrorhiza scrophulariflora* sp. etc. Every household is required to deposit a lump-sum amount as revenue to the authorities.

Figure 5 Areas around Lachen under the Dzumsa system (see online version for colours)

Inhabitants who did not want to migrate with their animals to the winter transhumance locations, had to seek permission of the Pipon and pay extra money for grazing since the grazing lands belonged to the community. They start moving for grazing on the dates as decided by the Pipon. Whosoever broke the rule was fined depending upon the number of grazing animals in his possession. Dzumsa also takes decisions regarding the sowing and harvesting of crops. Inhabitants participate in safeguarding the local forests with the help of Gram Vikas Samiti (village development committee) and plant trees in the wastelands. Local inhabitants carry out plantations on several hectares of land on their own to fill the gaps. Even the state forest department supplements the plantations with various tree species in the area.

4.3 Bhasme system

Bhasme practice is a kind of agroforestry system observed mainly at Dzongu situated at an altitude of 1,900 m amsl in the North Sikkim (Figure 6). This is particularly practiced to grow agricultural crops such as maize, millet, *Phagopyrum* sp. and potatoes etc. In this system, forests or private farmlands are cleared up to 90% sparing the larger trees and then burn. Such slashed and burnt trees are supposed to increase the fertility of the soil. This is followed by sowing of crops and harvesting subsequently. Thereafter, the place is left as such for a few years to regain complete growth of trees and bushes. This leads to increase in the soil fertility so that the area can be put to use again after an interval of three to four years. This is similar to the widely reported jhum or shifting cultivation practice of NE India (Ramakrishnan, 1998).

Figure 6 Areas around Dzongu with practice of Bhasme system (see online version for colours)

Suitable areas for *Bhasme* practice are chosen by the villagers mainly from within the matured forests. *Bhasme* has been practiced alternatively or regularly year after year depending upon the status of the land and its fertility. At Dzongu, it was without open participation of the local inhabitants for suitable management. These sites still possess a considerable percentage of vegetation cover both at farmland as well as the forest lands. *Bhasme* system is being practiced by both *Lepcha* ethnics as well as Nepali community

with approximately 2 to 3 acres per household either individually or jointly. Benefits of *Bhasme* system go to the community whereas, tourism and other businesses are less preferred at present.

4.4 Gumpa/monastery forests

Gumpa or monastery forests have been prevalent at Pemayangtse situated in the West Sikkim at an altitude of 1,900 m amsl (Figure 7). Historically, Pemayangtse was once the erstwhile state of Sikkim. *Rabdentse* was the second oldest capital of Sikkim situated on the south-west of Pemayangtse Monastery. This is found as ruins and is now an ancient monument of national importance. Community management practices were not focused much towards plantation or management but the forest was intact due to its sacred status. Administering authority for half of the forest was the monastery after the division of the original forest area into two parts. The other half of the forested land went under the control of the department of forest on a 50% revenue sharing basis. This half has been designated as a nature reserve named Rabdentse Nature Reserve and fenced from all its sides.

Figure 7 Pemayangtse area with Gumpa/monastery forests (see online version for colours)

Cultural aspects of this forest and the area include hilltops known as *chortens* or holy rocks, lakes (e.g., Cho-nam-Cho is one), cremation ground, *jhora* (streams), Rabdenste nature reserve, old palace, plantation area and footpaths inside. Out of 108 holy springs around Pemayangtse hill top, Dhotom spring has been the holiest. It flows into the holy lake Dhotom whose mythological protective deity has been Dhotom Ama Chomen Lhamu. Under such cultural beliefs, inhabitants have been protecting monastery forests due to sacredness driven conservation ethics. Prayers and offerings at monastery are performed four times in a month over four main religious ceremonies annually. So far, no separate traditional resource conservation practices existed in the village as in other cases. Forest has been rich and dense, and continues to be so. *Castanopsis tribuloides* is the most dominant tree species of this forest.

Another significant monastery forest is situated at Dubdi, West Sikkim at an altitude of 1,970 m amsl covering an approximate area of 16 hectares near Yuksom, the first capital of Sikkim (Figure 8). Historically, 'Dubdi' meant Hermit's cell and has been the oldest monastery of Sikkim, established in 1701 AD. Like other monastery/sacred place, Dubdi monastery maintained its own forest and became a monument of national importance under the Ancient Monuments Archaeological Sites and Remains Act 24 of 1958. Forest has been dense with *Castanopsis tribuloides* as the dominant species besides *Symploccos theifolia* and *Eurya acuminata* tree species found in the area. Forest department occasionally supplemented the development of monastery forest but with less direct role in this.

Figure 8 Dubdi area with Gumpa/monastery forests (see online version for colours)

4.5 Taungya system

Taungyadari was a phenomenon of pre-merger Sikkim but found now, though to a very limited extent, even after the merger of Sikkim with India. Examples of Taungyadars were observed at Begha, Buriakhop and Nuntaley in West district. In this system, plantation activities were undertaken on a limited scale in the marginal forest areas. Each family has been called Taungya and provided a few acres of forest land each year to plant and then look after these plantations for a period of three years. Thereafter, they had to return the forest land to the forest department. Taungyadars paid no taxes to the government and remained settled within the forest land. They carried out farming, cattle rearing besides plantation works on their own. This system is now gradually being discontinued.

4.6 Sacred lake forests

Sacred lake forests have been characteristically situated at Khecheopalri in West Sikkim situated at an altitude of 1,700 m amsl (Figure 9). Historically, there were a few mythological beliefs amongst different communities about this lake and the sacred forest. This has been one of the four significant religious sites of Sikkim and this sacred

landscape is considered one of the four limbs of the body. Lepcha, the aboriginals of Sikkim previously used to follow 'Bon' or 'Mune' religion associated with animal sacrifices to placate the various deities of the forest, river and wind. According to the Buddhist belief, this lake was the dwelling of Goddess Tara *Jestum Dolma* considered the mother of Lord Buddha. This lake in particular was considered to be her footprints and had a number of religious sites all around it. The location of this lake has been very captivating and magnificent due to lush green tract of forests around it.

Figure 9 Sacred lake forest area at Khecheopalri (see online version for colours)

Community management practices have been pursued by the *Lepcha*, *Bhutia* and to some extent, by *Limboo* communities with the religious sentiments for the forests. Cultural aspect of this sacred forest area included folklores as well as a number of religious festivals associated with the lake. Two main festivals associated with the lake are 'Cho-Tsho' falling in the month of October and 'Bhumchu' in February/March. Local communities worship in reverence of the sacredness of the area thereby protecting the area as sacred or holy lake-forest since long time back. Forest had been rich and dense earlier but declined in density as observed now. *Castanopsis tribuloides* and *Symploccos theifolia* have been the dominant species besides other tree species. The forest department and the villagers take care of the forest but still require strengthening through greater community participation. Traditional ecological knowledge (TEK) had not been so varied in this area except that the bamboos were regarded as soil binding species.

5 Discussion and conclusions

CFM can provide appropriate incentives to protect the biodiversity, strengthen local systems and create opportunities for the community participation as community-based enterprise. Formal community monitoring on the other hand is critical in assessing the ecological, economic and social sustainability. It also improves local conservation knowledge and awareness which are necessary in aiding a community's resource management capability. In the Himalayan region, forests have received maximum attention amongst a variety of resources. Historically, the forests were open to the

mountain inhabitants to meet their forest-based domestic needs while ownership of the forest land and revenue generated were the subjects of the state. Local needs of fuel, fodder, minor timber, grazing and other NTFPs depend very much on the forests. Traditional community-based forest management, wherever prevalent, aims to meet the above needs. Community participation in the state administered practices such as JFM and EDCs are essential to answer the question of sustainability of the rural populace in harmony with the forests till the alternatives are available in plenty.

This has been observed that the community-based forest management practices in Sikkim exist in different forms, but to a limited extent compared to the other north-eastern states. This emphasises on the need of detailed studies of each available system to fully understand the positive and negative aspects. Strengthening of any one system or to do away with other system out of all the surveyed practices shall require the views of stakeholders which in this case are the local inhabitants as well as the state itself. It is also very clear that most of the community-based practices are either sacred conservation ethics driven or the traditional need based driven. Therefore, there is less scope of commenting on the communities in terms of either resource exploitation or purely commercial motives being associated with any of the practices observed.

It should also encourage the preservation of their cultural heritage and diversity as the foundation of their cultural identity and thereby self-confidence. Since the community-based practices are highly localised and vary from area to area, a state wide policy on each of them may be tough. But empowering the institutions of local self-governance to look after such community practices in their jurisdictions with sufficient policy/legal instruments may make it possible. In the present day context of climate change, the CFM can contribute to the carbon mitigation option as well. This shall further help conserve the age old cultural values also instead of an accelerated erosion of the same by way of modern concepts of restrictions only as a blanket answer to the needs of ecosystem conservations.

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