Human use areas in the Kalakad–Mundanthurai Tiger Reserve

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Human settlements within forest areas and their utilization of usufructs are a common occurrence in the Parks and Sanctuaries of India. Subsequent conflicts with conservation interests are common and many strategies to tackle these have been discussed and debated. This paper presents the historical background of the settlements within the Kalakad–Mundanthurai Tiger Reserve and the need for a comprehensive effort to address the issues related to these.

'THE splendid leaf canopy of the evergreen forests are so dense that it rains for some minutes before any drops come through and then it comes down so lightly that it is soaked up by the soft humus and debris that forms the upper stratum of the surface soil. Where the trees are felled and burned for coffee cultivation much of this humus is burnt and the rest is swept down by the heavy forest rains. After this, whenever there is violent rain it rushes off down the side of the mountains forming numerous sluices where none existed before. If the rest of Kattalamalai Estate is felled I anticipate serious results and if it is not too late to interfere, I believe it would be good policy to pay a large sum to save the remainder from destruction.

The Singampatti forests are threatened and I believe they are doomed if the Government does not interfere. If it or any portion of it is felled, it will be an act of vandalism that will be bitterly resented when it is too late and it will be impossible to say what ruin on the Tinnevelly District.'

As the passage quoted above shows, Col. Beddome[1] recognized the importance of intact watersheds in this area over a hundred years ago, in 1878. He, along with others in both the Forest and Revenue Departments, such as Claude Puckle, also recognized these watersheds as being areas of great natural beauty. These areas have also been long recognized as containing valuable resources in terms of forest products, water power and tourism. Spiritual seekers have also long visited sites in these hills, since legend has it that the Saint Agastyar dwelled here. All these factors have led to people settling and altering the landscape of this region.

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In this paper, we address the human settlements in the Kalakad–Mundanthurai Tiger Reserve (KMTR). These settlements fall roughly into three categories: economic, religious and Electricity Board settlements. All these will be discussed below.

In this paper, an enclave is defined as an area surrounded by the Reserve on all sides. Table 1 lists the approximate areas, locations and impacts caused by each enclave. A total of 28 enclaves have been identified within the KMTR. Of these, 4 are Electricity Board (EB) camps, 1 BBTC (Bombay Burmah Trading Corporation) is leased, 4 are temple complexes and 19 appear to have pattas. Sixteen have been dealt with in this report, and 12 could not be located because of the lack of revenue maps: the Forest Department might already have resumed some of these.

Economic enclaves

The economic enclaves in the Park fall primarily into two categories: production agriculture and arboriculture, and electricity generation. The first of these two consist of a variety of plantations for tea, coffee, cardamom and coconut. They consist of the largest category, with approximately 5605 ha. There are several smaller enclaves. A prioritization was done to determine which order the estates should be acquired, as money becomes available. This is presented at the end of this article.

BBTC

This is the largest and most notable estate with an area of 3391 ha. The largest operation here is tea plantation, though there are some areas under cardamom and eucalyptus. These commercial operations do not harvest fuel wood and NTFPs, but their associated labour populations do. This has led to visible degradation on the rainforests surrounding the estate.

The Singampatti ex-Zamin forest was ceded to the Raja of Singampatti by the Maharani of Travancore about 250 years ago for helping her quell a court mutiny. The BBTC area, which is part of this, was leased by the company from the Raja of Singampatti in 1929. This was done to enable him to pay back debts incurred by him for defending himself against a murder charge. Management

of the Singampatti forest was taken over by the Forest Department in 1956, and the Forest Department became the lessor.

It needs to be stressed that BBTC took very good care of the forests in and around their lease. Because of this, the largest single population of the endangered lion-tailed macaque is found in this area. Ironically, it is precisely because of this that the company was prevented from expanding its tea plantations in the 1970s.

The lease expires in 2028. Legal manoeuvres have already started to determine what happens to the area after this, even though nobody is prepared to state this in an explicit fashion. There are over six ongoing cases between the Forest department and BBTC now, ranging from a challenge to the wildlife sanctuary notification by BBTC, to alleged theft of bananas by forest staff. Since large amounts of money are involved, and also the possible displacement of a population of 6600 labourers and dependents, it would be tragic if the decision to either revert the plantations back to forest, or to continue them as tea plantations, was to be taken at the last minute. Mediation efforts should begin now to settle the issue.

Kattalamalai estate

This is the second largest estate in the Park, with an area of 1271 ha. The quote at the beginning of this article indicates that its watershed importance was recognized more than a century ago. Several opportunities to acquire it by the Government were lost and it changed owners twice during this time. Parts of this estate have been converted to commercial timbers such as teak, and there are also coconut and eucalyptus plantations. Logging on a fairly extensive scale took place until five years ago. The owners have recently applied for a permit to extract cane, and this is certainly going to damage what is still the best moist deciduous forest in the region. Since it contains the largest block of lowland evergreen forests in the Reserve, and also some of the only moist deciduous forests in the area, this estate would be the first priority for acquisition in the Reserve.

EB estates

While under Government control, these estates have become commercial in nature, with a major part of the population having nothing to do with electricity generation. These are dealt with as settlement enclaves.

Abandoned estates

These estates should be a priority for inclusion, since they confer neither an economic nor a habitat benefit. Two such estates were identified during this study, covering an area of 90.1 ha.

Religious enclaves

Details of the religious enclaves are given in Table 2. There are two very distinct kinds of religious tourism in the Park: meditative (retreats, quiet meditation sessions) and festival. The meditative tourism, exemplified by the Dohnavur fellowship, has little impact and there is no problem with its continuing. The temple festival tourism has significant deleterious effects within the Park, with bus-loads of tourists bringing radios into the Park, starting fires and littering the place with food packaging material, etc. The largest festival, that of 'Adi Amavasi', brings about 5 lakh persons over a period of 10 days into the Park for visiting the Sorimuthianar koil alone.

Table 1. Summary of status and activities in all the enclaves identified in KMTR

Location	Type	Area (ha)	Longitude (E)	Latitude (N)	Wild life loss	Encro-achment	Fuel wood extraction	Grazing	Erosion	Pesti-cides	Herbi-cides	Invasive species
Adheenum mutt	Private Forest	673	77.32	8.33	x	x	x	x	x			
BBTC	Tea, Coffee	3390	77.24	8.34		x	x	x	x	x	x	x
Kattalamalai estate	Coconut, Eucalyptus	1271	77.17	8.38	x		x	x	x			
Manalthurai	Coconut, Mango	15.98	77.21	8.39	x			x	x	x		x
Thirupannipuram	Fruit trees	60.12	77.22	8.42		x	x	x	x			x
Vananamalai Jeer mutt	Tea	193.50	77.30	8.28			x		x	x		
Kuliraati	Abandoned	31.36	77.28	8.31					x			
Ramasubramania Raja estate	Abandoned	10.23										
Dohnavur fellowship	Religious	15.98	77.29	8.27			?					
Golaknath	Religious	0.56				x	x					
Nambikoil	Religious	2.48	77.30	8.26		x	x		x			
Sorimuthaianar koil	Religious	21.30	77.20	8.39		x	x		x			
Papanasam lower dam	Electricity settlement		77.22	8.42	x	x	x	x	x			x
Papanasam upper dam	Electricity settlement		77.18	8.39	x	x	x	x	x			x
Servalar	Electricity settlement		77.18	8.41	x				x			
Upper Kodayar	Electricity settlement		77.21	8.31	x	x	x	x	x			x

It is clear from Table 2 that Dohnavur has the least impact with a use level that is well below its capability to support it. By 'capability' it is meant that there need not be any serious short- or long-term damage with this kind of use. Nambikoil needs a little input; a better control over the visits of pilgrims into the Sanctuary and bringing in cooking gas from outside to prepare meals for the pilgrims. Bringing cooked food is also possible, but the temple now serves food to all the pilgrims. The problems posed by the other temples also need to be addressed in a comprehensive pilgrim-management plan. The plan must include measures to limit impacts, including:

(1) Shipping fuel wood from outside the Park or supply of gas by the temple authorities. The problem is most severe at Sorimuthaianar koil during the Adi Amavasi festival. Approximately 3 lakh people camp here and are dependent for most of their fuel wood on the forest. The impacts caused by this festival, both due to biomass depletion and also to the accidental forest fires that occur, are noticeable for months.
(2) Limiting and policing campsites would reduce the chances of fires, and also the chances of pilgrims going into the forest to camp. It would also localize the damage.
(3) Toilet and waste disposal facilities are urgently needed. Presently at Sorimuthaianar koil, the banks of the river are used for defecation, and the bad smell persists for up to six weeks later. A huge quantity of litter, plastic bags and food wastes is also generated.
(4) The transport and slaughter of goats and chickens inside the Reserve is a problem at the Golaknath complex. This complex has both a temple and a dargah (Muslim shrine). While persons belonging to all religions come to the dargah, ritual slaughter of goats and chickens is practiced here. The only cooking spaces are near the temple and this has led to tension in the past. This activity needs to be re-examined.

Electricity board enclaves

The many peaks and valleys in KMTR form a large watershed with numerous rivers and streams. All the rivers flow towards the east or south-east. The Tambiraparani is the major river and its main tributaries are the Ullar, Pambanar, Karaiyar and Servalar. This river system is the main source of irrigation to the plains below.

There are five dams within the Park, constructed at various times in the last century. The first to be constructed was the Papanasam Hydel Project which exploited the Tambiraparani river system. Two dams were built along the Tambiraparani, the Upper and Lower Papanasam dams. These were planned as early as in 1813, but were finally constructed only about a century later. The Servalar dam built on the Servalar tributary was completed in 1988. There are two other dams built on other river systems, the Manimuttar and the Kodayar dams.

The Conservator of Forests (CF) then asked the Divisional Forest Officer (DFO) to make a rough calculation of 'what forest expenditure could be considered nullified if dams submerge our forests'. We are reproducing this in some detail because it is one of the earliest examples we have come across of attempting to put economic costs to environmental damage.

On 22 December 1936, the following estimates (Table 3) were supplied by the DFO: this is of particular interest because it is one of the earliest cases of attempting to quantify the economic losses due to the creation of a hydel project in India.

Besides this, Kattalamalai estate contributed Rs 439/yr for road maintenance, which would then be lost. A statistical summary of the EB settlements is given in Table 4. These settlements have a number of impacts on the forests surrounding them. These impacts are as follows:

Fuel wood extraction

Between the three camps on the Mundanthurai plateau, at least 800 kg per day of fuel wood is used. Besides this, fuel collectors from the plains use these camps as a springboard to take out fuel, and an additional 600–700 kg per day goes out of the Park. Since the population in these settlements is increasing, the quantities going out will also increase.

Signs of cutting were observed on almost every tree species. Lower branches of trees with girths between 15 and 25 cm are preferred. Some of the species such as *Erythroxylon*, teak and *Phyllanthus* coppice extensively, but the others such as *Mundulia* and *Chloroxylon* most often do not. Teak, which has been planted extensively by the Forest Department, is the only species which shows a high abundance. Of the 84 species recorded, teak had an abundance of 31.64% and *Erythroxylon*, 12.2%. Of the remaining, 19 species had abundances ranging from 5 to 1% and the rest were below 1%. However, the effect of

Table 2. Religious enclaves and their usage

Temple	Pilgrims on routine visits	Pilgrims during festivals	Total persons days/yr	Area (ha)	Person days/yr/ha
Dohnavur fellowship	30/day (2 months)		1800	15.98	113
Golaknath	25/day	15,000	24,000	0.56	42,857
Nambikoil	10/day	750/month	12,600	2.48	5080
Sorimuthaianar koil	30/day	5,00,000	5,10,800	21.3	23,981

extensive cutting, especially removal of saplings, on growth and regeneration has not been studied in detail.

Since fuel collectors move extensively in the forest, they create numerous paths. Further, they tend to move in groups, thereby causing disturbance to the wildlife. There are many subsidiary branches off the main paths and in such places the canopies have been opened up considerably. In these open spaces invasive weeds such as *Eupatorium* and *Lantana* have taken over.

Livestock

These are another major problem associated with the settlements. They graze within the forest, and compete for forage with the wild herbivores. There is also a threat of disease brought in by cattle. The decline of the deer populations within the Park might be a consequence of the presence of cattle, though this has not been demonstrated yet.

Table 4 clearly shows that a large proportion of the population that stays within these settlements is not connected with the EB. The EB does not have the mandate to function as a landlord. Because there are no EB personnel at Upper Papanasam, it is feasible to shut down the camp and return the land to the Forest Department. If the non-EB personnel are moved out from both Lower Papanasam and Servalar, and the EB staff rehoused from Servalar to Lower Papanasam, it will become possible to revert the land in Servalar camp back to the Forest Department and two major sources of disturbance will be eliminated.

Table 3. Economic assessment of area of submergence

Factor	Amount (Rs)
Submergence of Pechiammal koil subordinates quarters	2602
Replacement cost of above	1000
880 acres submergence-campsites-quarries with 40 yr rotation, so 22 ac/yr	
Revenue Rs 34/ac, so total annual revenue – 22 × 34 = Rs 748 Capitalizing this over 40 years @ 3.5%	21,371
Karaiyar–Karuthalipodai road book value	650
Evergreen series: profit 2 annas/eft, annual loss 7200 eft	1200
Teak plantations submerged, future loss @ 4% considering quality and stocking	82,593
Total	1,11,310

Note: The capitalization appears to be wrongly calculated and the total does not add up; the numbers given are taken from the original letter.

Table 4. Statistical summary of EB camps

Item	Lower Tambiraparani	Upper Tambiraparani	Servalar	Upper Kodayar
Total no. of households	216	39	114	45
EB houses	132	0	73	40
Non-EB houses	84	39	41	5
No. using only firewood	107	35	59	5
No. of cattle	30	19	23	4
No. of buffalo	14	21	42	Feral
No. of goats	59	0	9	10

Table 5. Priorities for acquisition

Attribute	Kattalamalai	Vanamamalai	Kuliraati	Adheenam Mutt	Ramasubra-mania Raja	Manalthurai
Endemic/rare vegetation	6	5	4	2	3	1
Endemic/rare animals	6	5	4	2	3	1
Vulnerable to damage	6	4	3	5	2	1
Watershed functions	6	4	5	2	3	1
Current use in management	6	1	4	5	2	3
Litigation potential	4	5	3	6	2	1
Total	34	24	23	22	14	9
Priority	1	2	3	4	5	6

Priorities for acquisition

Where management changes in current land use would not benefit the surrounding forests, acquisition must be considered as an option. Six criteria were selected to prioritize acquisition. Each of the six estates was ranked 1–6 for each criterion:

(i) Endemic/rare animals and plants, 1 is poorest; 6 is richest.
(ii) Vulnerable to damage, 1 is least susceptible to damage due to additional human activity; 6 is most susceptible.
(iii) Watershed functions, 1 is not important as watershed; 6 very important as watershed.
(iv) Current use in management, 1 is useful currently as base for FD staff; 6 is not useful.
(v) Litigation potential, 1 is continued use by owner not likely to result in litigation; 6 is litigation likely.

The rankings arrived at are given in Table 5. While it is possible to calculate conservation values[2] in deciding priorities for acquisition, as is fashionable today, it was decided not to do so, since these values have two inherent problems. Firstly, they assign numerical values (as opposed to ranks), and then give equal weightage to a number of factors which need not necessarily be comparable. Secondly, social factors that are so important in the Indian context are ignored. While we do not claim that the index used is any better, a debate on the use of these indices is required.

1. Beddome, A Working Plan for the Tirunelveli North Division, Tamil Nadu Forest Department, 1976.
2. Daniels, R. J. R., Hegde, M., Joshi, N. V. and Gadgil, M., *Conserv. Biol.*, 1991, **5**, 464–475.

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