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Potential for Community and Conservation Reserves in the Western Ghats, India

Arun Kanagavel[1,2,3,*], Shijo Joseph[2,4], Revati Pandya[3] and Rajeev Raghavan[1,2]

[1]*Durrell Institute of Conservation and Ecology (DICE), School of Anthropology and Conservation, University of Kent, Canterbury, United Kingdom – CT2 7NZ*
[2]*Conservation Research Group (CRG), St. Albert's College, Kochi – 682 018, Kerala, India*
[3]*Wildlife Information Liaison Development Society (WILD), 96, Kumudham Nagar, Coimbatore, Tamil Nadu 641 035, India*
[4]*Center for International Forestry Research (CIFOR), Jalan CIFOR, Bogor 16115, Indonesia*

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ABSTRACT

Protected Areas represent the world's economic and political commitment towards the conservation of biodiversity. The Western Ghats (WG) in peninsular India, part of the Western Ghats-Sri Lanka Hotspot has the highest human population density and population pressure in the world and is in need of urgent conservation attention. Community Reserves and Conservation Reserves are protected area systems in India which integrate local communities as well as private organisations into protected area management. The potential for Community and Conservation Reserves was evaluated at 25 reserve forests and privately owned/leased forest fragments at Kodaikanal, Theni and Valparai, which are limited-access areas in the human-dominated landscape of the southern WG. Data collection at each site, on a range of issues, was based upon the characteristics of local communities which would be central to the integration of resource-use, community participation and biodiversity conservation. The sites where local communities preferred to participate in protected area management were further prioritized through ranking them for the variables and index calculated. Sixteen potential, community and conservation reserves were subsequently identified and prioritised. An analysis of the perceptions, of forest department officials and conservation researchers, towards the establishment of such reserves revealed that they were unsure whether these reserve systems would be beneficial for biodiversity conservation.

Key words: biodiversity conservation, community-based conservation, prioritization

INTRODUCTION

Protected areas, especially in developing countries, are associated with people living within or close to its boundaries and whose livelihood depends on these areas (Gadgil, 1990; Kothari, 2008). Protected areas (PA), based on the preservationist principle, affect millions of people by restricting resource-use and also create social conflicts, which in turn affect biodiversity conservation (Gadgil, 1990; Kothari, 2008). A new direction through community-based conservation was sought in order to reduce the negative social impacts of PAs on local communities, and garner their support for conservation (Western and Pearl, 1989; Southworth, Nagendra and Munroe, 2006). In the following turn of events which shaped PA principles, the International Union for Conservation of Nature and Natural Resources (IUCN) in 1994 classified the world's PA systems into six categories, two of which (Category V and Category VI) tried to integrate biodiversity conservation and the resource needs of the local people (Mulongoy and Chape, 2004). The total area protected under these two categories has gradually increased (Chape *et al*., 2003) and such PA systems have been promoted throughout the world.

However, PAs intended specifically for biodiversity conservation in India, continue to be profoundly preservationist (Madhusudan and Raman, 2003). The number of PAs in India has increased thirteen fold in the last three to four decades (Mathur, 2007). A consequential resettlement of more than 100,000 people and denial of traditional lands in many circumstances has ensued (Kothari *et al*., 1996, cited in Wani and Kothari, 2007). Moreover, this has affected millions of people whose livelihoods depend on non-timber forest products (NTFP) (Wani and Kothari, 2007), which contributes to 14% to 23% of the rural income for economically weak communities (UNDP 2009, cited in Srivastava and Singh, 2009).

The management of PAs in India, being highly centralized involves very little or no participation from local communities (Wani and Kothari, 2007). Due to pressure, funding and interest from international and local organizations (Guha, 1997; Lele, 2000; Kothari, 2008) in implementing community-based conservation, there has been an increasing focus in India in involving local communities within PA management. The Joint Forest Management (JFM) programme, which began in 1990, was the first official initiative in India to involve communities in forest management and achieved mixed results in different states (Lele, 2000). Pro-community initiatives like the Integrated Conservation and Development Projects and Biosphere Reserves followed and were set up in India like elsewhere in the world. Some of these initiatives have been successful to an extent, at supporting local community livelihoods and building participation (Mishra, Badola and Bhardwaj, 2009) but have not been able to improve biodiversity conservation (Rao *et al*., 2003;Varma, 2009).

A promising initiative in India, towards adopting a community-based conservation strategy into the PA system, are the Conservation Reserves and Community Reserves (MoEF 2010a). Conservation Reserves (IUCN Category VI) are biodiversity abundant,

*Corresponding Author's E-mail: arun.kanagavel@gmail.com

Government-owned areas that are particularly close to the existing PAs and co-managed by local communities. Community reserves (IUCN Category V) can be set up on biodiversity abundant, communal or private lands and are managed by the communities or entities in possession of the area. Both these reserve types allow for extraction of natural resources and represent an attempt at decentralizing the management of PAs by the inclusion of local communities and private organizations. This could potentially lead to a "win-win" situation where biodiversity conservation and local livelihood sustenance are integrated, leading to an improvement in conservation measures, especially in limited-access forests.

There are currently 43 Conservation Reserves (WII, 2010a) and five Community Reserves (WII, 2010b) in India. Recently, there have been suggestions for testing "pilot models" of Community and Conservation Reserves (CCRs) as a strategic direction to achieve conservation outcomes in the Western Ghats (Bawa *et al.*, 2007). This direction was especially suggested in order to increase the effectiveness of conservation mechanisms in the human-dominated landscape of the Hotspot. Establishment of CCRs in addition to safeguarding the resource need of the people would also expand the PA network and aid global efforts towards conserving threatened species.

Many reserve forests and private forest fragments occur in India that account for lesser conservation effectiveness in comparison to the other PAs or community-based reserves (Shahabuddin and Rao, 2010). As limited-access forest areas can be nominated to other PA categories by the respective State Governments, this study aims to evaluate the potential for the establishment of CCRs in 25 existing reserve forests and private forest fragments with community presence. These 25 sites occurred in the Tamil Nadu State in the southern Western Ghats (WG) and were chosen through convenience sampling from the priority conservation areas identified by Bawa *et al.* (2007). The suitability of these sites as CCRs was assessed and prioritized through local community characteristics which would be central to the integration of community participation, resource-use and biodiversity conservation. The study also explored the perceptions of forest department officials and conservation researchers towards the establishment of such reserves and the role of local communities in biodiversity conservation.

METHODS

Study Location

The Western Ghats of India - part of a biodiversity hotspot, extends over an area of 1,60,000 km^2 and elevation of 300 – 2700m (Das *et al.*, 2006). High rates of endemism especially among amphibians (78%) and reptiles (62%) characterize WG's biodiversity (Das *et al.*, 2006) along with the presence of charismatic and threatened species like the Asian elephant (*Elephas maximus*), tiger (*Panthera tigris*) and the lion-tailed macaque (*Macaca silenus*), emphasize global and local concern over WG's conservation. It is also one of the eight "hottest hotspots" in the world as the WG has the highest human population density in comparison to any other hotspot in the world, which represents a high risk to its sustenance as only 6.8% of the original primary vegetation currently exists (Cincotta *et al.*, 2000; Myers *et al.*, 2000).

Study sites

The study was conducted in three areas – Kodaikanal, Theni and Valparai within the Anamalai corridor of the southern Western Ghats (Bawa *et al.,* 2007).

The city of Kodaikanal (N10° 14', E 77° 29') is a popular tourist destination in the Palni Hills situated amidst numerous reserve forests. It supports a human population of 100 645 (DCO-TN, 2001) who are either dependent on tourism or farming for livelihood sustenance. Wildlife tourism in Kodaikanal is a supplementary feature as tourists mainly pursue the high-elevation city as a reprise from the climatic conditions prevailing in the plains.

The district of Theni (N 10° 00', E 77° 28') is comprised of southern tropical forests, dry and moist, deciduous forests and evergreen forests (Ignacimuthu *et al.*, 2008) and encompasses rich biodiversity characteristic of the WG. It supports a human population of 1 093 950 (DCO-TN, 2001), who are mainly dependant on agriculture (like sugarcane, rice, cotton, mango, grapes and vegetables) as a source of livelihood. Tea, coffee and cardamom plantations are also present at higher elevations.

The municipality of Valparai (N 10° 22', E 76° 58') is a highly fragmented landscape consisting of tea, coffee, cardamom and eucalyptus plantations (Raman, 2006) with rainforest fragments dispersed within them, which continue to support wildlife like the Endangered lion-tailed macaque and the Great Hornbill (*Buceros bicornis*). Valparai has a human population of 95 107 (DCO -TN, 2001) who generally work in the various plantations.

Twenty-five existing reserve forests and private forest fragments (Figure 1) at Kodaikanal (n = 5), Theni (n= 8) and Valparai (n = 12) were selected through convenience sampling.

Data Collection

Fieldwork was conducted from May to July 2010 at households close to or within the reserve forests and private forest fragments, forest department offices and at offices or field stations of conservation organizations .

Local Communities: Questionnaires were conducted with individuals from local communities; standardized for the native languages (Tamil and Malayalam) and piloted to check for wording and other problems. A final questionnaire, which on an average took 25 minutes to complete, was constructed, based on the results of the pilot survey. Questionnaires were administered face to face. Any individual irrespective of gender, above the age of 18, willing to be interviewed in a household was chosen as a respondent. Systematic sampling was undertaken while selecting households to be interviewed (Newing, 2010). Twenty individuals from the local community were interviewed from each of the 25 study-sites except at Kumbhakarai and Paliangudi due to time concerns.

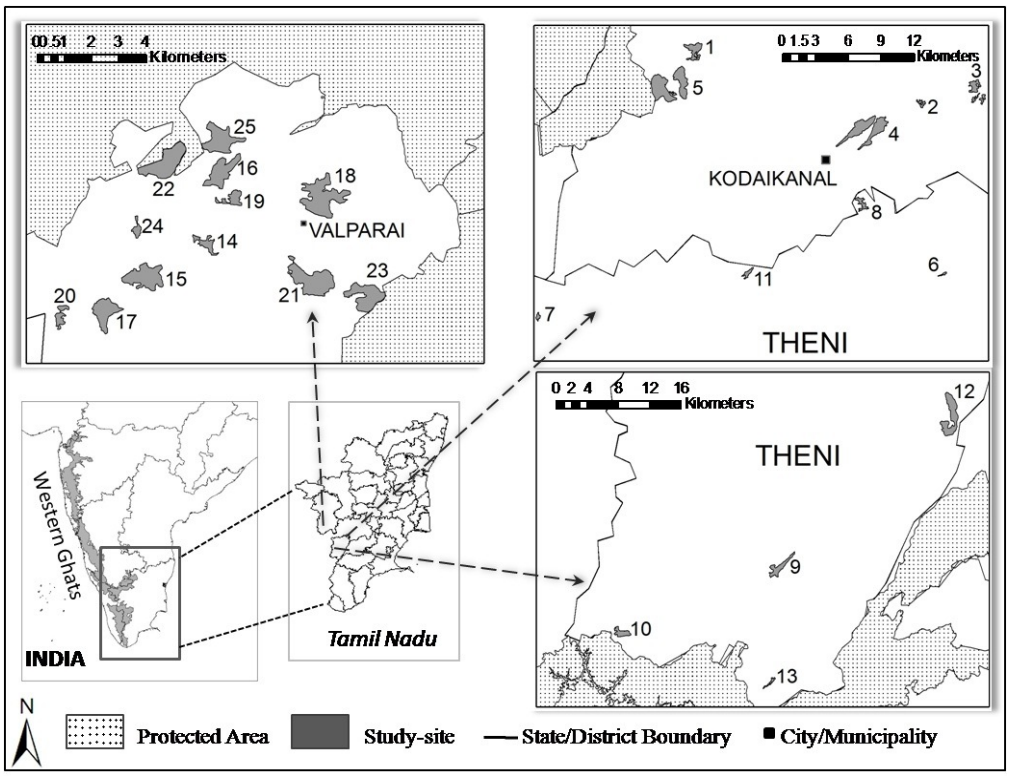

Figure 1. Map of the study-sites at Valparai, Kodaikanal and Theni and their location within the state of Tamil Nadu in southern India (Kanagavel *et al*., 2013).

To identify potential CCRs, the following information was collected from each respondent based on their characteristics and dependence on forests: 1) Nature and frequency of human-wildlife conflicts and the respondent's action to such conflicts; 2) Details regarding items collected from the forest (respondents were asked to grade each item collected as low, medium or high corresponding to the quantity collected); 3) Information on cooking fuels used and their sources; 4) Number of livestock; 5) Willingness to emigrate to a city and; 6) Type of household ownership (owner, rent or encroachment).

The pilot survey led to the recognition of the bias that locals would readily accept to participate in PA management as a questionnaire element, but an in-depth discussion of related issues proved other wise. Focus group discussions were therefore conducted in order to explore the views of the local community on issues relevant to PA management and participation, to arrive at a general consensus at each study-site. Participation in PA management was explained to the focus group as- patrolling, taking part in tourist guiding activities, formulating management plans and taking part in discussions with other stakeholders. At private forest fragments, the employees (individuals from the local community) and not the entity which owned the area were interviewed. This was based on a general trend that only employees directly depended on and were affected by any change related to forest resources. One focus group discussion was conducted at each of the 25 study-sites. Focus groups were selected through convenience sampling and comprised of three to eight individuals from the local community. Each discussion took 30 – 40 minutes approximately. The livelihood of the local community, current participation in the management of reserve forest or private forest fragment and their willingness to further participate in such management was determined through these discussions. The topic of incentives was deliberately left out and only discussed if the group mentioned it during the course of the discussion.

Forest Department Officials and Conservation Researchers: Questionnaires were also administered with forest department officials and conservation researchers at the three main areas, selected through snowball sampling (Newing, 2010). Perceptions on the establishment of CCRs and the role of local communities in biodiversity conservation were determined.

Data analysis

The questionnaire data with forest department officials and conservation researchers was analyzed qualitatively except for the responses to local community's efficiency in biodiversity conservation, which was averaged after combining the responses of conservation researchers and forest department officials from each area. The data derived from questionnaires and focus group discussions with local communities were analysed quantitatively.

Questionnaire data

Five key variables were calculated in order to help in the identification of potential CCRs. These variables indicated the percentage of respondents whose actions during wildlife conflicts could physically hurt the animal concerned (throw stones, set snares, keep hunting dogs, shoot or kill the animal); collection of NTFPs; number of livestock;

willingness to emigrate to a city and percentage of households which were encroachments at a study site were calculated. Most of these variables were calculated directly; others needed a more detailed calculation and are discussed below.

The items collected from the forests by the respondents were NTFPs and firewood. Low, medium and high quantities of collection as indicated by the respondent for each NTFP were assigned scores of 1, 2 and 3 respectively. Every respondent did not necessarily mention the same NTFPs and a score of "0" was assigned when collection was not mentioned or was denied. The NTFPs were classified under firewood, honey, fruits, tubers, fodder, spices and medicine. If two or more NTFPs mentioned were classified under the same group, the highest collection score among them was retained to represent the group. The data acquired on firewood as an NTFP was re-assessed with the data acquired from cooking fuels. In case a respondent mentioned the use of firewood as a cooking fuel and its source as the forest, but had not mentioned it in list of NTFPs, a value responding to that of low quantity of firewood collection (1) was re-assigned to the respondent. The quantity of each NTFP group collected for a study-site was calculated by averaging the scores of the respective respondents. This average quantity was then summed up to calculate the average NTFP collection for each site.

A score of 1, 0.5 or 0 was assigned depending on whether the respondent's willingness to emigrate to a city was "yes", "maybe" or "no" respectively. The average willingness to emigrate from each study-site was then calculated.

Focus group discussion data

The focus group discussions from each study-site were coded and the data acquired on the various issues were assigned values (Table 1). The values assigned for the various topics were then summed into a participation index.

Table 1. Scores assigned to data acquired from focus group discussions

Topic	Consensus among local community	Score
Willingness to participate in PA management	Willing to participate	2
	Doubtful of participation	1
	Unwilling to participate	0
Incentives for participating in PA management	No enquiry about incentives	1
	Enquired about incentives	0
Current participation in PA management	Fire management	1
	Fire management and other activities	2
	No current participation	0
Lifestyle	Spare time available	1
	Considerable spare time unavailable	0

Potential for Community or Conservation Reserves

A criterion that only those sites where the local community was willing to participate in PA management (deduced through the focus group discussions) were selected in order to delineate potential reserves. Thereafter, a methodology similar to that for identifying biodiversity hotspots (Myers *et al.*, 2000) was used. The study-sites delineated on applying the primary criterion were ranked separately for the six variables calculated from the questionnaire and focus group discussion data collected from various local communities whose significance in identifying potential reserves is described in Table 2. These variables differed from each other conceptually and was not combined into a single index. On ranking the study-sites, the number of times a study-site appeared in the top five rankings for each of the six variables was calculated, on the basis of which these sites were then prioritized.

Table 2. Significance of variables/index used to identify and prioritise sites

Variable/ Index	Significance in potential reserve selection
Participation Index	New reserve system seeks to integrate local communities in PA[a] management and their participation would be the most important factor in potential reserve selection
Wildlife Conflicts	New reserves in its aim to involve local communities in biodiversity conservation would benefit its purpose with individuals being pro-conservationist towards wildlife
NTFP[b] collection	A lower dependence on forest-based NTFPs would benefit biodiversity conservation
Livestock	A lower number of livestock would benefit biodiversity conservation through reduced human-wildlife conflicts and dependence on forests
Emigration	New reserve systems aim to integrate local communities. If a majority of individuals are willing to emigrate, reserves could be rendered non-functional.
Encroachment	Larger number of encroachments increase dependence on forests and, often backed by political support they would be difficult to manage if reserves became functional

[a]PA – Protected area; [b]NTFP – non-timber forest products

RESULTS

A total of 480 questionnaires were conducted and 25 focus group discussions were held among the local communities residing at each study-site. Questionnaires were conducted with 19 forest department officials and 11 conservation researchers at Kodaikanal, Theni and Valparai.

Potential Community and Conservation reserves

A total of 16 study-sites were identified as potential Community/Conservation reserves (Table 4) and prioritized based on the top five rankings. Nine sites were omitted on applying the criterion that the local community at the study -site was willing to participate in PA management.

Table 3. Variables and index based on which the 25 study-sites were prioritized

Site No[a]	Study-Site	Area[b]	Part[c]	WC[d]	NTFP[e]	Livest[f]	Emig[g]	Encroach[h]
1	Gundupatti	K	4 (2)	5	1.35	63	0.70	25
2	Machur	K	4 (1)	40	1.30	167	0.50	15
3	Pannaikadu	K	4 (2)	15	2.10	396	0.80	0
4	Perumal Malai	K	6 (2)	10	1.45	68	0.40	30
5	Kukkal	K	4 (2)	15	1.25	417	0.65	30
6	HCRI[i]	T	6 (2)	45	0.80	104	0.65	10
7	Kurangani	T	4 (2)	15	1.45	399	0.20	30
8	Kumbhakarai	T	5 (2)	10	2.20	6	0.70	0
9	Meghamalai	T	3 (1)	20	1.65	56	0.60	0
10	Paliangudi	T	6 (2)	0	2.60	157	0.40	10
11	Sothuparai	T	6 (2)	20	2.30	50	0.75	0
12	Vellapar Kovil	T	6 (2)	0	1.90	1465	0.95	10
13	Vellimalai	T	5 (2)	5	1.85	25	0.55	30
14	Injipara	V	2 (0)	15	1.35	17	0.85	0
15	Korangmudi	V	2 (1)	0	1.45	33	0.75	5
16	Old Valparai	V	4 (2)	0	1.40	15	0.80	0
17	Pannimade	V	1 (0)	0	2.20	21	0.95	0
18	Puthuthotam	V	4 (2)	15	1.75	6	0.78	0
19	Sellaliparai	V	2 (1)	0	1.20	24	0.70	0
20	Sholayur Dam	V	1 (0)	5	1.70	25	0.65	30
21	Srikundra	V	2 (0)	0	0.80	23	0.95	0
22	Surlimalai	V	5 (2)	10	1.40	17	0.60	20
23	Tantea	V	4 (2)	5	1.00	0	0.65	0
24	Urulikkal	V	2 (1)	0	1.55	104	0.45	0
25	Varrattuparai	V	4 (2)	0	1.80	17	0.90	0

[a] *Site No. corresponds to the reserve forests and private forest fragments in Figure 1.*
[b] *K = Kodaikanal; T = Theni; V = Valparai*
[c] *Part = Participation index, derived by assigning scores to data from focus group discussions (Table 1); (n) indicates the "willingness to participate in PA management" variable for the local community*
[d] *WC = Percentage of respondents whose actions during wildlife conflicts could physically hurt the animal concerned*
[e] *NTFP (non-timber forest products) collection derived through summing the average collection of various NTFPs collected by respondents from the forests.*
[f] *Livest = Average number of livestock present at the study site*
[g] *Emig = Average number of respondents who are willing to emigrate to a city*
[h] *Encroach = Percentage of households that were encroachments*

Local community characteristics

Participation in PA management: Willingness to participate in PA management differed among the local communities at different study-sites (Table 3). A larger number of local communities at Kodaikanal and Theni were willing to participate than at Valparai. Those communities who were unwilling or doubtful of participation in PA management were apprehensive to enter the forests due to wildlife conflicts, had little time to spare due to their livelihood-based routine or due to subjugation by the local forest departments. Study sites where the majority of respondents worked at tea, coffee or cardamom plantations were found to have a busy daily schedule with considerable time to spare only on Sundays. People with livelihoods other than those based at plantations had the willingness to collaborate on account of more time.

The local communities at all the study-sites were already assisting in forest management undertaken by the FD, especially in managing forest fires. At some places the local communities were paid to do so by the forest department while at other areas, the locals stated that they did it voluntarily to prevent forest fires from spreading to their farmlands and plantations. Out of the 25 forest fragments, local communities at 12 enquired about incentives and payments towards participation in PA management.

NTFP and firewood collection

Approximately 96% of the respondents from local communities collected NTFPs from the forests. Firewood was the most abundant NTFP collected from forests at many study-sites and was restricted to collection of small, dry twigs. Local communities who worked in tea or coffee estates (all the sites at Valparai-12, and two at Theni) also used firewood from silver oak (*Grevillea robusta*) at the plantations. Firewood played a major role as a cooking fuel, dominant over kerosene and gas in Theni and Kodaikanal. Many respondents (51%), especially at Valparai used gas and kerosene in combination with firewood, for

Table 4. Priority Community and Conservation Reserves

Study-site	Reserve Type	Ownership [a]	Top 5 Ranking
Kumbakarai	Conservation	Govt[b]	
Old Valparai	Community	Private	4
Tantea	Conservation	Govt	
Varratuparai	Community	Private	
Paliangudi	Conservation	Govt	
Vellimalai	Community	Private	3
Surlimalai	Community	Private	
Puthuthottam	Community	Private	
Perumal Malai	Conservation	Govt	
Sothuparai	Conservation	Govt	2
Pannaikadu	Conservation	Govt	
Kurangani	Conservation	Govt	1
Vellapar Kovil	Conservation	Govt	
HCRI[c]	Conservation	Govt	
Gundupatti	Conservation	Govt	
Kukkal	Conservation	Govt	0

[a] *Study-site owner;* [b]*Govt = Government;* [c]*Horticulture College and Research Institute*

cooking. Also, three to five litres of kerosene were distributed free of cost to many households at Valparai as per state government provisions.

Wildlife conflicts, livestock, emigration and house ownership

Approximately 10% of the 480 respondents could have physically hurt the animal concerned (throwing stones, setting snares, hunting dogs, shooting or killing the animal) during conflicts with wildlife. Such actions were more prominent at study-sites in Theni and Kodaikanal. Wild boar and gaur were the main conflict animals causing a loss of agricultural produce in these areas.

The total livestock (goats, cows and horses) numbers ranged from 0 to 1465. The numbers of livestock were lesser at those study-sites (mainly at Valparai) occurring within tea, coffee or cardamom plantations due to household restrictions on livestock number and type imposed by the plantation management.

A majority of the sample (67.7%) wanted to emigrate to a city. Reasons for emigration were wildlife conflicts, lack of facilities (like schools and hospitals) and high-income jobs.

The majority of the sample population either owned the house they lived in (35.7%) or lived in a plantation, forest department or college accommodation (41.8%). A total of 50 respondents resided in houses which were encroachments.

Perceptions of Forest Department officials and Conservation Researchers

Role of local communities in biodiversity conservation: In all the three areas, local communities were largely perceived as uninterested in issues pertaining to wildlife conservation. Local interest in this regard was considered "superficial", existing only in a few individuals and not as a major trend in the entire community. Moreover, they were perceived as being mainly associated with the exploitation of natural resources and opportunistic in this regard.

Potential of Community and Conservation reserves

Both forest department officials and conservation researchers were either doubtful or unsure whether the system of Community and Conservation Reserves would work towards the benefit of conservation. This perception was a result of their earlier views of local communities, the CCR system being a fairly new concept for PA management in India and their effectiveness in biodiversity conservation being unknown.

DISCUSSION

Local Community participation in PA management

Local communities in all the potential reserves were willing to participate in the management of the potential reserves (in return for financial incentives in some areas) and from the results, they currently do participate in the management of the reserve forests or private forest fragments to varying degrees. The communities unwilling or doubtful of participation in the management of potential reserves were on account of their exposure to wildlife conflicts, little time to spare due to their livelihood activities or due to hostility from the local forest departments. These reasons were also reflected in Ogra's (2009) study that assessed local willingness to participate in a collaborative approach to resolve conflicts with

wildlife in the state of Uttarakhand.

Community participation dominant among the study sites could be categorised either as passive or bought participation (Pretty and Smith, 2004). This was because the individuals from the local community were either paid or felt obliged to participate when requested by a forest department official to manage forest fires. These issues could be a reason why some communities were unwilling or expressed doubts towards further participation in PA management even though they were already participating in forest management activities.

A preservationist attitude

The perception of forest department officials that local communities are primarily responsible for the threats towards biodiversity and are incapable of sustainable resource use is predominant around the world (Pimbert and Pretty, 1995; Guha, 1997), and is supported by this study. Forest department officials and to an extent, conservation researchers interviewed in this study possessed a preservationist attitude towards PA management, while there has been a growing impetus for local support and community-based conservation throughout the global conservation network.

In contrast to the global scenario, this perception existed among the stakeholders inspite of community participation. Similar attitudes were prevalent at the Nanda Devi biosphere reserve in the Himalayas (Rao *et al.*, 2003) wherein the forest department did not favour the use of natural resources for economic benefits or allow local institutions to make resource-related decisions. Karanth *et al.*'s (2008) study revealed a confused outlook among the sample of natural scientists, social scientists, conservation managers, amateur naturalists and others. A majority of them supported strict enforcement, supported relocation, claimed that people living within PAs was unsustainable and they should not live within them. On the contrary, a majority also supported a "participatory approach" and benefit sharing among local communities.

The concern expressed by forest department officials and conservation researchers over legalized resource-use by local communities and its negative effects on biodiversity is justifiable, as community-conserved areas have generally resulted in a further loss of forest cover and other biological variables (Shahabuddin and Rao, 2010). However, it would be impractical to totally isolate local communities from PAs in a human-dominated landscape, especially in India, where the key forest management authority- the forest department could function more effectively and benefit from their participation.

CONCLUSIONS

Community and Conservation Reserves have been recommended (Dookia, 2007; Tripathy and Choudhury, 2007 and Pattanaik, Prasad and Reddy, 2008) in order to conserve specific species or entire ecosystems and could be set up to gain local popularity and greater support for conservation in a human dominated landscape (Bawa *et al.*, 2007). However, the role of the local communities in Conservation Reserves is advisory as of now and may or may not be binding on the decisions taken by the forest department, re-instating the "top-down" management approach. In case of Community Reserves, the initially affirmed land use pattern can only be altered if approved by the State Government. This could deflect interested private organizations or individuals due to loss of decision-making towards land-use and a possible devolvement of their power through state control. The reserve system could allow for increased levels of local participation and adaptability. Undermining the role of local communities in biodiversity conservation by conservation practitioners could affect the establishment of relationships necessary for the functioning of PAs in India, a majority of which have people residing within them.

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