

**AN ASSESSMENT OF ECODEVELOPMENT INITIATIVES
IN
PERIYAR TIGER RESERVE**

**THESIS
SUBMITTED TO THE
FOREST RESEARCH INSTITUTE UNIVERSITY
DEHRADUN, UTTARAKHAND**

**For
THE AWARD OF THE DEGREE OF
DOCTOR OF PHILOSOPHY IN FORESTRY
(Forest Ecology and Environment)**



**BY
ANIL KUMAR BHARDWAJ**

Wildlife Institute of India

Dehradun

2007

DECLARATION

I hereby declare that the thesis entitled "**An Assessment of Ecodevelopment initiatives in Periyar Tiger Reserve**" submitted for the award of Doctor of Philosophy in Forestry (Forest Ecology & Environment) to Forest Research Institute University, Dehradun is a record of original research work done by me under the supervision Dr. Ruchi Badola, Senior Reader, Wildlife Institute of India, Dehradun and it has not formed the basis for the award of any other degree or diploma. I also declare that the thesis embodies the result of my own work and observations and in that respect the investigation appears to advance knowledge in the subject.

Date: 30 August, 2007

Place: Dehradun



(Anil Kumar Bhardwaj)
Candidate

Countersigned:



(Dr. Ruchi Badola)
Supervisor



CERTIFICATE

This is to certify that the thesis entitled "AN ASSESSMENT OF ECODEVELOPMENT INITIATIVES IN PERIYAR TIGER RESERVE", submitted for the award of degree of DOCTOR OF PHILOSOPHY in Forestry to Forest Research Institute University, Dehradun (Uttarakhand), is a record of bonafied research work carried out by Shri Anil Kumar Bhardwaj under my guidance and supervision. No part of this thesis has been submitted for any other degree or diploma and it fulfils all the requirements laid down in the ordinance of Forest Research Institute University for this purpose.

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Supervisor

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Supervisor



Head of Division



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Chairman RAC

Forest Research Institute
(Deemed University)
P.O.: I.P.E., Kaulagarh Road
Dehra Dun - 248 195

Dated 31-10 2001

☎: 0135 - 751826
EPBX: 757021-28 - 4439, 4495 (Ext.)
E-Mail: arorasd@icfre.up.nic.in

To,

Sh. Anil Kumar Bhardwaj
Wildlife Institute of India
Post Box No.18, Chandrabani,
Dehra Dun.

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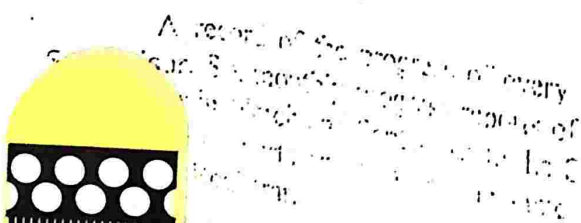
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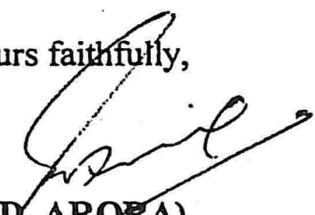
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F.R.I., Deemed University

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2. The Nodal Officer, Wild Life Institute of India, P.B. No.18, Chandrabani, Dehra Dun – 248 001.
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Executive Summary

1. Chapter I introduces the concept and evolution of ecodevelopment and the present study. The main approach to recent wildlife management schemes has been to include the local people to gain their cooperation and support, which have eventually resulted in Integrated Conservation and Development Projects (ICDPs) or ecodevelopment as termed in Indian context. These seek to organize human use of ecosystems to strike a balance between benefiting from natural resources available from ecosystems while maintaining its ability to provide these at a sustainable level. It focuses on maintaining ecosystem functions and integrity recognizing that people are a part of the ecosystem, need for knowledge based adaptive management, need for multi-sector collaboration and making ecosystem based management a mainstream development approach.

2. India has one of the world's most extensive networks of Protected Areas (PAs) totaling 96 National Parks and 510 Wildlife Sanctuaries, 3 conservation and 2 community Reserves and covering 4.77% of its geographical area. The basic approach of managing these PAs till the beginning of 90s had been the conventional isolationist approach wherein management seeks to protect the PAs from inappropriate use of natural resources by the people so as to protect wildlife and other natural resources contained in these PAs. This approach has helped to conserve a significant part of India's biodiversity including a wide variety of natural habitats and plant and animal species by putting a check on destructive development processes and industrial exploitation of resources. However, it also engendered conflicts between PAs and people. To overcome such conflicts a Task Force was set up under the Indian Board for Wildlife (IBWL) in 1982 to propose possible

strategies to reduce these conflicts for the better management of PAs. This Task Force recommended for the concept of ecodevelopment as a measure to gain public support for the conservation of these PAs. As a result a Centrally Sponsored Scheme named *"Ecodevelopment Around National Parks and Sanctuaries including Project Tiger Areas"* was started in 1991 by Government of India with the basic objective of reducing pressures on the core areas of PAs. Later with the help of a number of externally aided projects, ecodevelopment programs have been initiated in few of the PAs in different states. Ecodevelopment seeks to conserve biodiversity through economic development of the local communities and by offering alternative income generating opportunities to them to reduce forest dependence, through community participation. It seeks the participation of local communities in conservation through their empowerment and aims to sustain this participation through developing an environment that encourages the mutuality of conservation and development wherein conservation is redefined from 'preservation to sustainable use' and development revisited to incorporate conservation and social concerns in addition to economic gains and where ultimately the paradigm of conservation and development is rooted in interdisciplinary culture, participatory approaches and planning from below.

3. From the review of literature it is clear that several studies, evaluation and assessments, both at the national and international levels have been carried out for the community based biodiversity conservation approaches. However, despite the fact that these approaches have been officially implemented at least for the past three decades there is no comprehensive study that attempts to analyze the inputs and processes involved in such an approach. Neither is there any study that captures in totality the impacts of such an approach on the socio-economic and cultural lives of the people, formal as well as

informal institutions for biodiversity conservation, gender issues, social capital as well as biodiversity conservation. The present study is an attempt to fulfill the gap in this direction.

4. The present study was undertaken with the objectives of examining the kind of inputs provided to local communities (Ecodevelopment Committees) through ecodevelopment program, To examine the impacts of the ecodevelopment program and to critically examine the factors responsible for the success and failure of ecodevelopment initiatives with respect to Periyar Tiger Reserve and suggest measures for effective implementation of the future programs.

5. Chapter II provides information on the study area. The study was carried out in and around Periyar Tiger Reserve (PTR) of Kerala State situated in the Southern-Western Ghats, a representative area of Western Ghats Mountains-Biotic Province (5-B). Located between 9°15' to 9°40' North latitude and 76°55' to 77°25' East longitude in Idukki district of Kerala, PTR is the largest PA and the only Tiger Reserve in the state, extending over an area of 777 km² (350 km² core zone and 427 km² buffer zone), including the 26 km² water spread area of the lake created by construction of Mullaperiyar dam on Periyar river in 1895. It shares a common boundary with Tamil Nadu state. Sabarimala, one of the most visited pilgrimage site in the country is located in the south western part of the reserve. The terrain of the area is undulating to hilly and most of the reserve lies between altitudes of 750 m to 1500 m. The average annual rainfall of the reserve is about 2500 mm. The total fringe area perimeter of 220 km has an intense interface with 58 villages/settlements and five tea estates in Kerala side. Population density of the area is 750 persons km² with about 2.2% tribals, 28.9% Schedule Castes and remaining from other castes and communities. In addition, 23 private estates have about 3,000 laborers exerting pressure on

the reserve. Core area of the reserve is free from human habitation. Fringe area people portray a heterogeneous society of uneven groups having interactions and competition for resources under market pressures. The tribals and fringe area communities have their strong association with the reserve for their forest resource based livelihood. Dependence of the local communities, for firewood, grazing, fishing and NTFPs leads to problem of fires and habitat degradation. The Tiger Reserve receives about 4.50 lakh visitors every year (KFD 2000). Management of large number of visitors in the interest of reserve and local communities and unplanned development on the fringe of Periyar due to increasing tourism and a large influx of pilgrims to Sabarimala within a short period of about two months are new challenges.

6. Chapter III explains the methodology adopted for the study in detail. The study was carried out from September 2001 to August 2007. Available secondary information relevant to the study area was collected through perusal of existing documents and official records. A rapid survey of all the 72 EDCs using a close-ended questionnaire was carried out through field visits to different areas or by involving the secretaries of different EDCs and information about the livelihood patterns, resource use, community needs/ concerns and local institutions was collected. Focused group discussions with selected senior staff were also used to understand the problems and management initiatives in the past. Based on the information generated through rapid survey, prominent variables indicating characteristic distinction among EDCs were identified and the EDCs were subjected to cluster analysis. Eight distinct clusters of EDCs were obtained and a sample of 21 EDCs representing 20% of EDCs among each cluster was randomly selected for detailed investigation. For detailed investigation at the household level, 154

households (10%) from in each of the above 21 selected EDCs were randomly identified for detailed investigations. For investigation of EDCs at executive level and household level, questionnaire consisting of open ended and close ended questions was framed. The questionnaires at the EDC level had questions related to background, community structure and inputs, impact of program – resource use and socio-economics, attitudes of community and institutions. The interviews were recorded using a simple tape recorder. The recorded interviews were played back, translated in English and collated by the researcher to find out the gaps in the information. To fill up these gaps, *in situ* focused group discussions with the identified respondents and Executive Committees were held.

7. During the period between 1998 and 2006, 731 staff members and officials worked for PTR from within or from forest headquarters. These staff were stratified as five broad groups depending upon their roles; (1) Frontline staff (Forest Guards, Foresters and Deputy Range Officers), (2) Executive Officers (Range Officers), (3) Controlling and Supervising Officers (Deputy Conservators and Assistant Conservators of Forests), (4) Policy and Decision Making Officers (Conservators and Chief Conservators of Forests) and (5) Support staff (Office and contract staff). A random sample of 73 (10%) staff members from different strata was selected for detailed investigation. A questionnaire consisting of open ended as well as close ended questions was used to gather information from the staff regarding their background, understanding of concept of ecodevelopment and the impact of program. The vegetation composition and structure in different sites viz., Kokara, Anchruli, Koruthodu, Pamba Valley and traditional path to Sabarimala Shrine, in the impact zone were studied for ecological assessment. In each selected site ten, 10m quadrates were laid. All the individuals were identified and were categorized as

follows: >30cm, circumference at breast height i.e. 1.37m as trees, individuals between 20-30cm as saplings, 10-20cm as recruitment and <10 cm (up to 1 ft in height) as seedlings were measured and counted, respectively.

8. In Chapter IV, an attempt has been made to understand the level of various investments and range of activities carried out for different Ecodevelopment Committees (EDCs), supporting micro institutions such as Self Help Groups (SHGs) and Nature Clubs and individual households. Major changes in terms of processes and legal, administrative and institutional structures to accommodate the new participatory approach of management have also been discussed. Effort has also been made to understand the broad issues of the IEDP as well as steps taken for sustainability of the project initiatives in Post IEDP period. During Pre-IEDP period, even though the money was limited, significant investments in terms of time and effort were made in ecodevelopment activities in selected village clusters of PTR. These initiatives were responsible for generating initial trust of the communities with the park management, enhancing understanding of staff about the program and generating baseline information on the impact villages. However, the program remained weak because the investments during this period were low, sporadic and without proper micro-planning. Therefore, the program could not go beyond trust building activities and the process of institutional building remained weak. The real issues of PA and people conflicts (illegal resource use by the communities, alternative livelihoods and protection of PTR) could not be addressed by the project. The program remained informal due to the lack of legal and institutional mechanisms of the state required for fund flow and transparency in implementation.

9. An enabling environment for the IEDP was created by providing legal backup for the implementation of IEDP, through sequential Government Orders of Government of Kerala. An elaborate institutional mechanism for implementation of the IEDP in PTR was put in place under the umbrella of new legal framework of the state. At grass root level, Village Ecodevelopment Committees (EDCs) as basic bodies for planning and implementation were constituted. For decentralized decision making at the Government level, Protected Area level Coordination Committee (PACC) and State level Ecodevelopment Steering Committee (SESC) were put in place under the Chairmanship of Field Director, Periyar Tiger Reserve and Chief Secretary, Government of Kerala, respectively. Regional level Research Coordination Committee (RRCC) was constituted under the chairmanship of Field Director, Periyar Tiger Reserve, to build synergy in research and monitoring initiatives. In 1996, a separate Ecodevelopment officer with his support team was put in place for implementation of IEDP. The inward looking focus of the management gradually provided space for addressing the interface issues. The micro-plans were prepared for different settlements/villages to strengthen livelihoods of local people, reduce resource use pressure on the reserve and strengthen their support for protection of PTR. Memorandum of Understanding (MoUs) with EDCs defined the mutual duties and responsibilities of the EDCs and park management.

10. Seventy two villages/settlements comprising of 5,584 families (approximate population 28,000) within Kerala, were covered under the IEDP. Proportionately more focus was given to the ST families (19% of total families) as compared to other sections (25% SCs and 56% other communities) in this project. About 15% of the families covered under the program were landless. More than 65% of the sampled households were from low economic status. Literacy in the sampled household was high (89%) as compared to

the total population of the impact zone. The major occupation of the surveyed household was agriculture (24%) followed by business enterprise (9%). Majority of the households depended upon forest resources; however, 2% of this population is exclusively dependent upon PTR resources for their livelihood. Participatory Rural Appraisals carried out during the process of micro-planning provided opportunity of mutual learning and understanding of the program to staff as well as communities. All the 72 EDCs of PTR were established over a period of 4 years, maximum being formed during second year of the project. General Body of each EDC had membership of two adult members (male and female) from each household. Similarly, the Executive Committee of each EDC also had 50% representation from SCs/STs and women members. Two representatives of voluntary agencies/ NGOs were also included in the Executive Committee. Chairperson of the EDC was one of the community members, Member Secretary being the forester of the concerned area.

Out of 72 EDCs, 56 were village based and these were called *Neighbourhood EDCs*. 13 EDCs related to pilgrimage and ecotourism had been categorized as *Professional group EDCs*. Out of these, *pilgrimage related* professional group comprised of 6 EDCs and the other *ecotourism related* professional group had seven EDCs. Members of professional group EDCs had some professional expertise which could be used for the benefit of the community and the reserve. The third category of three EDCs had been designated as *User group EDCs*. Members of these EDCs had been allowed to use some of the forest resources (Fire wood, thatching grass and grazing) in identified fringe areas of the reserve with the objective of reducing this resource use over a time. The members of the professional group EDCs could also be the members of Neighborhood mother EDCs but the duplication of inputs to these members was avoided. It was presumed that the

professional groups EDCs are transition EDCs and these should merge into Neighborhood EDCs in the time to come.

11. During IEDP period, an amount of Rs. 3,227.51 lakhs was invested on different activities of PTR. Broadly the investments had gone in three major areas of the management: improved PA management, village ecodevelopment program, effective and environmental education and awareness program and impact monitoring. The maximum investments had gone in improved PA management (57%). Village ecodevelopment program had also been adequately addressed with about 35% investment. However, the component of education and research had received minimum investments. Under research component, 122 short and long term studies were carried out by the project contract staff, local institutions and talented individuals/groups. In PTR, out of the total investment of Rs. 1150.32 lakhs on Village Ecodevelopment program, an amount of Rs. 757.75 lakhs was invested on 5,584 households of 72 EDCs for Micro-plan activities. Of the four categories of EDCs of PTR, pilgrimage based professional group (SAPP) EDCs have received minimum per household investment whereas the investment on ecotourism based professional group EDCs has been higher. About 19% of the investment has gone to tribal households. Schedule caste families have received about 25% investment. SC/ST populations were found to be significantly different in Neighbourhood EDCs ($\chi^2 = 90.63$, $df = 2$, $p < 0.01$), Professional group-ecotourism based EDCs ($\chi^2 = 127.43$, $df = 2$, $p < 0.01$), Professional group-pilgrimage based EDCs ($\chi^2 = 135.36$, $df = 2$, $p < 0.01$), and User Group ($\chi^2 = 58.65$, $df = 2$, $p < 0.01$). It was clear that the population structure was highly variable, influencing the response to various investments, both fiscal and program initiatives. In the sampled EDCs the maximum investment per household has gone to Professional group EDCs. Neighborhood and User group EDCs have received almost

similar investments. Village ecodevelopment investments had been made on four broad groups of activities i.e. income generation support, community infrastructure, community welfare and project implementation support. For income generating activities, the major investment had gone for improvement of agriculture (46%), small business (21%) and enterprise development (18%). The major investment in terms of enterprise development was for tourism and pilgrimage based professional group EDCs. The major community welfare activities have been drinking water supply, education/awareness and provision of alternate energy devices. A variety of community infrastructure in the form of approach roads, community halls, furniture, and materials required for pilgrimage shops etc. has been provided to the EDC members. Crop protection fences (both live and barbed wire), trenches and protection walls were created as a part of community infrastructure.

12. During the project period 120 different training programs for local staff and EDC members (18,425 participants) were conducted. Training programs were also carried out for other stakeholders from outside Periyar (31 training programs and 672 participants). Trainings covered a variety of subject areas which included project awareness and micro-planning, participatory tools for planning, ecodevelopment, enterprise development, pilgrimage management, visitor management and interpretation skills, group dynamics and interpersonal skills, financial management, micro credits, agriculture improvement, taxi/auto driving, handicraft making, biodiversity monitoring, wildlife census techniques, etc. Twenty four field exchange visits (12 outside the State) were important means of capacity building for 683 persons among staff and EDCs. Significant time and effort has also gone in regular EDC meetings which were important platform for mutual learning while doing. During IEDP period, 2141 participants from local communities were covered under different nature awareness programs. Awareness programs for other stakeholders

were also carried out. These included extension programs for educational institutions (75 programs and 7000 participants) and EDCs (100 programs and 4000 participants), Academic forums (22 sessions, 7000 participants). Even though the money spent for awareness programs was only 3.4% of the total project investment, the time and effort in this component was very high. During the project period, about 1,150 man-days of effort has been utilized for these programs and on an average, 57 man-days per year have been spent exclusively for awareness creation of EDC members.

13. IEDP had brought in major institutional changes in PTR. This process can be seen in terms of institutional structures as well as improved community organization through generation of social capital. All the 72 EDCs established during IEDP had organized themselves in two Confederations (Periyar East and Periyar West). Another important step in institution building had been the establishment of a Micro-plan Implementation Support Team (MIST) which comprised of staff and NGIs. The role of this team was to facilitate different meetings/activities and micro-planning of the EDCs. Around 52 EDCs have established 159 SHGs with 2450 members in PTR. These SHGs have a capital of about 19.23 lakhs for supporting different income generating activities and other day-to-day needs of the members. More than 75% of these SHGs are of women members. Similarly 53 Nature Clubs with a membership of 1652 children have been constituted in the last phase of IEDP with the objective of awareness generation and building a constituency of young children for conservation of PTR in the coming future.

14. Post IEDP there was a sudden drop in the level of investment in PTR ecodevelopment program. The expectations of the communities also became high from PTR management. The massive institutional structure in the form of EDCs created

during IEDP required regular management for their functioning. There were other issues related to the sustainability of ongoing ecotourism programs, continuation of awareness programs for the communities, arrangements for uninterrupted communication with EDCs, continuation of contractual staff of IEDP who had played significant role during the project period, capacities of the frontline staff to handle ecodevelopment initiatives, and extension of ecodevelopment program to the communities which could not be covered during IEDP. Government of Kerala ordered for establishment of a trust named Periyar Foundation (hereafter referred as Foundation), as a mechanism of sustainability of IEDP initiatives, with the twin objective of biodiversity conservation and livelihood support to the local communities in PTR and its adjoining landscape. The Foundation had a flexibility of an NGO and an authority of a government. Government of Kerala also introduced an additional cess, called ecodevelopment surcharge on the visitors of PTR. The income through this surcharge is pooled in the kitty of the Foundation for running its programs. Foundation has also the scope of raising its incomes from regional, national and international sources in the form of donations and institutional charges undertaking research and capacity building programs. Since its establishment, the Foundation has ploughed back an amount of Rs.146.27 lakhs from its income to PTR and fringe area communities. About 31.48% of the total investments of the Foundation have gone for community welfare activities. The investments of the Foundation for the communities have gradually increased from 18.40% during 2004-05 to 41.40% during 2006-07. The financial support to the EDCs has again started flowing after IEDP. However, so far this support has been extended to only selected EDCs which have revisited and revised their micro-plans. After the establishment of the Periyar Foundation, 93 training programs (involving 1094 participants from local

community/staff and 1400 from other stakeholders) on varied subjects were carried out during 2004-05 and 2005-06. Another institutional development initiative during IEDP had been the establishment of a corpus called Park Welfare Fund. The Park Welfare Fund has generated an amount of Rs. 84 lakhs for the EDCs involved in major ecotourism programs of PTR.

15. Chapter V is devoted for detailed analysis of the impacts of various investments and activities undertaken for different EDCs. The various investments and activities undertaken for different EDCs was assessed in terms of change in socio-economic conditions of the local communities, their resource use patterns, attitudes of local communities and staff, strength of village level institutions and status of wildlife habitat in the selected pockets of the impact zone of PTR. Analysis of the households' data revealed that as compared to the years before the implementation of IEDP, the incomes of the EDCs have increased significantly ($t = -2.87$, $df = 20$, $p < 0.01$). The overall increase in income level was about 24%. User group EDC showed highest improvement in the incomes (about 70%) followed by Neighbourhood EDCs (about 38%). In case of Professional group EDCs the improvement in income level was marginal (about 9%). Among professional group of EDCs, pilgrimage based EDCs showed about 19% improvement in their incomes as compared to Ecotourism based EDC where the increase was about 10%. Interestingly the incomes for *Ex-Vayana* Bark collectors EDC fell sharply by about 65% in comparison to what they were earning before.

The high variation in incomes of the EDCs before IEDP was considerably narrowed down after the implementation of the project. Share of the incomes from resource use activities of PTR has come down from 29% to 2% after the implementation of ecodevelopment

program. Similarly, the share of grazing incomes has come down from 8% to 2% during this period. Out of the total income of the households in sampled EDCs, the income from forest consumptive activities of PTR have come down sharply (about 87% of the previous level before IEDP) and the share of the forest non-consumptive activities of PTR (ecotourism and pilgrimage) have gone up.

16. The strength of the EDCs was found to be related to its skill/capacities. The overall well being was found to be significantly correlated to indicator variables representing quality of life such as health (Pearson correlation, $r = 0.6$, $p = 0.009$), sanitation ($r = 0.4$, $p = 0.05$) and drinking water ($r = 0.4$, $p = 0.06$). It was also seen that in general the EDCs which had better landholdings or skills, also demonstrated good institutional strength. While empowerment of women and other under privileged groups added to the working capability of the EDC, factors like mutual conflict acted as serious drags on the performance of the EDC. The IEDP intervention contributed to the cultural and social revival in many of the tribal EDCs. About 70% of the respondents have shown desire to re-establish their old traditions of folklores, dances, festivals, and strengthen the traditional institutions. Women empowerment was one of the major successes of the program. Out of the total sampled populations of 265 households, 118 were represented by women members, 55 women represented in the executive committees of the EDCs. These members had power to intervene in any financial decisions if they desire and they could refuse to sign the cheques. In addition, the empowerment of women had further been demonstrated by the formation of only-women Self Help Groups (SHGs). In total, 45 women SHGs with representation of 677 members and working capital of 7.54 lacs were working in the area. Circulation of this money was as high as 66%.

17. There is a significant decline in the fuel wood use from PTR in all the EDCs (Paired T-tests, $t = 3.37$, $df = 20$, $p < 0.01$). Overall reduction of about 57% in the fuel wood consumption was observed in the sampled EDCs with maximum reduction (about 85%) was seen in the case of user group EDCs which were most dependent on fuel wood for their livelihood before IEDP. Even though, over all reduction of fuel wood has been very high, the reduction in the number of fuel wood collectors was marginal. Sale of fuel wood has come down by about 74% and the same for self use was observed as 36%. There was significant reduction (about 87%) in the fodder consumption in PTR as compared to Pre IEDP period ($t = 3.09$, $df = 20$, $p < 0.01$). The reduction in case of professional group EDCs (tourism based) and user group Kollampadda EDCs was 100%. Both pilgrimage based professional based EDCs and Neighbourhood EDCs showed reduction of about 86%. The total number of cattle in PTR reduced marginally (from 224 to 180) in the sampled EDCs. It is reveal that there is significant reduction in the level of NWFP collection in PTR. The NWFP collection has reduced by 60% (Wilcoxon Signed Ranks test, $Z = -3.42$, $df = 20$, $p < 0.01$).

18. The households particularly from Professional Group-ecotourism and User Group EDCs were involved in different activities of protection. This included fire protection, providing information of illegal activities, patrolling with or without staff and clean plastic drives of the tourism and pilgrimage zone. User Group EDCs, which are solely represented by women, had highest contribution in patrolling. There has been a significant reduction in fire, ganja cultivation, poaching and illicit felling. There had been marked increase in the number of crop damage cases and related financial losses since 1995.

19. The results of the attitude survey revealed that in general, there was high level of recognition about the overall impact of the program, improved protection of PTR and better trust between staff and communities all across different categories of staff. Even though the front line staff was cautious to adapt the new approach of management, they have high level of acceptance with respect the impact of the program on protection. The Professional Group and User Group EDCs demonstrated higher level of positive attitudes towards IEDP initiatives.
20. The level of participation of the households in the ecodevelopment program ranged from high to medium. Women empowerment has been one of the major successes of the program, with major impetus from SHGs. The EDCs have developed conflict resolving capabilities and most of the conflicts were resolved within community by various strategies such as mutual dialogue, mediation by Secretary/Chairman of the EDC, and a decision in executive committee or general body. There were relatively few situations where the EDCs could not resolve the conflicts. Financially it appears that most of the Professional group and User group EDCs are likely to sustain their ongoing ecodevelopment initiatives.
21. The vegetation studies in six sites in the impact zone revealed appreciable regeneration status and recruitment in selected study sites w.r.t. some species. But still some of the tree species do not seem to have normal population structure.
22. Chapter VI concluded the major findings of this study. It was revealed that performance of EDCs was positively related to SHGs ($r = 0.59$), social capital ($r = 0.56$), well being ($r = 0.54$) and secretary strength ($r = 0.47$). All these factors collectively

contributed towards the performance of EDCs. Interestingly, the parameters related to investments did not show direct correlation. Further, the role of capacity building had only limited effect, and it was not significantly different between the EDCs with various levels of capacity inputs. Therefore, it is in fact a combination of social and economic empowerment, and the leadership capacity of the EDCs Secretaries under an overall umbrella of enabling legal and management environment that this programme can make a meaningful contribution to the biodiversity conservation and human well being.

Chapter I

Introduction

1.1 BACKGROUND

Ecological systems form the life support systems within which all economic development takes place. The services of ecological systems and the natural capital stocks that produce them are critical to the functioning of the earth's life-support system (Daily 1997). Therefore in the long run, a healthy economy can only exist in symbiosis with a healthy ecosystem (Costanza et al. 1997). As the scale of human activity continues to increase, environmental damage begins to occur not only in local ecosystems, but also regionally and globally. But economic development always remains subject to the ecological limitations, which operate within natural systems. This implies that as economies grow relative to their life support ecosystems, the dynamics of both become more tightly connected.

Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber and fuel. This has resulted in a substantial and largely irreversible loss in the diversity of life on earth. The harmful effects of the degradation of ecosystems being borne disproportionately by the poor are contributing to growing inequities across groups of people and are sometimes the principal factors causing poverty and social conflict (Millennium Ecosystem Assessment 2005). These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems.

Everywhere we see limits to human use of natural ecosystems. The economic subsystem has already reached or exceeded important source and sink functions e.g. human economy uses 40% net primary product of terrestrial photosynthesis today (Costanza et al. 1997). Desertification, urban encroachment into agricultural lands, soil erosion and pollution are increasing. Seven of the hottest years on record, all occurred in the past 11 years. Fossil fuel based human economy is leading to CO₂ release. The 7 billion tons of carbon released every year by human activity accumulates in the atmosphere (Costanza et al. 1997). Technology may reduce but not eliminate this cost. The global ozone layer is fast thinning. About 35% of the earth's land is already degraded. Soil loss ranges from 10 to 100 t ha⁻¹ yr⁻¹, exceeding soil formation by at least tenfold. The world's richest species habitats, tropical forests, have already been 55% destroyed. The current rate of loss of tropical forests exceeds 168,000 sq km yr⁻¹. While the total number of species extinct is not known, conservative estimates put the rate at more than 5000 species each year

Protected Areas (PAs) have long been recognized as the single most important method of conserving wildlife and biological diversity. However, the establishment of PAs has often displaced rural communities from their traditional lands, alienated the wildlife from the local people and has frequently transformed wildlife from a valuable commodity into a threat and a nuisance (Kiss 1990, Swanson and Barbier 1992, Martin 1993, Barrett and Arcese 1995, Gibson and Marks 1995, Songorwa 1999). For these and other reasons, many PAs have operated directly against the economic interests of the local communities (Brandon and Wells 1992, Milner-Gulland and Leader-Williams 1992, Wells 1992, Wells and Brandon 1992, Nepal and Weber 1995), and persistent conflicts with surrounding communities has led to a growing recognition that this 'fences and fines' approach has failed to achieve its objective of conserving biodiversity (Marks 1984, Leader-Williams

and Albon 1988, Kiss 1990, Swanson and Barbier 1992). Hence, the main approach to recent wildlife management has been to gain the cooperation and support of local people, which has eventually resulted in the so called Integrated Conservation and Development Projects (ICDPs) (Wells and Brandon 1992). These projects involve varying levels of local participation, ranging from pure benefit sharing, such as transfers of benefits from wildlife-related activities, to a more far-reaching design of community-based management in which local communities are trained to manage and control resources. While the core objective of these projects is PA conservation (Brandon and Wells 1992), the aim is to achieve this by promoting sustainable economic development and by providing local people with alternative income sources that do not threaten wildlife. These seek to organize human use of ecosystems to strike a balance between benefiting from natural resources available from ecosystems, while maintaining their ability to provide these benefits at a sustainable level in the future. It focuses on maintaining ecosystem functions and integrity, recognizing that the people are a part of the ecosystem, need for knowledge based adaptive management, need for multi sector collaboration and making ecosystem based management a mainstream development approach.

1.1.1 The Indian Scenario

India is one of the 12 mega-biodiversity countries of the world that collectively account for 60 to 70% of world's biodiversity (World Bank 1996). A biogeographically representative and effectively managed PA network is considered to be a most important means of *in situ* conservation of this unique biodiversity (Panwar 1992). The country has one of the world's most extensive networks of officially recognized PAs totaling 96 National Parks, 510 Wildlife Sanctuaries, 3 Conservation Reserves and 2 Community Reserves and covering 4.77% of its geographical area (Wildlife Institute of India Database

2007). The basic approach of managing these PAs till the beginning of 90s had been the conventional isolationist approach wherein management seeks to protect the PAs from inappropriate use of natural resources by the people so as to protect wildlife and other natural resources contained in these PAs (IIED 1995). This approach has helped to conserve a significant part of India's biodiversity including a wide variety of natural habitats, plant and animal species by putting a check on destructive development processes and industrial exploitation of resources. However, out of one billion human population of India, 64 % of the rural population and around 100 million tribals (Lynch 1992) depend on the forests for their sustenance; ninety million cattle graze inside the forests (Dwivedi 1993); 62% of the total 173412 K` tons firewood consumption is derived from forests (RWEDP 1997) and income from non-timber forest produce is important for 60 million households living below the poverty line. According to a survey carried out in mid 80s, over 65% of the PAs were characterized by human settlements and resource use (Kothari et al. 1989). In such a situation, the isolationist approach has engendered conflicts between the livelihood requirements and aspirations of the local communities, who had been historically and traditionally dependent on the resources of these areas, and the PA managements. Attempts to protect the PAs from human intervention by coercion have often resulted in open conflicts between the communities and state forest departments. Between 1979 and 1984, fifty-one clashes were reported in connection with National Parks and 66 with Wildlife Sanctuaries due to this clash of interests and hostile attitude (Gadgil and Guha 1992).

1.1.2 Origin and evolution of concept of ecodevelopment

In the background of above-mentioned conflicts, a Task Force was set up under the Indian Board for Wildlife (IBWL) in 1982 to propose possible strategies to reduce these conflicts

for the better management of PAs. This Task Force recommended the concept of ecodevelopment as a measure to gain public support for the conservation of these PAs. It suggested that ecodevelopment should be pursued to divert pressure from PAs, thereby ensuring better protection to core areas (IBWL 1983). Due to the positive lessons emerging in different parts of the country in the area of Joint Forest Management and in line with the recommendations of the Task Force, a Centrally Sponsored Scheme named "*Ecodevelopment Around National Parks and Sanctuaries including Project Tiger Areas*" was started in 1991 by Government of India with the basic objective of reducing pressures on the core areas of PAs. Later with the help of a number of externally aided projects, ecodevelopment programs have been initiated in few of the PAs in different states. Such initiatives have also been started by NGOs in smaller pockets around few PAs (Kothari et al. 1998).

Ecodevelopment or Integrated Conservation and Development Projects (ICDPs) as these are called otherwise in other parts of the world, seek to conserve biodiversity through economic development of the local communities and by offering alternative income generating opportunities to them to reduce forest dependence (Badola et al. 1998a, Singh 1998). This is a site-specific conservation friendly package of measures for rural development and sustainable use of natural resources by local people so as to strengthen the PA conservation through community participation (Panwar 1992).

The initial inputs in ecodevelopment were sporadic and fragmented rural development type activities. These were low profile, based on largely inflexible annual plans. The stress was on compensating the local communities for lost access to the resources inside the PAs, mostly through alternatives. The second generation of ecodevelopment activities in India were more organised through a focus on micro planning. However, these are also based on the

assumption of a direct relationship between poverty alleviation and environmental protection (Badola 1997 a b and 1998). It is believed that providing people with alternatives to forest products is sufficient to guarantee the conservation of natural resources for all times to come. Although of late some of the ecodevelopment projects provide for a focus on the 'processes' involved in community participation, empowerment of the partners and collaborations with other stakeholders, in actual implementation it still remains inadequate and area specific (Baviskar 1998).

The concept of ecodevelopment as being presently promoted and practised seeks the participation of local communities in conservation through their empowerment. It seeks to sustain this participation through developing an environment that encourages the mutuality of conservation and development wherein conservation is redefined from 'Preservation to sustainable use' and development revisited to incorporate conservation and social concerns in addition to economic gains and where ultimately the paradigm of conservation and development is rooted in interdisciplinary culture, participatory approaches and planning from below (Badola 2000 and 1999, Badola et al. 2000, Ambastha et al. 2007).

1.2 REVIEW OF LITERATURE

ICDPs or ecodevelopment projects attempt to link biodiversity conservation in PAs with social and economic development in surrounding communities. There have been numerous difficulties in the implementation of these approaches, and these have generally drawn mixed responses. While many of the difficulties can be traced to specific design or implementation flaws, more fundamental conceptual issues pose a challenge for the approach. Brandon and Wells (1992) highlight the evolution and performance of these projects so far, and the conceptual tradeoffs inherent in linking conservation and development. Wells et al. (1992) examined the early experiences of 23 ICDPs in Africa,

Asia and Latin America. They report on the social, ecological, technical and development issues that have arisen in the development of the ICDP concept, drawing on the variability of the sites. The book gives considerable attention to local participation in conservation projects. They stress the difference between beneficiary participation whereby local participation is limited to receiving goods and services and the participatory approach whereby the project empowers the people to effect change. Although the book evaluates non-conventional ideas concerning methods for biodiversity conservation, the authors repeatedly stress the need for the traditional methods of reserve protection (Chapman and Chapman 1993).

In the Indian context the term ecodevelopment was first suggested by the Task Force set up under IBWL in 1982 (IBWL 1983). Panwar in his landmark paper in 1992 defined ecodevelopment as a site-specific conservation friendly package of measures for rural development and use of natural resources by local people so as to help the PA conservation through community participation. (Panwar 1992). Rathore et al. (1998), defined ecodevelopment as a strategy to overcome unsustainable and incompatible resource use practices by dependent communities for their livelihoods in and around PAs through regulated (sustainable and compatible) use and alternatives and through participation of various stakeholders. Rodgers (1992) and Pabla et al. (1995) attempted to formulate guidelines for ecodevelopment planning around PAs. These provide the approach which should be followed for ecodevelopment planning.

Simultaneously, as the understanding of the concept of ecodevelopment became clearer, action research projects evolved. In Rajaji National Park, an attempt was made to bring the stakeholders to a common platform along with capacity building of primary stakeholders for integrated conservation and development (Bhardwaj et al. 2002). Likewise the

collaborative project of GoI-UNDP and West Bengal Forest Department at Jaldapara Wildlife Sanctuary was strongly committed to conservation of biodiversity by integrating wildlife management and ecodevelopment and focused on processes and building partnerships (Mishra et al. 2003). In Panna attempt has been made to identify the impact zones and the quantification of the mutual impact through capacity building of the staff and involvement of other stakeholders (Bhardwaj et al. 1999). Similarly, for facilitating the micro planning, capacity building of the spearhead teams was carried out in three PAs of U.P. i.e. Corbett Tiger Reserve, Dudhwa Tiger Reserve and Chambal Wildlife Sanctuary (WII 1998).

Centre for Environment Education (1997) evaluated the ecodevelopment impacts of the centrally assisted scheme in different PAs that were under implementation in the country since 1992 (CEE 1997). The study reveals that the initiatives lacked continuity and planning and therefore, the desired impacts could not be obtained. Kothari et al. (1989, 1997, 1998 and 2000) have discussed the issues pertaining to community participation in biodiversity conservation. Singh (1997) reviewed the ecodevelopment process in India and enumerated the objectives and strategies of the concept besides discussing related issues.

Badola et al. (2002) pointed out that the success of the ecodevelopment program depends upon the ability of the planners to understand the complex issues in ecodevelopment and integrate these with overall planning process. Their book contains structured information on concepts, issues and the planning process.

Significant research information exists on ecological aspects of Periyar Tiger Reserve (PTR). Kerala Forest Research Institute (KFRI) carried out an ecological survey of the reserve. This was the first work which provided detailed information about the status of

flora, fauna and associated ecological aspects (KFRI 1999). Later on a number of studies have been carried out to provide baseline information on different groups of flora and fauna. These include the survey of birds including raptors and water birds (Srivastava et al. 1993a 1995b, Mohammed et al. 1997). Studies on the food habits of mammalian predators and important herbivores provided information about the food habits of tiger, leopard, wild dog, sambar, gaur, elephant and nilgiri langur in the reserve (Srivastava et al. 1993b 1995a and 1996 a b c). Nelson and Bhardwaj (1999) provided baseline information about the food habits and ecology of sloth bear in PTR. The studies conducted by Zacharias and Bhardwaj (1996) provided the first information about the important amphibian fauna of the area. Similar studies gave information about the fish fauna of the reserve (Zacharias et al. 1996). The Tiger Reserve did not have adequate information on plants and in this direction significant improvements in the form of surveys and flora were made by Srivastava et al. (1994), Augustine et al. (1998) and KFRI (1999). As far as socio-economic aspects are concerned, no significant information exists except what is provided in the management plan and different reports. Information about the different EDCs along with their main activities is presented in the form of a status paper prepared by the park management (Forest and Wildlife Department, Government of Kerala 2000).

Brown and Wyckoff-Baird (1995) described the process of designing ICDPs using new methodologies to reconcile conservation and development objectives. They concluded that while selecting project sites the biological and socioeconomic criteria must be considered, and the grassroots participation and collaboration between stakeholders be ensured.

The study by Sekhran (1996) reports on the challenges in establishing a representative system of PAs in Papua New Guinea using development as a conservation tool. In doing so, it assesses the issues that must be taken on board within the country in implementing

ICDPs. The challenges outlined in this study do not lend themselves to quick-fix solutions. The replicability of ICDP methodologies, in a situation characterized by high cultural and geographical diversity and variation, is limited. Thus, many of the solutions will be site specific. Clearly, an important need at the inception stage of ICDPs is to consider the complexity of the process, and design interventions, if possible, in ways that reduce risk and uncertainty.

Larson et al. (1998) tried to capture lessons from ten different ICDP projects scattered over different countries. They conclude that ICDP approach is “an essential and primary conservation tool”, albeit one where significant improvements are needed in design, implementation and monitoring.

The functioning of ICDPs may be limited by possible design dilemmas and tradeoffs inherent in linking conservation and development. Ferraro (2001), and Ferraro and Kiss (2002), among others, question the underlying assumption that local people will respond to benefit transfers by voluntarily refraining from activities that would otherwise undermine natural resource conservation. That is, local people may incorporate new sources of income as complements to existing activities rather than as substitutes for them. These authors therefore stress the need to change incentives from indirect measures to direct measures; that is, transfers conditional on conservation results. Possible shortcomings of the benefit-sharing components of ICDPs are also discussed by Barrett and Arcese (1995). They argue that, for cash transfers to work, local people must be able to exchange money for food or other consumption goods. However, in rural and remote areas, the opportunity to do this is often constrained by poor access to markets due to high transaction costs (Muller and Albers 2004).

Flinton (2003) discusses key issues identified through research carried out on ICDPs in Africa and Asia. It draws out the experiences and lessons learnt from the two year research project in ICDPs. Few ICDPs in both Africa and Asia have actively addressed gender issues. Though it has been realized that women are 'missing out' from ICDPs there has been a lack of experience and knowledge concerning how to tackle this. Interventions in the past have mainly focused on 'women's projects' which have been seen as the means of overcoming the inequities that exist (Thukral 2002). As such, there is, as yet, little evidence to suggest that ICDPs have contributed to more equitable long-term development in local communities. Though there have been some positive results in, for example, the establishment of women user groups, increasing the number of women participating in conservation activities and to some extent, in increasing women's benefits, it remains the case that communities, and particularly women, fail to understand and/or support the conservation-development concept that is the central crux of ICDPs. As such the long-term sustainability of ICDPs must continue to be questioned and doubts remain concerning whether, in reality, ICDPs can work. If ICDPs are to be truly community-based, then the gender inequities inherent in communities and institutions must be understood recognized and addressed (Badola and Hussain 2003). Issues such as gender equity cannot be addressed overnight but require commitment, time, resources and well-informed interventions.

Analyzing the ICDP experience in Tanzania, Johannesen (2004 a and b) concludes that the success of benefit sharing is conditional on the ICDP design. Benefit-sharing scheme implemented without a proper link to illegal activities is less likely to succeed in gaining wildlife conservation. The analysis shows that in order for benefit sharing to succeed, there must be a risk for the local people of being expelled from the transfers if they get

caught in illegal hunting. Higher return from formal employment may promote wildlife conservation. As long as the effect of working through an increased alternative cost of hunting is relatively strong, the local people will shift the allocation of labor from illegal hunting to formal employment. The general conclusion of this analysis is that work should be done in order to design some type of explicit agreement over the benefit-sharing instruments between the management authorities and the local people. This agreement must specify the rights and duties of the respective parties and must be supported by enforceable penalties that provide enough incentives for the parties to comply.

Skonhoft and Johannesen (2004) conclude that the effectiveness of ICDPs in Africa has been hampered by conflicts and illegal harvesting activities. This study focuses on the strategic interaction between the manager of a PA and a group of local people living near the park. The park manager benefits from wildlife through non-consumptive tourism and safari hunting. The local people benefit through hunting, although this is illegal according to existing laws, but they also bear costs as wildlife causes agricultural damage. Depending on the economic and ecological environment, that ICDPs relying on money transfers to the local people derived from the park manager's activities may or may not promote wildlife conservation.

Bajracharya et al. (2005) examined the effectiveness of community-based approaches for conservation of biodiversity in Annapurna Conservation Area (ACA), Nepal. They found that the community-based management has been successful in delivering conservation benefits in ACA, attributable to changing patterns of resource use and behavior among local communities, increased control of local communities over their local resources, increased conservation awareness among local people resulting from environmental education, and the development and strengthening of local institutions such as

Conservation Area Management Committees (CAMC). However, these positive achievements are threatened by the current political instability in Nepal.

Greenberg and Brown (2006) present an innovative approach that builds on an established development principle that systematic multi-stakeholder participation, and more equitable sharing of decision-making and benefits, generates more effective programs. It also emphasizes that contemporary conservation planning and fieldwork need to occur at larger scales – sometimes ‘landscapes’ – than has been attempted in most earlier ICDPs. The key new methodological element introduced here and the systematic field activities that activate multi-stakeholder collaboration, incorporate key technical and knowledge inputs, promote clear incentives for conservation, and facilitate negotiated resource management decisions. In moving beyond currently prevailing ‘consultative’ models of participation to ones that more fundamentally and durably engage communities, this methodology increases the probability of successful conservation and development outcomes.

Bajracharya et al. (2006), examine the socio-economic impacts of community-based conservation within the Annapurna Conservation Area (ACA), Nepal. They conclude that the socio-economic benefits of community-based approaches to conservation can outweigh the costs, even though the latter are significant (Badola and Hussain 1999). However, a participatory approach to management of problematic animal species will need to be developed if conflicts between local communities and PA management are to be avoided in future.

Baral et al. (2007) studied five Conservation Area Management Committees (CAMCs) in the Annapurna Conservation Area (ACA), Nepal. Greater longevity of each ICDP was associated with greater conservation activity in relation to development activities. Results suggest that success has come over a period of nearly a decade, suggesting that prior

conclusions about ICDP failures may have been based on unrealistic expectations of the time needed to influence behavioral changes in target populations.

In India there are few studies regarding the individual assessment of the ecodevelopment initiatives in some potential areas like Great Himalayan National Park (Pandey 1998) and Nagarjunasagar- Srisailam Tiger Reserve (Rao and Rao 1998). These studies provide information about the strategies adopted under the program and the existing outputs and impacts. From the review of literature it is clear that several studies, evaluation and assessments, both at the national and international levels, have been carried for the community based biodiversity conservation approaches. However, despite the fact that these approaches have been officially implemented at least for the past three decades there is no comprehensive study that attempts to analyze the inputs and processes involved in such an approach. Neither is there any study that captures in totality the impacts of such an approach on the socio-economic and cultural lives of the people, formal as well as informal institutions for biodiversity conservation, gender issues, social capital as well as biodiversity conservation. The present study is thus an attempt to fulfill the gap in this direction.

1.3 OBJECTIVES OF THE STUDY

The present study had the following objectives:

- (i) To examine the kind of inputs provided to local communities (Ecodevelopment Committees) through ecodevelopment program.
- (ii) To examine the impacts of such ecodevelopment program with respect to following parameters:
 - a) Change in socio-economic conditions of local communities (EDC members) prior to and after the initiation of ecodevelopment program.

- b) Change in quantum of forest resource (fuel wood, fodder, and NTFP) use by local communities.
 - c) Extent of park-people conflicts after the implementation of the program.
 - d) State of attitudes of local communities (EDC members) towards conservation.
 - e) Viability of EDCs formed under the ecodevelopment program with respect to
 - i) Structure and membership
 - ii) Economic status (funds received/generated/invested/spent and audit system)
 - iii) Capacity building of members
 - iv) Level of participation and empowerment of women and marginal groups
 - v) Decision making and conflict resolution mechanism adopted
- (iii) To critically examine the factors responsible for the success and failure of ecodevelopment initiatives with respect to Periyar Tiger Reserve and suggest measures for effective implementation of future programs.

1.4 RESEARCH QUESTIONS

Following main research questions are proposed to be addressed in this study:

- i) Is there any significant change in socio-economic conditions of local communities (EDC members) after the initiation of the ecodevelopment program?
- ii) Is there any change in quantum of forest resources (fuel wood, fodder and NTFP) use by the local communities (EDC members) after the initiation of the ecodevelopment program?
- iii) Is there any change in the extent of people-park conflicts after the implementation of the program?

- iv) What is the attitude of the local communities (EDC members) towards conservation of Periyar Tiger Reserve after the implementation of the program?
- v) Are the local institutions formed under ecodevelopment program viable in terms of representation of different community groups, economic status, capacities and empowerment of weaker/marginal groups?

1.5 SIGNIFICANCE OF THE STUDY

Approaches to the management of PAs that involve the participation of local communities are now being widely promoted. However, the information on the impacts of such community-based conservation initiatives on local communities and the outcome of these approaches for conservation remain poorly defined. As the struggle to balance conservation and development continues, the need to evaluate what works and what doesn't becomes increasingly important. If successful, these approaches may provide viable alternatives for sustainable development with equity, where the use of the ecosystem is truly sustainable and local people benefit equitably.

A perusal of the existing literature reveals that in the late 80s and early 90s several short and long-term research projects have been carried out to provide an insight into the resource-use patterns, dependencies and impacts of local communities on forest (e.g. Badola 1997 b c, Badola and Silori 1998, Musavi 1999, Gupta and Mishra 1999, Silori and Mishra 2001). These research projects were undertaken in a wide range of ecological and socio-cultural contexts and have served as valuable baseline information (Badola et al. 2000 a b). As the concept of ecodevelopment evolved to include other stakeholders and enhanced people's participation in PA management, the focus of research in this field changed to wider action oriented programs in the field (Rathore et al. 1998, Mishra 1999,

Mishra and Gupta 2000, Bhardwaj et al. 2005)). However, there are hardly any studies that link baseline information from the field studies to this new understanding of the concept of ecodevelopment, and actually strive to base this program on a scientific approach.

This study is the first attempt to examine in depth the impacts of ecodevelopment program being implemented and the issues of community participation in PA management. Locally the study has been able to examine the effectiveness of this participatory PA management approach in PTR. It has also identified critical factors responsible for the success and failure of the initiatives taken up so far and suggests measures for effective implementation of the program in future. The study is likely to provide important lessons for proper planning and implementation of the program at the national level, particularly when financial as well as spatial scaling up of such programs is round the corner.

1.6 ORGANISATION OF THE THESIS

The entire efforts for the thesis work and its outcomes have been synthesized into six chapters *viz.* 1) Introduction, 2) Study Area, 3) Methods 4) Ecodevelopment in Periyar Tiger Reserve - extent, activities and linkages 5) Assessment and implications on Park Management and 6) Conclusions. Chapter 1 discusses the need for community based natural resource management and the evaluation of these approaches. It essentially provides the background to the research, highlighting the lack of in-depth study on impacts of such approaches for conservation and sustainable development and the necessity to undertake the present study. Chapter 2 describes the study area in terms of both physical and biological characteristics. Chapter 3 outlines the methodology adopted for different aspects of the study. Chapter 4 describes in detail the process of ecodevelopment as it unfolded in the PTR. It goes on to discuss the inputs that has been

provided as a part of the ecodevelopment program-the investments, institutions and the process of change in the management. Major changes in terms of processes and legal, administrative and institutional structures to accommodate the new participatory approach of management have also been discussed. Chapter 5 discusses the impacts of the ecodevelopment program, on the socio-economic and cultural lives of the local communities, their resource use patterns, attitudes of local communities and staff, strength of village level institutions and status of wildlife habitat in the selected pockets of the impact zone of the PTR. Chapter 6 highlights the main conclusions and lessons for management drawn from this study.

Chapter II

Study Area

The Western Ghats or Sahyadri mountains run along the western coast of India. The mountain range starts south of the Tapti River near the border of Gujarat and Maharashtra and extends for a distance of 1600 km through the states of Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu to the southern tip of India. It is also one of the major tropical evergreen forest regions in India. This mountain chain has been cut by wide valleys at few places, preventing dispersal of less motile species and encouraging local speciation and endemism. Moyar Gorge, Palghat Gap and Shencottah Gap are the barriers that separate the Nilgiri, Anamalai and Agasthyamalai mountain blocks. Out of some 15000 species of higher plants some 4000 (27%) are reported from the Western Ghats, which is just 5% of the geographical area of the India. Nearly 1800 species are endemic to the ghats. Vegetation types range from tropical wet evergreen/semi evergreen forests, tropical moist/dry deciduous, montane subtropical and temperate (shola) forests. The western ghat zone has viable populations of most of the vertebrate species found in Peninsula India along with an endemic fauna. As the Western Ghats enjoy heavy rainfall, the gentler slopes with good soil resources have paved way for the development of cash crops like tea, coffee, cardamom, rubber etc. This development has put intense pressure on remaining forest lands which has already lost large part of its forest cover.

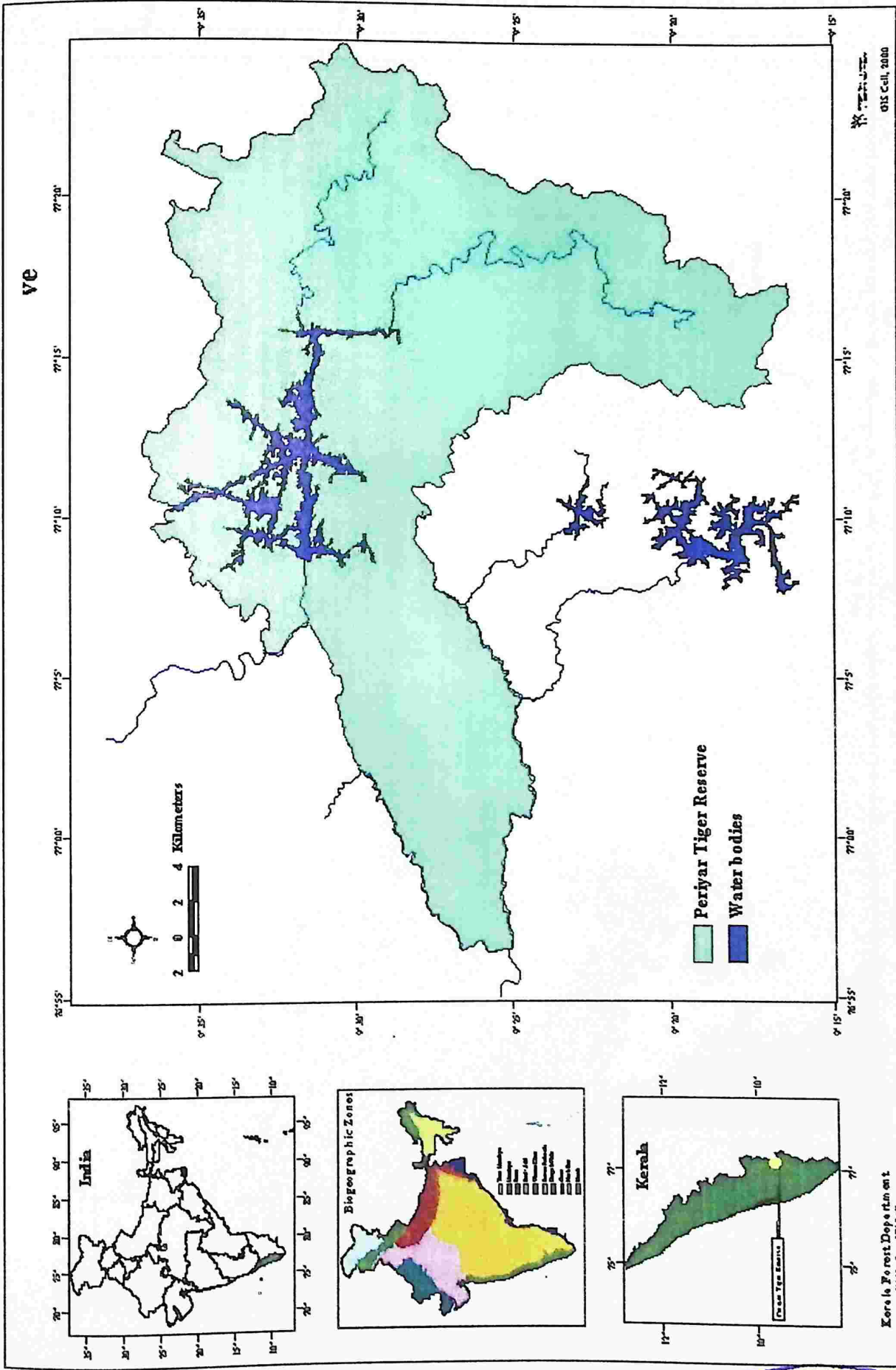
The Cardamom hills, a plateau of 700-1000 m height occupies the central portion of the Western Ghats in Kerala. The ridge that divides the Pamba basin from Periyar basin forms the southern boundary and it touches the High Ranges in the north. The Periyar Tiger Reserve (PTR) is located within this southern most part of the Cardamom hills. PTR is one

of the seven sites selected for the implementation of the India Ecodevelopment Project. The present study attempted to study the effectiveness of this project in this biodiversity rich area also having high anthropogenic pressures. Located in the state of Kerala, PTR is a representative area of Western Ghats Mountains-Biotic Province (5-B) (Rodgers and Panwar 1988). Following sections highlight historical perspective, floral and faunal diversity, socio-economic conditions, management challenges and conservation significance of the study area.

2.1 LOCATION AND EXTENT

PTR lies between 9°15' to 9°40' North latitude and 76°55' to 77°25' East longitude in Idukki district of Kerala (Figure 2.1). It is the largest PA and the only Tiger Reserve in the state, extending over an area of 777 km² (350 km² core zone and 427 km² buffer zone), including the 26 km² water spread area of the lake created by construction of Mullaperiyar dam on Periyar river in 1895 (KFD 2001). Theni Forest Division, Srivilliputhur Grizzled Giant Squirrel Sanctuary and Tirunelveli Forest Division of Tamil Nadu state form about 90 km border of Periyar on its north-eastern, eastern and south-eastern side. The north-western, western and southern portions of the reserve are surrounded by the territorial forests of Kottayam (Kottayam and Idukki districts) and Ranni Division (Pathanamthitta district), respectively. River Azhutha forms the boundary between PTR and Kottayam Forest Division, while river Pamba separates the reserve from Ranni Forest Division. Large private estates and some un-inhabited land patches touch small portions of Periyar interstate boundary in Theni Division. Only a few settlements in Ranni Division lie on the boundary but a number of habitations and large private estates in Kottayam Division fall along the western and north-western boundary of the tiger reserve.

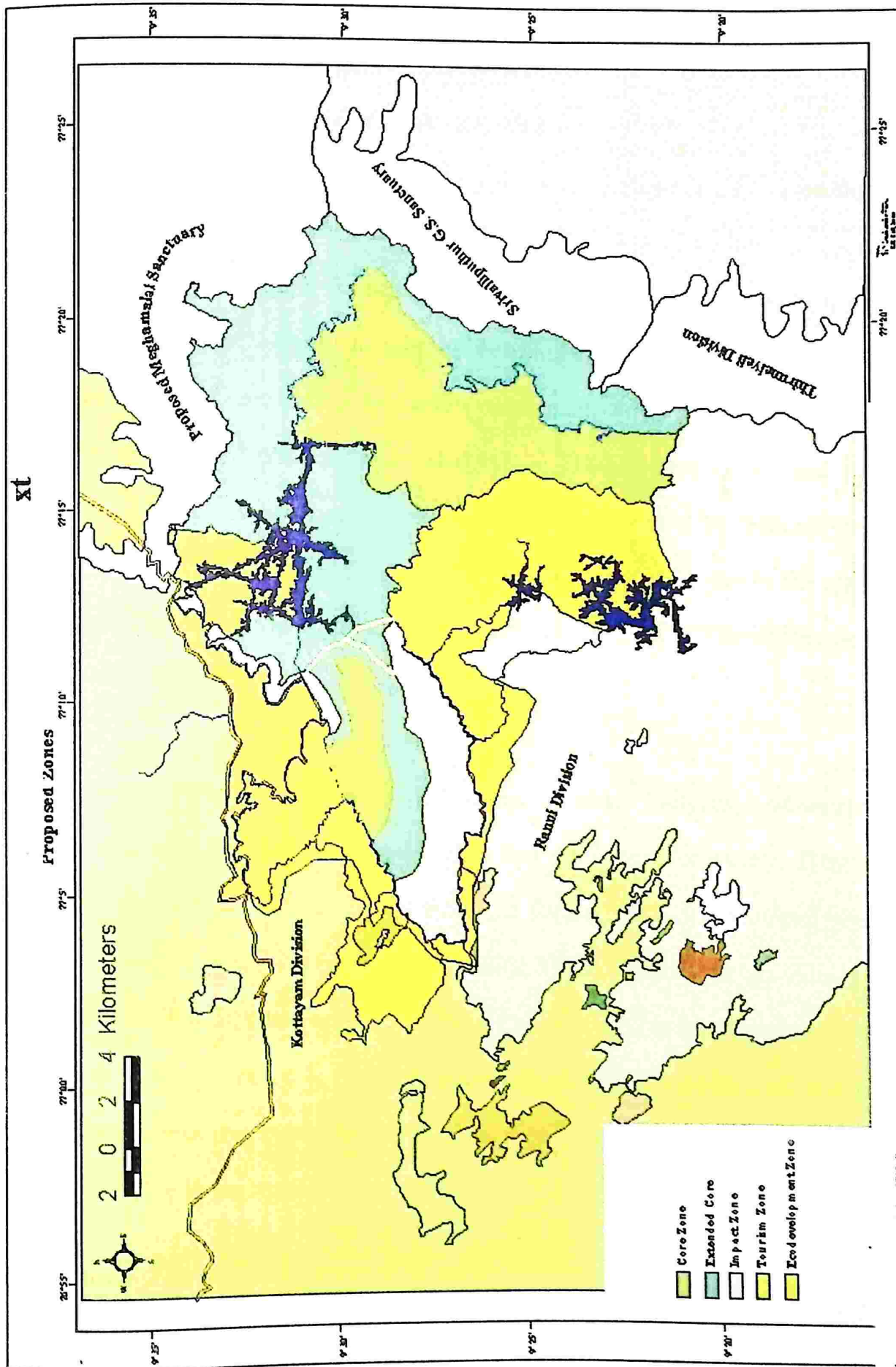
Figure 2.1: Location map of Periyar Tiger Reserve



Source: KFRJ, KFD and WII (2000)

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 Date 25/9/2007

Figure 2.2: Periyar Tiger Reserve in the regional context



Source: KFR, KFD and WII (2000)

Sabarimala, one of the most visited pilgrimage site in the country is located in the south western part of the reserve (Figure 2.2).

2.2 HISTORY AND PAST MANAGEMENT

The present day conservation and management of Periyar is the manifestation of interactions of this remote forested landscape with a variety of acting and counteracting factors. These factors include the changing socio-political scenario in and around the area, requirements of water for irrigation in the surrounding districts of Tamil Nadu and the consequent need of conserving the Periyar catchment. Since 1100 A.D., the area was under the control of Pandian King of Madurai. In 1180, it became the part of Poonjar Kingdom. The High Range area of Poonjar Kingdom was sold by Travancore King to Poonjar King and due to this deal Travancore rulers did have their say in the management of this area. The Poonjar king ultimately surrendered this land to Travancore in 3 phases between 1849 and 1898.

During above period, the tribals (Mannans, Uralis, Paliyans, Malaaryans and Malamchandarams) inhabited the tract and they had subsistence economy. They collected fish, honey and variety of wild tubers from the forests and also practiced small scale shifting cultivation inside the reserve (Bourdillon 1893). There was no felling of trees from the area. However, some non timber forest products used to be extracted for the royal family. Practically no record is available about the status of wildlife during the period. But Captain Payne during his explorations of the area in 1866 has reported good evidences of tiger occurrence in the reserve.

The importance of this area as a potential source of water was realized in middle of the nineteenth century. The Madras Presidency and Travancore government agreed to construct a dam in 1886 so as to divert waters of abundant rainfall of western slopes of

Ghats to the east of watershed for the purpose of irrigation in district of Madurai where the rainfall was scanty and often uncertain resulting into famines. The dam was ready in 1895. In 1899, forest area (600.88 km²) around the lake was declared as Periyar Lake Reserve No. 39 under section 18 of Travancore Regulation Act 1068. This also marked the beginning of scientific management of forests of this area.

The period from starting of the construction of dam and till the declaration of area as a Game Reserve was seen as a period of conflicting interests of conservation and development. The existing cardamom plantations (237.50 acres) in the catchment area were abandoned in 1890. The area was declared as Nellikampetti Game Sanctuary in 1934. Mr. S.C.H Robinson was appointed as the first Game Warden of the Game Sanctuary which is mentioned as a Royal National Park in the records. In 1939-40, the lake channel from Thekkady to Thannikudy was cleared by removing 1600 tree stumps for smooth plying of boats. Game management practices initiated during this period continued even after independence. Relocation of tribals from the interior areas of the sanctuary to the fringes was initiated in 1940s and continued till 1970s. However, very few families of nomadic Malampondarams still can be seen moving illusively in the area. In 1950, the Game Sanctuary was expanded and raised to the status of Periyar Wildlife Sanctuary (777 km²) by adding adjoining forests of Rattendon valley (12.95 km²) and Mount plateau (163.17 km²). In 1966, the Game Department was merged with the Forest Department. The sanctuary was brought under Project Tiger in 1978 as 10th Tiger Reserve of the country. In 1982 first notification was issued for declaring the core area (350 km²) of the reserve as National Park (NP). Three private cardamom estates in the core area of tiger reserve were acquired in 1984.

During 1971 to 1978, significant improvements were made in the tourism infrastructure. To meet the raw material demand of Hindustan Newsprint Limited (HNL), a functional

division named as Grassland Afforestation Division (GLAD) was created with its headquarters at Peermade. Large stretches of available grassland areas (48.77 km² inside and 19.72 km² outside the tiger reserve) were planted with eucalyptus till 1967 to ensure supply of raw material to the industry. Extraction of eucalyptus was started in 1980 onwards. After 1991 amendment of Wildlife Protection Act and subsequent orders of Hon. Supreme Court of India all forms of extraction was banned from the reserve in 1999. Subsequently in 2001 GLAD was abandoned and for effective management PTR area was reorganized into two territorial divisions, Periyar East (618 km²) and Periyar West (159 km²) with headquarters at Thekkady and Peermade respectively.

There are two more locations of historical and cultural significance inside the Tiger Reserve. One of these is the famous Sabarimala shrine of Lord Ayyappa located in the south western fringe of buffer zone in Periyar West division of the Tiger Reserve. History of the origin of this temple in these forests dates back to 9th or 10th century AD. Royal records of Panthalam kingdom ascribe the temple to 18th century when it attracted only few thousand pilgrims. In 1950 the temple caught a major fire and subsequently in mid 50s its renovation was carried out. Since then the temple is being managed by Travancore Devasom Board. Mangala Devi is another important shrine associated with the Pandayan kingdom. This temple was attacked and demolished by Hyder Ali in 1770. This temple was visited occasionally by pilgrims from Tamil Nadu and Kerala. However after the establishment of Tiger Reserve, this is being opened to pilgrims only once in a year on the eve of 'Chitrapournami' in the month of May (SoSS 1999, KFD 2000, 2001).

2.3 PHYSICAL FEATURES AND CLIMATE

Geology of the area is of plutonic origin with rocks consisting of granite and gneiss. Stream beds and banks have numerous boulders. Lower reaches have laterite formations

while higher altitudes have coarse soil with large amount of quartz and gravel formed from crystalline rocks. In general, the soil is acidic (KFD 2001).

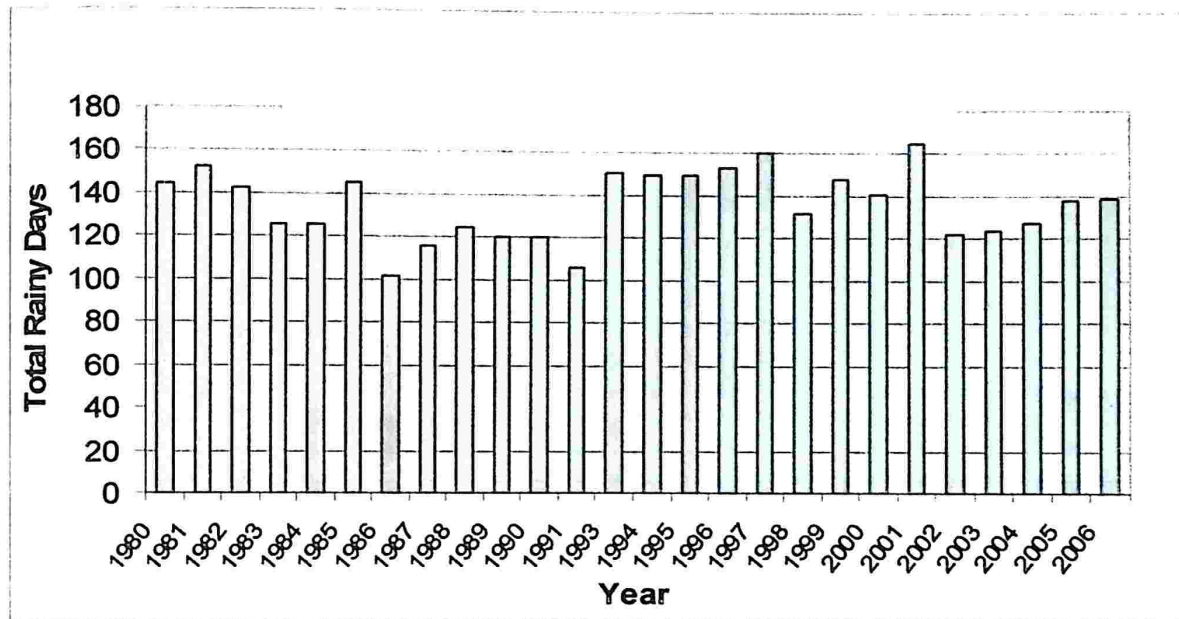
The terrain of the area is undulating to hilly and most of the reserve lies between altitudes of 750 m to 1500 m. The lowest altitude is 100 m at Pamba valley, the confluence of Pamba and Azhutha Rivers. The highest peak of the reserve is Kottamala with an altitude of 2019 m. The eastern part of the reserve forms basins of Mullayar and Periyar Rivers which join to form Mullaperiyar impounded by the Mullaperiyar Dam. Periyar Lake has maximum and minimum water level of 46 m and 32 m, respectively. On southern side, is the basin of river Pamba.

Periyar has a cool and humid climate with comparatively high rainfall. The average annual rainfall of the reserve is about 2500 mm. However it varies in different parts of the reserve (KFD 2001). Major share of this rainfall is contributed by south-west monsoon from June to September. North-east monsoon, though less predictable, occurs from October to December and it is the intensity and distribution of this monsoon which has a major influence on the management options. As per the available weather records from United Planters Association of South India (UPASI) Research Centre, Vandiperiyar (which can be taken as a representative of Thekkady and Vallakaduvu areas of the reserve), there is significant fluctuations in the total annual rainfall (750 to 2400 mm) and number of rainy days (102 to 165) between 1980 and 2006 (Figures 2.3 and 2.3). Two low peaks of rainfall could be observed at an interval of about 15 years in this period.

Temperature of the reserve varies considerably. Lowest recorded temperature was 4°C at Kottamala and the maximum was 39°C in Pamba valley. April-May are the hottest and December- January the coolest months (KFD 2001, 2002). The gap between minimum and maximum temperature seems to be gradually narrowing down from 1980 to 2006 towards

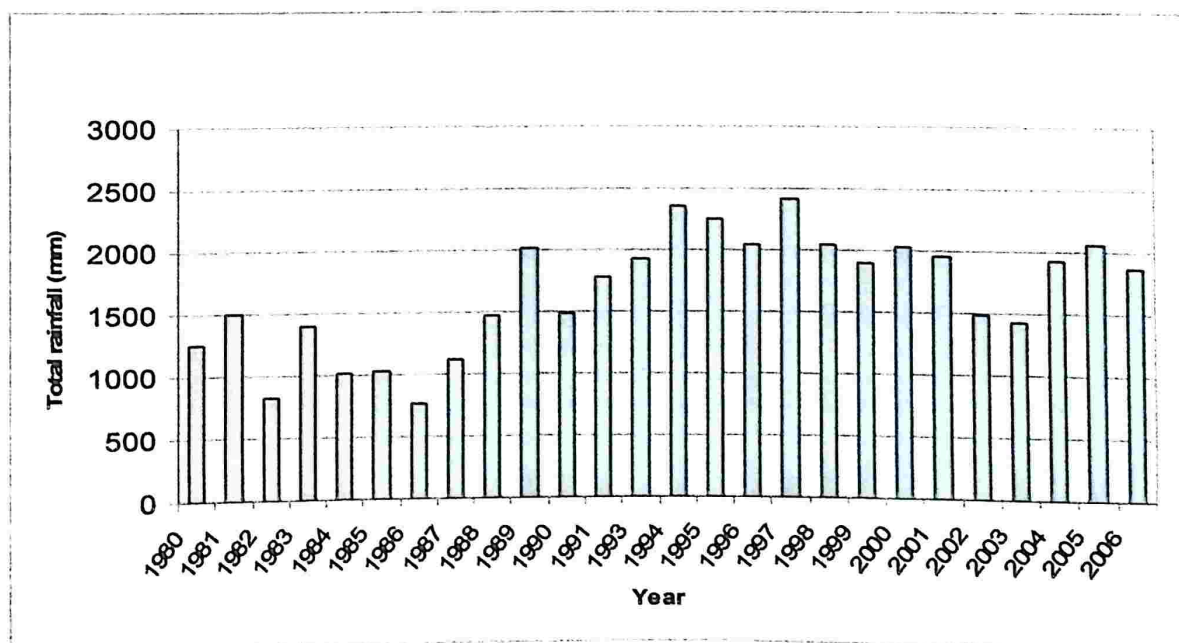
the higher side (Figure 2.5). Average humidity varies from 60 to 85% around the year. Fluctuations in rainfall and temperature can be correlated with the extent of fires and availability of water in and around reserve, and these might be important from the point of view of ongoing ecodevelopment program (particularly agriculture related initiatives).

Figure 2.3: Number of rainy days from 1980 to 2006



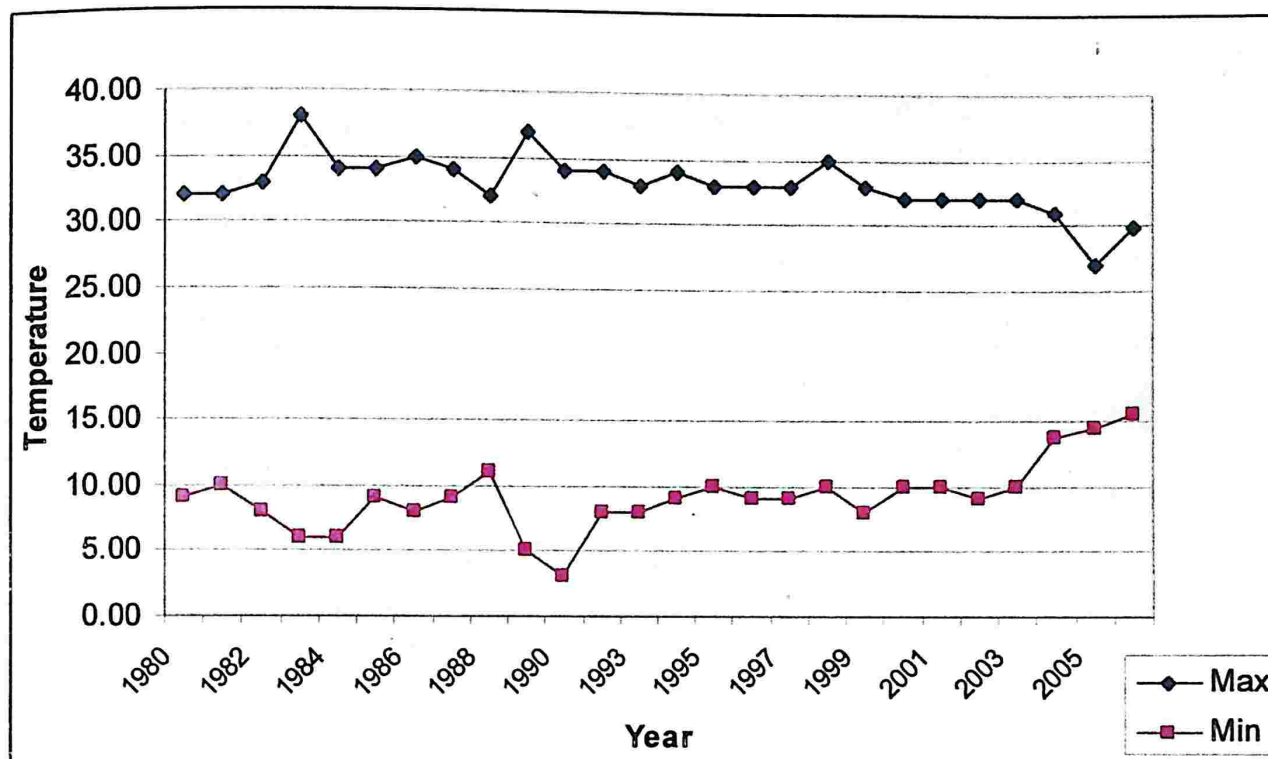
Source: UPASI Research Centre, Vandiperiyar

Figure 2.4: Total annual rainfall from 1980 to 2006



Source: UPASI Research Centre, Vandiperiyar

Figure 2.5: Minimum and Maximum temperatures from 1980 to 2006



Source: UPASI Research Centre, Vandiperiyar

2.4 VEGETATION TYPES AND FLORA

Vegetation studies for Kerala have been carried out by Chandrashekhar (1973) using the broad principles of Champion and Seth (1968) classification scheme. According to this study, the vegetation of the reserve can be categorized into 6 types. These are (1) tropical evergreen (305 km²), (2) tropical semi evergreen (275 km²), (3) moist deciduous (98 km²), (4) grasslands (12 km²), (5) eucalyptus plantations (55 km²) and (6) reed patches (5 km²). The core area has maximum extent of evergreen forests with tall trees and almost closed canopy. The common species of these forests are *Vateria indica*, *Mesua ferrea*, *Elaeocarpus tuberculatus*, *Myristica dactyloides*, *Cullenia exarilleta* and *Hopea parviflora*. Woody climbers, canes (*Calamus* spp.) and the reeds (*Ochlandra* spp.) also occur here, particularly in swampy areas. Moist deciduous forests comprise of *Dalbergia latifolia*, *Lagerstroemia lanceolata*, *Pterocarpus marsupium* and species of *Terminalia*. The grasslands broadly comprise of three categories viz. Hilltop Grasslands (most

diverse), Hill Slopes Grasslands and Lake Shore Grasslands (Srivastava et al. 1994, Sasidharan 1998). As per the study conducted by French Institute of Pondicherry (Ramesh et al. 1997), 10 vegetation types have been recognized in Periyar. These additional types essentially emerged from sub categorization of few main vegetation types described above (Figure 2.6).

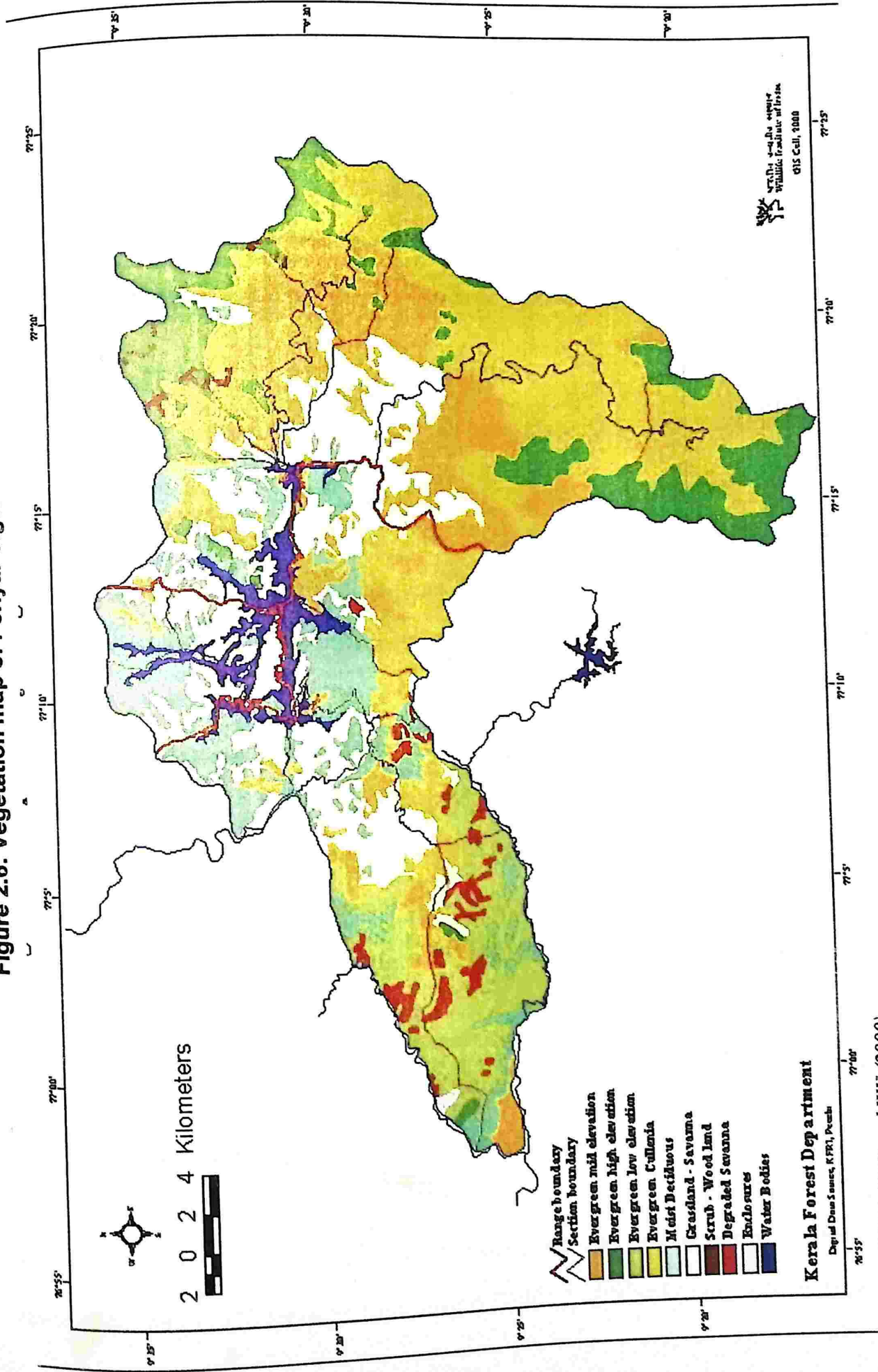
There are 1965 species of flowering plants (1440 dicots and 525 monocots) belonging to 823 genera and 151 families reported from the reserve (Sasidharan 1998, KFD 2000, Vivekanandan 1980). High degree of species richness and endemism can be seen from the fact that of the total 1965 species reported from the area, 515 (26%) are endemic to Southern Western Ghats. There are 4 new records to science, 4 new species for India and 14 new species for Kerala as per latest floristic studies (Sasidharan 1998, Sasidharan et al., 2002).

More than 350 species found in the reserve are of medicinal value. Richness of Periyar landscape in medicinal plants can provide a number of opportunities of linking livelihoods of the local communities with Indian system of medicine through ex-situ cultivation of such rare plants.

2.5 FAUNA

A general account of faunal diversity in PTR has been provided by Kurup (1971), Vijayan et al. (1979) and Nair et al. (1985). Other specific studies on various faunal groups are: mammals- Ramachandran et al. (1987), Bates et al. (1994) and Padmanabhan et al. (1998); birds- Yahya (1980, 1990), Srivastava et al. (1993, 1995) and Mohammed et al. (1997); reptiles- Zacharias (1997), KFD (2000); amphibians- Zacharias and Bhardwaj (1996); fishes- Arun et al., (1996), Arun (1998) and Zacharias et al. (1996); butterflies- Elamon (1995), and Jafer et al., (1997), and spiders- Joseph et al. (1998). Following is the gist of faunal diversity of PTR.

Figure 2.6: Vegetation map of Periyar Tiger Reserve



Source: KFR, KFD and WII (2000)

The fauna of the reserve is represented by 62 species of mammals, 315 species of birds (including 21 species of raptors, 23 aquatic including 7 winter visitors and 14 endemic to Western Ghats), 45 species of reptiles (13 snake species endemic to Western Ghats), 16 species of amphibians (10 species endemic to Western Ghats) and 55 species of fishes including three new records and 18 rare species of Western Ghats. There are 180 species of butterflies recorded from Periyar, of which 19 are endemic to Western Ghats. The rare butterfly Travancore Evening Brown has been rediscovered from this area.

2.6 THE PEOPLE IN AND AROUND PTR

Total fringe area perimeter of 220 km has an intense interface with 58 villages/settlements and five tea estates in Kerala side. The total population within two kilometers radius of the reserve is about 2.25 lakh (KFD 2000). Population density of the area is 750 persons km² (nearly the state average and 2.5 times the district average). The population has about 2.2% tribals, 28.9% Schedule Castes and remaining from other castes and communities (SoSS 1999, GoI 2001). Core area of the reserve is free from human habitation. On North-eastern and eastern side, the villages of Tamil Nadu with about 25,000 families and a population of about 1.50 lakh are scattered making the impact zone very wide. In addition, 23 private estates have about 3,000 laborers exerting pressure on the reserve. Kerala Forest Development Corporation (KFDC) also has three Cardamom estates adjacent to Periyar boundary providing job to about 275 rehabilitated Sri Lankan repatriates.

2.6.1 Demography, culture, land use and occupation

Census estimates for 1991 and 2001 for the fringe area villages are given in the Table 2.1. Population growth rate for the district has come down from 10.45 to 6.96 as per 1991 and 2001 census records. Growth rate for the fringe area villages also shows a sharp decline. Sex ratio for Idukki district is in favor of males, whereas in fringe area villages it is in favor of females (1004 females: 1000 males) (Table 2.2). The literacy rate in district as a

whole has improved and this improvement is seen in the fringe area villages also with 74.8% literates (males 79.7% and females 69.9%).

Table 2.1: Demographic pattern of fringe area villages

Village	No. of HH		Male		Female		Population	
	1991	2001	1991	2001	1991	2001	1991	2001
Elappara	6361	6390	13974	12908	13985	13186	27959	26094
Vandiperiyar	5198	6233	12214	13102	12002	13224	24216	26326
Kumily	5890	6666	13851	14437	13163	14215	27014	28652
Malappara	296	307	487	549	444	576	931	1125
Manjumala	5122	5279	11649	11383	11615	11246	23264	22629
Peerumed	4308	4932	9548	10400	9532	10408	19080	20808
Peruvanthanam	3522	3746	8621	8203	8521	8098	17142	16301
Erumeli (N)	7073	8098	17031	18551	17206	18787	34237	37338
Erumeli (S)	7230	8277	17254	18794	17384	18982	34638	37775
TOTAL	45000	49928	104629	108326	103852	108722	208481	217048
Growth rate		10.95		3.53		4.69		4.11

Male-Female ratio	1991	2001
		1000:993

Source: Government of India (1991 and 2001)

Table 2.2: Community structure and literacy in fringe area villages

NAME	House Holds	Pop.	SC	ST	Literate			Illiterate		
					Total	Male	Female	Total	Males	Female
Elappara	6390	26094	8115	48	19697	10397	9300	6397	2511	3886
Peerumade	4932	20808	7940	43	15718	8336	7382	5090	2064	3026
Manjumala	5279	22629	9176	331	15543	8647	6896	7086	2736	4350
Periyar	6233	26326	9128	317	19297	10425	8872	7029	2677	4352
Kumily	6666	28652	5293	1493	21430	11353	10077	7222	3084	4138
Mlappara	307	1125	150	717	895	458	437	230	91	139
Peruvanthanam	3746	16301	1149	134	13648	6984	6664	2653	1219	1434
TOTAL	33553	141935	40951	3083	106228	56600	49628	35707	14382	21325

Literacy		Community structure		
Male	79.7	SC		28.9
Female	69.9	ST		2.2
Total	74.8	Others		69.1

Source: Government of India (2001)

Fringe area population consists of a variety of stakeholders. These include tribals as the primary group, settlers (Scheduled Castes, Christians and others) mainly on the sides of river Pamba and Periyar, poor households of work force and small scale farmers to relatively well off agriculturists. The socio economic profile along the fringe area people is market oriented development of agronomy. Fringe area people portray a heterogeneous society of uneven groups having interactions and competition for resources under market pressures. They could be divided into three strata based on uneven character of socio-economic resourcefulness corresponding to their distinct ethno-social status. These are: (1) the tribals, (2) poor settlers, marginal farmers and landless immigrants, and (3) rich farmers. All the groups have varying degree of dependence on forest resource ranging from collection of firewood and grasses to poaching.

The land use of the area is very diverse. Within the PA, the forest is more or less intact as there are no forestry operations. However, pilgrimage zone (area around traditional paths to Sabarimala and the shrine proper) faces the problem of huge pollution, degradation of forests and disturbance to wild animals from a large crowd of nearly 5 million pilgrims visiting the shrine over a short span of less than two months. At Sabarimala and Pamba, there is huge concrete infrastructure for pilgrims. All along the traditional routes (more than 30 km), seasonal shops of the local vendors are erected during the pilgrimage season. Similarly, in Pamba valley, the area occupied by settlers under Grow More Food Programme of 1960s, has been put to agriculture. Wildlife tourism inside the reserve is restricted to less than 50 km² area of tourism zone. There are three hotels of Kerala Tourism Development Corporation (KTDC) inside the reserve.

Outside the reserve, varied land uses exist. Private estates of tea, coffee, and cardamom are the biggest land use. Tea estates occupy a very large portion of fringe area and it is particularly important when the tea industry in the state is in bad shape and there are serious labor problems. Expanding townships of Kumily and Vandiperiyar are the hub of business activities due to increasing tourism and pilgrimage. Kumily particularly is becoming a big concrete jungle due to mushrooming hotels and shops. Reed collection in the adjoining forests of Judicial range of Ranni Forest Division is the major forestry operation.

Historically, a number of events have led to evolution of different types of land uses in and around Periyar. These include import of labor force at the time of construction of Mullaperiyar Dam, the cardamom leases in high range areas and migration of agriculturists from plains to high ranges starting from 16th century onwards, import of labor force from Tamil Nadu for tea estates and shifting of tribals from interior areas of Periyar to fringes. There were also resettlement of Sri Lankan repatriates by KFDC during 1960s, settling of 692 families in Pamba valley in 1962 under Grow More Food programme and Eucalyptus plantation activity of 1960s, acquisition of private cardamom estates in the core area of Tiger Reserve in 1984, tourism and pilgrimage developments during past three decades (SoSS 1999, KFD 2000). Due to heterogeneity of the community structure, land use and the growing market economy, the pressures on the forest resources are heavy. Due to this, the forest produce based livelihoods of the local communities particularly tribals are no more sustainable. The culture of the area is a mix of Christianity, Hinduism and tribal. There is also influence of Tamil culture as the area is on the border of Tamil Nadu.

2.6.2 Linkages of local community with the PTR

The linkages of the local communities with Tiger Reserve are varied and dynamic. The tribals still have their strong association with the reserve for their forest resource based livelihood. They also feel associated with Periyar because of cultural and emotional reasons. Other poor fringe area communities also have their linkages with Periyar mainly for supplemental livelihoods based on forest resources.

Ecotourism in and around Periyar is emerging as an important activity. The economy of Kumily town is actually dependent on the visitors of Periyar. The value of water for Tamil Nadu plains is enormous but this somehow has not been projected and understood by masses to the required extent. Sabarimala shrine has strong religious linkages of people coming from far off places.

2.7 CONSERVATION SIGNIFICANCE

Periyar is ecologically very rich and this reserve along with the adjoining forested landscape of Kerala and Tamil Nadu up to extreme south offers unique opportunity for long term conservation of this large landscape (about 8000 sq km.) This is also an important watershed of Periyar River and the water from Mullaperiyar Dam is being used for irrigation of a vast stretch of agriculture land (about 68,000 ha of four districts) and power generation in Tamil Nadu. Ecotourism of Periyar is supporting the entire economy of townships of Kumily and Vandiperiyar. PTR has strong socioeconomic, cultural and religious values (especially because of Sabarimala and Mangla Devi shrines). It also offers unique opportunities for research and outreach activities for the masses.

2.8 MANAGEMENT ISSUES

The major management issue for the reserve is protection problems presented by Cannabis (Ganja) cultivators, poachers and smugglers of Non Wood Forest Products (NWFPs) particularly in core zone due to inadequate communication network, 90 km long inter-state border along the core zone and inaccessibility of certain areas. Dependence of the local communities, both tribals and non-tribals, for firewood, grazing, fishing and NWFPs leads to problem of fires and habitat degradation.

Presence of the important Sabarimala shrine in the buffer zone and resultant pressures of large influx of pilgrims within a short period of about two months is a major issue for the management. How to restore existing habitat of grassland under eucalyptus plantations in buffer zone is another challenge.

The Tiger Reserve receives about 4.50 lakh visitors every year (KFD 2000). Management of large number of visitors in the interest of reserve and locals communities and unplanned development on the fringe of Periyar due to increasing tourism are new challenges. Management institutions like Periyar Foundation, EDCs, confederations of EDCs and proposal of raising the height of Mullaperiyar dam are other issues.

Chapter III

Methodology

3.1 INTRODUCTION

Under the ecodevelopment program, a variety of inputs are provided for the empowerment of local communities toward their awareness, capacity building, development of village level institutions and socio-economic conditions (Badola et al. 2002). The ultimate objective of the program is to reduce the negative mutual interactions of the PAs and local communities, thereby restoring/improving the health of the PA ecosystem. The primary purpose of this study was to understand the impact of various inputs of ecodevelopment program in Periyar Tiger Reserve (PTR) with respect to the expected outputs and outcomes. The study basically covered two key components i.e. (1) socio-economic dynamics and resource use patterns of Ecodevelopment Communities (EDCs), and (2) change in attitudes of local communities and staff in response to conservation inputs. In addition, a cursory analysis of vegetation status in different sites of impact zone of the PA was done, to understand the broad pattern in vegetation composition and structure, and to provide baseline information for future studies. For addressing the above aspects, an interdisciplinary approach was used for data collection pertaining to the objectives.

In the first stage of the study, all available secondary information was collected and analyzed for building a better understanding of socio-economic, ecological and managerial issues and emerging trends, particularly in the light of latest initiatives under the India Ecodevelopment Project (IEDP). The field study was carried out from 2004 to 2006. In this duration, field data collection relevant to different objectives of the study was undertaken over a period of three years. In the last stage, the analysis of data, synthesis and writing of the thesis was carried out over a period of one year.

3.2 DETAILED METHODS

For the interdisciplinary study a good blend of qualitative and quantitative information was necessary and therefore, a combination of different methods was employed. Following methods were used in the present study:

3.2.1. Collection and review of secondary information

Available secondary information relevant to the study area was collected through perusal of existing documents and official records. These included three sequential management plans for the reserve (Nair 1978, Asari 1985, KFD 2001), peer reviewed published research papers and research/ consultancy reports. While the first two management plans provided the information about the past management strategies of the area since the initiation of Project Tiger, the current plan provided the vision of seeing Periyar beyond PA boundaries. Published literature in pre IEDP period provided information mainly on the biodiversity of the area with respect to different taxonomic groups of flora and fauna. This also included information about the ecology, population structure and behavior of a few large mammals (i.e. tiger, elephant, sambar, Indian gaur and Nilgiri langur). Documents prepared during IEDP period also provided information on park-people interface issues, resource dependence of local communities, wildlife tourism, pilgrimage and regional context of Periyar.

Information about the demography and inputs provided to local communities as a part of the ecodevelopment program was obtained by perusing existing 72 microplans, annual plans of operation, different implementation reports and status papers prepared during IEDP period. Some of the microplans prepared in the beginning of the program did not have detailed village information and therefore, a rapid survey of all the 72 EDCs using a

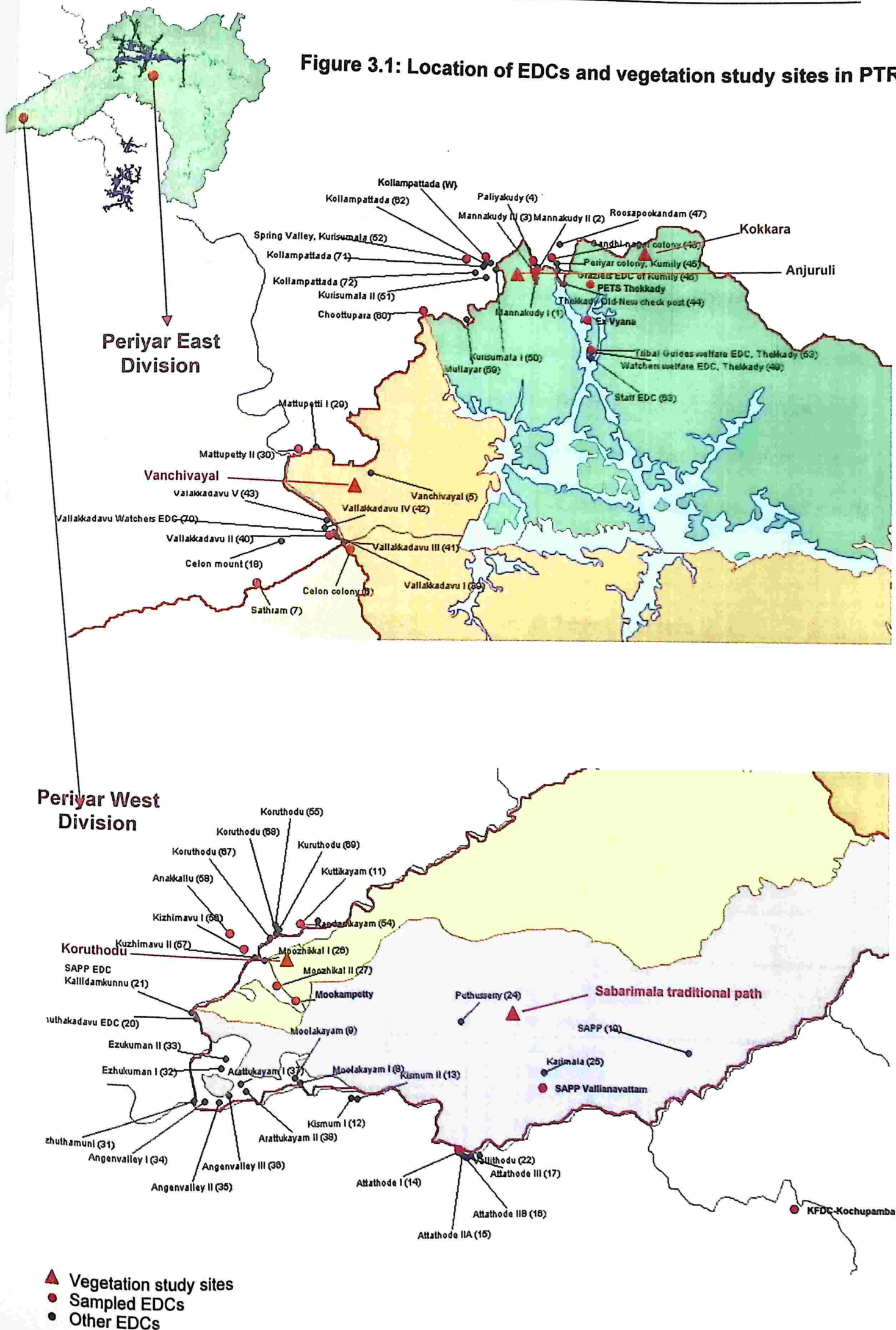
close-ended questionnaire as adopted by Clarke (1986) was carried out through field visits to different areas or by involving the secretaries of different EDCs (Figure 3.1). Personal visits were conducted to the EDCs for cross examination and validation of some of the issues. Participant Observation Method as suggested by Chambers (1992) was used during the researcher's interaction with community groups to gather information about the livelihood patterns, resource use, community needs/ concerns and local institutions in different areas. Focused group discussions with selected senior staff was also used to understand the problems and management initiatives in the past which could not be deciphered from the existing records. Through a combination of above methods, information on the following aspects could be compiled and synthesized.

- a) Ecological status of the Tiger Reserve.
- b) Past management of the area.
- c) Conservation issues, management plan strategies and activities.
- d) Evolution of ecodevelopment program in Periyar
- e) Specific inputs provided to different EDCs and staff under the IEDP.
- f) Baseline information on EDCs pertaining to their proximity with PA, demography, community structure, livelihoods, forest dependencies, project investments, community fund generated and involvement of other agencies in the area.

3.2.2 Assessment of EDCs and households

Local communities around PTR are heterogeneous with respect to their community structure, livelihoods and interactions with the reserve. The program was designed keeping in mind this heterogeneity of different village hamlets. Accordingly, the village level institutions such as EDCs constituted under the program also differed from each other. To capture this range of diversity, survey of EDCs and households was carried out in following steps:

Figure 3.1: Location of EDCs and vegetation study sites in PTR



3.2.2.1 Stratification of EDCs

Based on the information generated through rapid survey (Annexure I), prominent variables indicating characteristic distinction among EDCs were identified. These variables were: (i) Proximity of EDC to the PTR, (ii) Life of EDC or its existence, (iii) Social structure, (iv) Population of participating members, (v) Major conservation issues, main focus of ecodevelopment activities, and extent of investments, and (vi) Market access and availability of land. On the basis of these variables the EDCs were subjected to cluster analysis using MVSP software (<http://www.exetersoftware.com/cat/kovach/mvsp.html>). Through cluster analysis, all the EDCs could be grouped into 8 distinct clusters (Figure 3.2). Number of EDCs in different clusters varied. For instance cluster no. 1 had single EDC while cluster no. 3 had 18 EDCs (Table 3.1).

Table 3.1: Sampled EDCs from different clusters

Cluster No.	No. of EDCs in the cluster	No. of EDCs picked for sample	Names of the sampled EDCs
1	01	01	1. SAPP Valiyanavattam
2	09	03	1. Ex Vayana Bark Collectors 2. Kollampattada Women 3. Tribal Trackers cum Guides
3	18	04	1. Gandhi Nagar 2. Mukkampetty - II 3. Ceylon Pon Nagar Colony 4. Anakkallu
4	09	02	1. Vallakkadavu – II 2. Kuttikayam
5	04	03	1. Sathram Colony 2. PETS - Thekkady 3. Paliyakudy
6	07	02	1. Kuzhimavu-I 2. Chottupara
7	16	03	1. KFDC – Kochupamba 2. Mannakudi – I 3. Mattupetty - II (Estate)
8	09	03	1. Attathodu – I 2. Moozhikal 3. Spring valley – I

3.2.2.2 Selection of EDCs and households for survey

From the eight distinct clusters of EDCs deciphered after the cluster analysis, a sample of 20% EDCs among each cluster was randomly selected for detailed investigation as suggested by Fink (1995) and O'Donnell (1992). Even if the number of EDCs in a cluster was less than 5, at least one EDC representative of this cluster was selected. To capture the maximum heterogeneity of communities, above sample was supplemented by few more EDCs which appeared to be unique as per the knowledge and understanding of the researcher. As a result, a sample of 21 EDCs was selected for assessment.

For detailed investigation at the household level, 10% random sample of the households in each of the above 21 selected EDCs was identified. Thus a sample of 154 households was investigated in detail.

3.2.2.3 Designing and validation of questionnaires

The assessment of EDCs was carried out at two levels, i.e. at the level of Executive Committee of EDC and at the household level. Executive Committee of the EDC is generally more vocal and powerful. There is a possibility that certain information may not be forthcoming correctly at this level. Therefore, reaching out to the individual household was necessary. Also it was critical to get the perception of households who were the ultimate beneficiaries of the program and basic unit of an EDC. Combination of this two tier investigation enhanced the chances of getting quality information as well as desired validation.

For investigation of EDCs at executive level and household level, questionnaire consisting of open ended and close ended questions was framed (Clarke 1986, Badola and Hussain 2003). In this questionnaire, while structured close ended questions tried to keep the

discussions focused, semi structured open questions allowed to capture the depth and breadth of the information (Bernard 2002).

As a first step to formulate the specific contents of the questionnaire, open-ended interviews with selected respondents were conducted. Based on the information obtained through these interviews, the questionnaire was framed. This was finally firmed up after a careful review to ensure a comprehensive coverage of assumptions and viewpoints of all sub-sections within the community.

The questionnaire for Executive Committees comprised of four broad sections. These sections were: (i) Background, community structure and inputs, (ii) Impact of program, (iii) Attitudes of the community, and (iv) Institutions (Annexure II). Broad focus of these sections was as follows:

Section 1 - Background, community structure and inputs

This section comprised of 13 questions pertaining to objective 1 of the study. It covered the basic details of EDCs with respect to its population, community structure, age of EDC, investments and activities under the program and community fund generation.

Section 2 – Impact of programme – resource use and socio-economics

Second section comprise of eight questions related to objective 2a, b and c. These questions aimed to capture the understanding of the EDC about the program, impact of the program with respect to change in resource use patterns and socio economic status.

Section 3 – Attitudes of community

Third section covered objective 2d and comprised of nine questions capturing the attitudes of the local community towards park and park management.

Section 4 - Institutions

This section comprised of nineteen questions addressing objective 2e of the study. These questions tried to investigate the strength of the institutions (EDCs) with respect to different parameters and sustainability of the program. For assessing the sustainability, questions were used to investigate the level of individual and institutional social capital generated among the respondents during the program.

The questionnaire used for household survey (Annexure III) included six major components. These components were: (i) background, education and assets, (ii) changes in socio economic conditions and forest dependency, (iii) park-people conflict, (iv) attitudes and participation of local communities, (v) community empowerment and institutions, and (vi) willingness to pay. Focus of these components was as follows:

Section 1 - Background, education and assets

This section tried to cover the background of the respondent and objective 1 of the study (partially). Out of ten questions of this section, first three were basically to anchor the respondent. Remaining 7 questions covered the background of the household, details of family members, educational status, year of migration to the present locality, household assets, land holding and knowledge about the program initiatives.

Section 2 - Changes in socio economic conditions and forest dependency

The second section covered objective 2a and b. It comprised of 6 questions related to changes in livelihood patterns, income, forest resource use patterns and cattle grazing.

Section 3- Park-people conflict

The third section designed for objective 2c, addressed the issue of human wildlife conflict through 7 questions. These questions tried to capture the situation of wildlife attack, crop

raiding, compensation, animals causing crop damage and perception of the respondents on change in the population of wild animals causing crop damage.

Section 4- Attitudes and participation of local communities

The fourth section covering objective 2d of the study comprised of 20 questions which tried to understand different aspects of the programme i.e. attitudes of households for conservation and ecodevelopment, their understanding and level of participation in the program and strength of institutions.

Section 5- Community empowerment and institutions

The fifth section covering objective 2e comprised of 17 questions which covered the issues of empowerment of the households, decision making, conflicts, strength of institutions and social capital generated.

Section 6- Willingness to pay

The last section comprised of 10 questions which tried to cover the acceptability of three approaches (exclusive approach, ecodevelopment approach and community based approach) of PA management. This section provided information for objective 3.

3.2.2.4 Questionnaire based interviews

Questionnaire based interviews were conducted with the selected sample of Executive Committees of EDCs and households based upon the methodology as suggested by Burgess (1982). These interviews were recorded using a simple tape recorder. This helped in reducing the personal biases of the researcher with the community and vice versa. All the interviews were conducted by independent data collectors who were trained for this work before the actual survey. The researcher remained present in the interviews as an observer without interfering in the conduct of interviews by the data collectors. This

provided the researcher an opportunity of assisting them in steering the interviews without influencing the respondents. The data collectors as well as the researcher were well versed with the local language and this helped in overcoming the problem of communication with the respondents.

3.2.2.5. Analysis of recorded interviews and collation of final data

The recorded interviews were played back, translated in English and collated by the researcher to find out the gaps in the information. To fill up these gaps, *in situ* focused group discussions with the identified respondents and Executive Committees were held. This helped in generation of final data required for analysis and interpretation.

Sources of data: The data for the study come from both primary and secondary sources. The primary data includes information on households, economic status (income patterns and sources of income), community well being, cultural and societal revival, women empowerment, resource use pattern (fuel wood, fodder and NWFP), PA-people interaction (park protection, wildlife attack and crop damage) excluding the offence records, attitudes of communities and staff and strength of EDCs. Secondary data was collected from records of Forest Department, EDCs and Self Help Groups, and this includes investments details, capacity building and awareness.

3.2.3 Attitude survey of staff

The management of PTR had been mostly inward looking before the initiation of ecodevelopment program. The mandate as well as the competence of the staff was mostly on protection. Therefore, no baseline information existed on the attitudes of the staff to deal with communities. Significant inputs were made through training, exchange visits and in-house discussions to build new capacities required for the dealing with the

communities. The study was used to understand the attitudes of the staff to deal with participatory management approach of PTR after the implementation of ecodevelopment program. Attitude survey of the staff was carried out in following steps:

3.2.3.1 Sampling of staff

During the period between 1998 and 2006, 731 staff members and officials worked for PTR from within or from forest headquarters. These staff were stratified as five broad groups depending upon their roles (Annexure IV); (1) Frontline staff (Forest Guards, Foresters and Deputy Range Officers), (2) Executive Officers (Range Officers), (3) Controlling and Supervising Officers (Deputy Conservators and Assistant Conservators of Forests), (4) Policy and Decision Making Officers (Conservators and Chief Conservators of Forests) and (5) Support staff (Office and contract staff). A random sample of 10% staff members from different strata was selected for detailed investigation. A sample of 73 staff members selected for the detailed investigation was distributed in different clusters as follows:

Table 3.2: Forest department staff interviewed for attitude survey

Sl. No.	Staff category	Total No. of staff	Sample size
1.	Frontline staff	558	37
2.	Executive officers	35	09
3.	Controlling and supervising officers	11	05
4.	Policy and decision level officers	12	05
5.	Support staff	115	17

3.2.3.2 Designing and validation of questionnaires

A questionnaire consisting of open ended as well as close ended questions was prepared and the same was validated through a pilot survey in Thekkady (Clarke 1986). Necessary modifications were made to accommodate the possible view point of different categories

of staff. The questionnaire consisted of 3 sections comprising 17 questions (Annexure V). These sections were:

Section 1- Background

This section comprised of six questions which covered the information about the background of the respondent, his/her training and participation in the program.

Section 2- Understanding of concept

This section tried to capture the attitudes of the staff members with respect to his level of acceptance of the program and the impacts of the program through four questions.

Section 3- Impact of program

Last section comprised of seven questions. This section focused on the perception of the staff about the attitudes and involvement of different categories of staff members in the participatory ecodevelopment program and change in attitudes of local communities towards Forest Department.

3.2.3.3 Questionnaire survey

The questionnaire was administered to the randomly selected respondents through the concerned officer in-charge of the area. Some of the staff had been transferred out or retired. Therefore, nearly half of the staff members were sent questionnaires through post or email. Ultimately responses of all the selected staff members on the questionnaire could be collected.

3.2.4. Broad patterns of vegetation structure and composition

The vegetation composition and structure in five different sites viz., Kokara, Anchruli, Koruthodu, Pamba Valley and traditional path to Sabarimala Shrine (Figure 2.1), in the

impact zone were studied for ecological assessment following Misra (1968) and Muller-Dombois and Ellenberg (1974). In each selected site ten, 10x10m quadrates were laid. All the individuals >30cm, circumference at breast height i.e. 1.37m as trees, individuals between 20-30cm as saplings, 10-20cm as recruitment and <10 cm (up to 1 ft in height) as seedlings were measured and counted, respectively. The trees were categorized into different girth classes viz., 30-60cm, 60-90cm, 90-120cm, 120-150cm, 150-180cm, 180-210cm, 210-240cm, 240-270cm and >270cm to assess the regeneration pattern in various sites. The diversity indices were calculated following Maguran (1988).

3.2.5 Analysis and interpretation of data

The quantitative data pertaining to EDCs (Executive Committees and households) and on staff attitude was analyzed using SPSS/PC software. Similarly some of the qualitative data was also converted into quantitative form for its statistical analysis. The community structure in various EDCs was analyzed using Chi-square tests for proportions (Gibbons 1976). The difference in fuel wood extraction, fodder collection, and income level were compared using paired two sample t-tests (Sokal and Rohlf 1981), while attitudinal change and people engaged in NTFP collections were assessed using Wilcoxon signed rank tests (Siegel and Castellan 1988). Correlation analysis was done to interpret the impact of various input parameters on the overall performance of the EDCs. As it was an interdisciplinary study, richest domain of social theory was used for interpretation of the data concerning social aspects. For other components also the interpretation was done in the light of existing literature and theories.

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Ecodevelopment in Periyar Tiger Reserve- Extent, Activities and Linkages

4.1 INTRODUCTION

In the past several decades, governments have recognized the role of Protected Areas (PAs) in the overall national land use and economic development (McNeely and Miller 1984, McNeely 1993). Recently many of the developing countries have tried to expand their PA network areas because of increasing international concern with deforestation and loss of biodiversity, the future potential of bioprospecting within PAs and huge funding opportunities available for nature conservation (Ghimire 1994, Pimbert and Pretty 1997). But, despite many contributions of PAs to the modern society (Heinen and Youzon 1994), they suffer from the problems of weak national constituency, conflicts with the local people, insufficient management and insecure/ insufficient funding. Today there is a larger concern on building support for the PAs which are fundamental for continuation of the life renewal processes.

The physical proximity of human populations and economic activity to biodiversity means that issues affecting any of these affect them all. Every economic system is completely encompassed by the natural world, taking raw materials into a production and consumption process that is separable from nature only in the abstractions of economic theory (Georgescu-Roegen 1971). All but the most remote PAs are increasingly encompassed by economically productive landscapes, and most tropical forests identified as high value sites for biodiversity protection are inhabited by people (Schwartzman et al. 2000). A global review of the geographic and ecological overlap between human populations and biodiversity 'hotspots' shows that about one-fifth of humanity (more than

1.1 billion people) live within the hotspot boundaries identified by Conservation International. Population density within those hotspots is about twice that of the world as a whole in 1995 (Cincotta and Engelman 2000).

Most of the costs (including the opportunity costs) of conservation, particularly in developing countries, are borne by forest-edge communities, while the benefits accrue mainly to global communities and future generations (Wells et al. 1992). This imbalance between costs and benefits often causes communities at the forest edge to opt for conflicting forms of land use. Integrated Conservation and Development Projects (ICDPs) aim to protect biodiversity by providing local communities with tangible incentives for conservation management (Sekhran 1996). It is realized that the local people must be actively involved and their needs and aspirations must be considered if the biodiversity conservation initiative have to progress further (Dudley et al. 1999, Gadgil 1992, Kothari 1998 and Srivastava 2003). A clear incentive system for community conservation must be created that offsets the possible financial and resource-use losses that are often implied by PAs. The failure or inability to understand community perceptions about existing and potential incentives is a common reason for the failure of PAs and ICDPs (Gullison et al. 2001).

An essential element in the design of every ICDP is the consideration of the linkage between the conservation and development objectives. All material benefits of a project must be clearly tied to its conservation actions (Owen-Smith and Jacobsohn 1988). ICDPs must offer viable, ecologically sound development alternatives, particularly when the conservation activity requires the alteration of existing extraction or production activities. In a project where the conservation benefits are seen to serve individuals living outside of the area while local people pay the costs of the conservation actions, it is unlikely that the project will be successful in meeting its goals (Murphree 1991). Optimally, at least five

components comprise an ICDP strategy, including: (1) research for planning, monitoring, and evaluation; (2) conservation of the resource base and environmental management; (3) social and economic development; (4) institutional strengthening and (5) brokering and balancing the interests of stakeholder groups. These project components should be supplemented by assistance to ensure an enabling policy environment (Brown and Wyckoff – Baird 1995). Globally, inputs in the ICDPs have varied across space and time. While the earlier ICDPs were focused on providing alternatives to local people for lost access to PA resources, the recent ICDPs are more community driven and focus on improving community skills in resource planning and management and sustainability issues.

In this chapter, an attempt has been made to understand the level of various inputs in terms of investments and range of activities carried out for different Ecodevelopment Committees (EDCs), supporting micro institutions such as Self Help Groups (SHGs), Nature Clubs and individual households. Major changes in terms of processes; and legal, administrative and institutional structures to accommodate the new participatory approach of management have also been discussed. Effort has also been made to understand the broad issues of the IEDP as well as steps taken for sustainability of the project initiatives in Post IEDP period.

4.1.1 Ecodevelopment in PTR

Since its inception, the forests of Periyar Tiger Reserve (PTR) have passed through periods of conflicting interests of conservation and development. Up-gradation of the status of the area from the Game Reserve to Wildlife Sanctuary and then to Project Tiger had brought in more regulations and restrictions (KFD 1978). Late 1980s was a period of conflicts when strict protection initiatives against illegal activities like ganja cultivation, debarking of cinnamon trees, sporadic poaching and illegal removal of NWFP etc. were

taken up to curb these illegal activities. But sooner it was realized that management of PTR is no longer a frontline strategy alone and support of local communities was necessary for sustaining any protection initiative. It was also realized that there were genuine resource use needs of the local people from the reserve and these required to be addressed appropriately for effective management of PTR. Formulation of first Ecodevelopment Scheme for the reserve demonstrated this concern of management towards resource needs of the communities and their livelihoods (KFD 1989). It is in this backdrop that PTR management opened up channels of communication with the local communities, particularly tribal and this made the beginning of a change for participatory approach of management in the reserve. Focused group discussions with the selected officials and official records reveal that the ecodevelopment program of PTR was an outcome of a long drawn process of experimentation, trials and adaptation for the last more than two decades. The program initiatives could be broadly described in three different phases i.e. Pre-India Ecodevelopment Project (Pre-IEDP) period from 1990 to 1995, India Ecodevelopment Project (IEDP) period from 1996 to 2004 and Post- IEDP period after 2004. While the broad outline of Pre-IEDP initiatives is given below, the details of IEDP and Post-IEDP are discussed under results.

4.1.2 Pre-India Ecodevelopment Project initiatives

Initial ecodevelopment schemes prepared under the support of Government of India did provide for creation of alternative fuel and fodder resources on the fringes of PTR. These schemes proposed for creation of alternative livelihoods opportunities for the local people (KFD 1989 and 1992a). These schemes however, remained heavily loaded with the concerns for traditional protection infrastructure, overlooking the participatory approach, which was fundamental to the philosophy of ecodevelopment program. At this juncture, other state programs like Tribal Sub-Plan and World Food Programs, provided necessary

flexibility and space for initiating processes of trust building and participation (KFD 1992b). The management tried to involve few other stakeholders (local NGOs, representatives of line agencies, doctors and the managers of surrounding tea estates) in this process. These initial trust building efforts were seen translated on ground in small successful initiatives of fire protection involving local people from 1993 onwards in Thekkady section of PTR. While the trust building activities for the local communities were being extended to few other village clusters, PTR was picked up as one of the seven sites for the pilot IEDP funded by Global Environment Facility and World Bank.

During Pre-IEDP period, even though the money was limited, significant investments in terms of time and effort were made in ecodevelopment activities in selected village clusters of PTR. These initiatives were responsible for generating initial trust of the communities with the park management, enhancing understanding of staff about the program and generating baseline information on the impact villages. However, the program remained weak due to following constrains. The investments during this period were low, sporadic and without proper Micro-planning. Therefore, the program could not go beyond trust building activities and the process of institution building remained weak. The real issues of PA-people conflicts (illegal resource use by the communities, alternative livelihoods and protection of PTR) could not be addressed. The program remained informal due to the lack of legal and institutional mechanisms of the state required for fund flow and transparency in implementation. Munro (1995) explains about the different levels of support for PAs from local communities along a continuum of passive to active. It was implied that pre-IEDP initiatives could generate lot of passive support of communities for PTR but it could not be converted into expressed support through vigilance of local people for the reserve.

It was only during the Project Preparatory Phase of IEDP that a process of change in the management of PTR could be set in. The inputs provided as a part of the IEDP in terms of physical inputs, changes in the management process, awareness raising, capacity and skill development are described in the following sections.

4.1.3 Process of change

During 1994-95 rapid survey of fringe areas of PTR was carried out through a spearhead team consisting of selected staff and local NGO representative. Based on this survey, the first document for PTR was developed by Indian Institute of Public Administration (IIPA), New Delhi which ultimately led to the preparation of a national level project proposal for IEDP funding (Singh et al. 1995, Singh 1997). The project was finally approved and launched during 1996. The new project required significant reforms/changes in the existing approach of management of PTR, which are described in results.

4.2 METHODS

Detailed methodology to assess the inputs provided as part of the IEDP has been discussed in Chapter III. The methods broadly followed three steps. A reconnaissance of the EDCs by the researcher along with his own understanding of the process of project implementation (as the researcher was a part of the project implementation) formed the backdrop to the investigations. Discussions and interactions with past Park managers, range officers and selected community groups of EDCs were carried out to generate an understanding about the evolution of processes of change. A through review of secondary information including management plans, official reports and records, World Bank mission reports, historical records as well as published and unpublished literature, was carried out to gather data on the quality and quantity of investments and inputs. For detailed investigation at the EDC and household level, 10% random sample of the

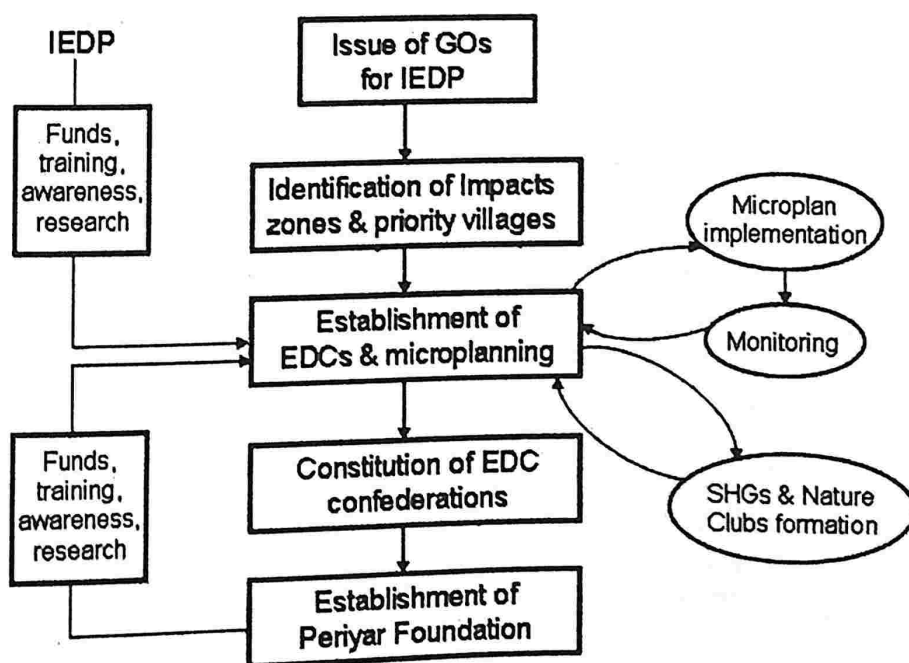
households in 21 EDCs selected through cluster analysis was identified (Please see Chapter III for details). Thus a sample of 21 executive committees of the EDCs and 154 households was investigated in detail to understand the inputs and investments at the level of the beneficiaries.

4.3 RESULTS

4.3.1 India Ecodevelopment Project initiatives

India Ecodevelopment Project was implemented in PTR from 1996 to 2004 with the funding support of The World Bank, Global Environmental Facility, Government of India and Government of Kerala. Even though reduction of dependencies of the local communities on the resources of PTR was one of the major objectives of IEDP, it was an integrated project for strengthening the overall management of the reserve. As per Staff Appraisal Report (World Bank 1996), the project provided inputs in three broad areas i.e. Improved PA management, Village ecodevelopment, effective and extensive support for ecodevelopment (Environmental Education and Awareness and Impact Monitoring and Research). The broad process and the inputs of the project are described in Figure 4.1.

Figure 4.1: Broad processes of IEDP and Post-IEDP



4.3.1.1 Creating an enabling environment

For the successful implementation of the IEDP it was necessary to have appropriate policy, legal and institutional support. Therefore changes in the legal, administrative and managerial environment were made. The constraints and weaknesses of Pre-IEDP period were kept in mind while initiating these new changes.

4.3.1.1.1 Legal and administrative framework

During Pre-IEDP period, the ecodevelopment program was mainly driven through approved annual plans for the reserve and the activities were carried out in the traditional mode of departmental working. To provide legal backup for the implementation of IEDP, Government of Kerala came out with sequential Government Orders (GOs) in 1996 and 1998 (Table 2.1). These GOs provided the necessary backup of the policy support and institutional mechanisms for the implementation of the IEDP and post IEDP sustainability.

Table 4.1: Government Orders (GO) issued for enabling the process of change

Government Order (GO)	Issues addressed	Outcome
GO(Rt) 410/96/F&WLD, dt. 26.11.96, Government of Kerala	Government sanction for implementation of IEDP	Participatory management of PTR involving local communities officially recognized
GO(Rt) 427/96/F&WLD, dt. 11.12.96, Government of Kerala	Government guidelines for the constitution of Ecodevelopment Committees	Process, structure and responsibilities of village level institutions in place
GO(Rt) 428/96/F&WLD, dt. 11.12.96, Government of Kerala	GO for setting up of the State Level Steering Committee	Decentralized mechanism of decision taking at the government level in place
GO(Rt) 429/96/F&WLD, dt. 11.12.96, Government of Kerala	GO for setting up of the PA level Coordination Committee	System of decision taking involving different stakeholders at the PA level in place
GO(Rt) 430/96/F&WLD, dt. 11.12.96, Government of Kerala	GO for setting up of the Regional Level Research Coordination Committee	Synergy created for research and monitoring activities in PTR by networking of different institutions
GO(Rt) 251/98/F&WLD, dt. 29.5.98, Government of Kerala	Revised GO for state level and PA level steering and coordination committees, respectively	Further delegation of decision making in the government and broadening of the participation of local stakeholders for PA level decision taking
GO(MA) 36/04/F&WLD, dt. 27.7.04, Government of Kerala	GO for establishment of Periyar Foundation as a trust under the Charitable and Religious Act 1920	Institutional arrangement for sustainability of the ecodevelopment program beyond IEDP in place

4.3.1.1.2 Institutional framework

An elaborate institutional mechanism for implementation of the IEDP in PTR under the umbrella of new legal framework of the state was put in place (Table 4.2). These institutions ensured the participation of different stakeholders, quick decision making at the PA and state level and facilitated the implementation of IEDP at the grassroots level.

Table 4.2: Institutional framework for the IEDP and beyond

Name of the institution	Structure	Role
Village Ecodevelopment Committees (EDCs)	General body consisting of all the households of a village, represented by two adult members (female and male). Executive committee with adequate representation of SCs, ST, others and women.	Basic village level bodies for planning and implementation of ecodevelopment program
PA level Coordination Committee (PACC) re-designated as Ecodevelopment Implementation Committee (EDIC)	Chairmanship of Field Director, PTR with members from developmental agencies, public representatives and NGO	Decentralized body for quick decision making at the level of PTR as well as space for involvement of different stakeholders and public representatives
State level Ecodevelopment Steering Committee (SESC)) re-designated as State Ecodevelopment Coordination Committee (SECC)	Chairmanship of Chief Secretary, Government of Kerala later under Principal Secretary, Forest and Wildlife Department, and representatives from forests, finance and KFRI	Decentralized body for quick decision making at the level of the Govt. as well as space for involvement of different stakeholders and public representatives
Regional level Research Coordination Committee (RRCC)	Chairmanship of Field Director, PTR and other officers of PTR	To manage research for scientific management of PTR through networking
Office of the Ecodevelopment officer (EDO)	Ecodevelopment officer and his support team of field and office staff	To provide focus to the implementation of the IEDP
Micro-plan Implementation Support Team (MIST)	Senior field staff of PTR and local non-governmental individuals (NGIs)	To facilitate micro-planning process
Periyar Foundation	Government trust with governing body chaired by Hon' Minister of Forests, Govt. of Kerala and members from Govt., district Panchayats and other departments. Executive committee with field director PTR as chairperson and members from PTR and two chairpersons of EDC confederations.	To carry on the processes and programs set in motion under the IEDP by providing continuing financial, institutional and technical support

4.3.1.1.3 Management focus

The inward looking focus of the management gradually provided space for addressing the interface issues. Participation of local communities in different protection and management initiatives became an important facet of PTR. The micro-plans were prepared for different settlements/villages to strengthen livelihoods of local people, reduce resource use pressure on the reserve and strengthen their support for protection of PTR. Memorandum of Understanding (MoUs) with EDCs defined the mutual duties and responsibilities of the EDCs and park management. Through implementation of the program, the exclusive protection approach of the management gradually transformed into participatory protection. Management of the tiger reserve became inclusive of the management of surrounding dependent communities. The overall details and strategy of IEDP was ultimately brought out in the form of Staff Appraisal Report (World Bank, 1996).

4.3.1.2 Impact zone and community coverage

In the initial stages of the project, fringe area for PTR (from immediate surrounds of the reserve up to 7 km width for a perimeter of 210 km) was taken up for rapid survey through participatory appraisals by the reserve staff (SoSS 1999). On the basis of information generated through these surveys, area up to 2 km radius from the reserve was taken up as impact zone for the purpose of this project. Official records estimated a population of about 2.25 lakh (population density 750/km²) in the impact zone. This population comprised of Scheduled Tribes (2%), Scheduled Castes (27%) and other communities (71%). Major management issues concerning protection (poaching, ganja cultivation, illicit felling and fishing), illegal and unsustainable resource use (firewood, grazing, thatching grass and other NWFPs) and habitat degradation (due to pilgrimage and tourism) were used as the criteria for prioritizing 105 villages/settlements for project

implementation. However, only 72 villages/settlements comprising of 5,584 families (approximate population 28,000) within Kerala, were actually covered under the project (Table 4.3). Comparing the overall community structure of the impact zone, proportionately more focus was given to the ST families (19% of total families) as compared to other sections (25% SCs and 56% other communities) in this project. This is probably because of the fact that tribal communities were mostly located on the fringes of the reserve and were traditionally more dependent on forest for their livelihoods.

Data from sample EDCs revealed that major section of the population fell in the age group of 30 to 50 years (Figure 4.2). About 15% of the families covered under the program were landless. More than 65% of the sampled households were from low economic status. Literacy in the sampled household was high (89%) as compared to the total population of the impact zone (Figure 4.3). Coverage of male and female EDC members is also almost comparable. Average literacy of the sampled households was higher being 83% as compared to the impact zone population with an average literacy of 74.8%. Looking at the past history of the communities it was revealed that the population was low till the mid of last century. About 70% of the households had migrated to this area only between 1950 and 1990. It is also revealed that the major occupation of the surveyed households has been agriculture (24%) followed by business enterprise (9%). Majority of the households depend upon forest resources, however, 2% of this population is exclusively dependent upon PTR resources for their livelihood (Figure 4.4). The program could not cover the villages of Tamil Nadu state because of the administrative constraints of the project.

Figure 4.2: Age structure of population in sampled EDCs

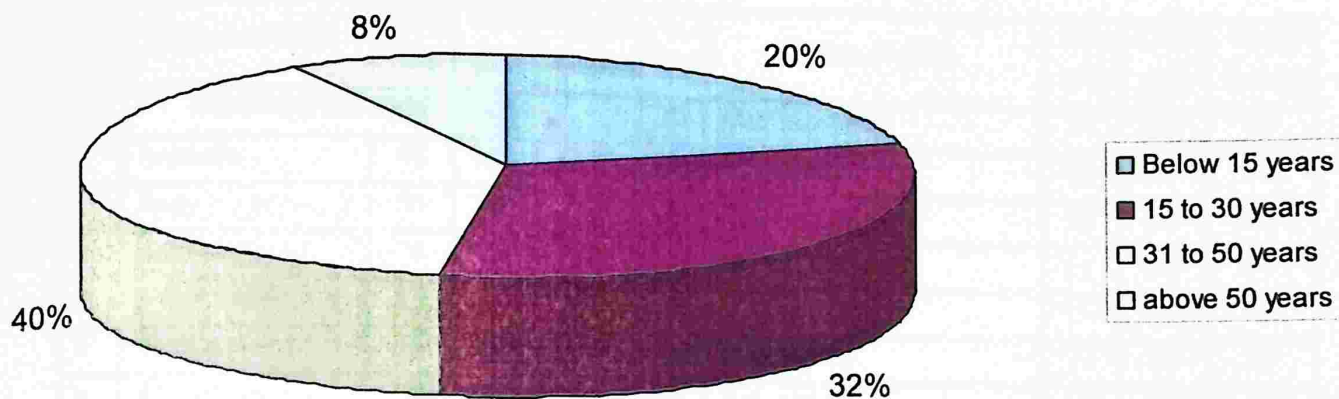


Figure 4.3: Literacy level in different age groups of sampled population

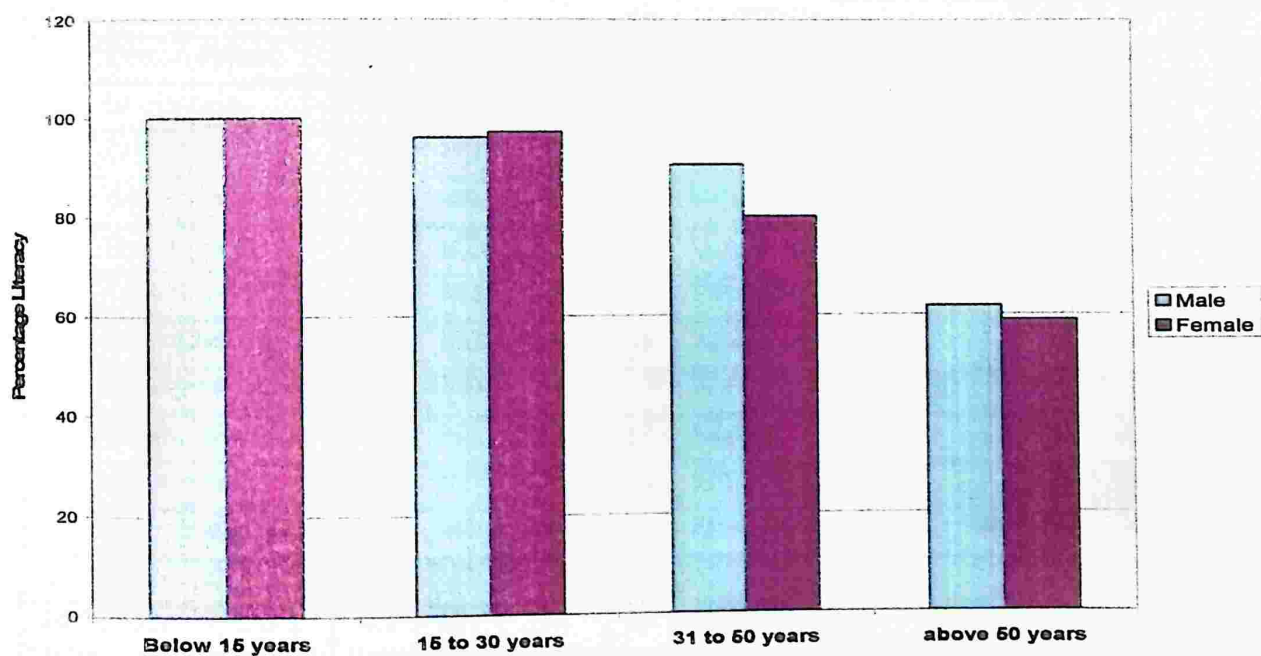


Figure 4.4: Main employment of households in sampled EDCs

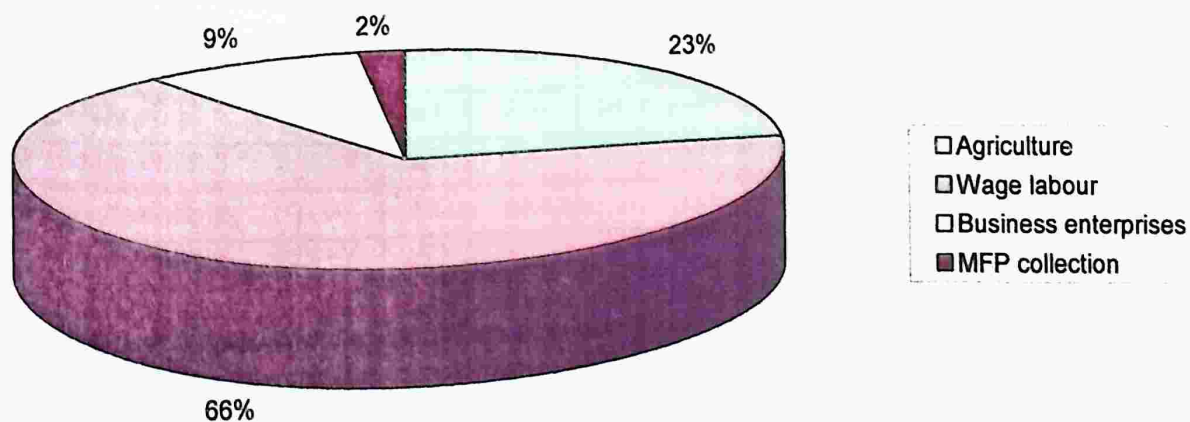


Table 4.3: General details of Ecodevelopment Committees formed as part of IEDP

S. No.	Name of EDC	Total HHs	Category	Major Issues	S. No.	Name of EDC	Total HHs	Category	Major Issues
NEIGHBOURHOOD EDCS					38	Moolakayam-2	71	MD	PF
1	Anakallu	49	MD	PF	39	Moozhickal	96	ST	PF
2	Angel Valley-1	58	MD	PF	40	Mukkampatty-1	96	MD	PF
3	Angel Valley-2	79	MD	PF	41	Mukkampatty-2	87	MD	PF
4	Angel Valley-3	95	GL	PF	42	Mullayar	117	MD	PF
5	Arattukayam-1	75	MD	PF	43	Nambupara	73	ST	PF
6	Arattukayam-2	69	GL	PF	44	Paliyakudy	119	ST	FT
7	Attathodu-1	72	ST	FN	45	Periyar Colony	32	MD	FT
8	Attathodu-2	70	ST	FN	46	Sathram Colony	120	MD	FN
9	Attathodu-3	71	ST	FN	47	SpringVally-1	87	MD	PF
10	Azhuthamunni	92	MD	PF	48	Staff	84	GL	PH
11	Ceylon Colony	41	SC	FT	49	Thadithodu	47	ST	PF
12	Ceylon Mount	35	SC	FN	50	Thekkady	74	GL	PH
13	Chottupara	109	MD	PF	51	Vallakadavu-1	84	MD	FT
14	Ezhukuman-1	75	MD	PF	52	Vallakadavu-2	102	MD	FT
15	Ezhukuman-2	74	MD	PF	53	Vallakadavu-3	71	MD	FT
16	GandhiNagar	34	MD	FT	54	Vallakadavu-4	67	MD	FT
17	Kalakatty-1	102	MD	PF	55	Vallakadavu-5	73	MD	FT
18	Kalakatty-2	90	MD	PF	56	Vanchivayal	47	ST	FN
19	Kandankayam	101	MD	PF	PROFESSIONAL GROUP - ECOTOURISM EDCS				
20	Kisumum-1	71	MD	PF	57	Exvyna	23	MD	PF
21	Kisumum-2	70	MD	PF	58	KFDC Gavi	95	MD	FN
22	Kollampattada-1	78	MD	PF	59	KFDC K. Pamba	102	MD	FN
23	Kollampattada-2	128	MD	PF	60	KFDC Meenar	72	MD	FN
24	Kollampattada-3	101	MD	PF	61	PETS Thekkady	65	MD	PH
25	Kollampattada-4	72	MD	PF	62	PETS V.kadavu	33	MD	PH
26	Koruthodu	123	MD	PF	63	Tribal Trekkers	20	ST	FN
27	Kurisumala-2	55	GL	PF	PROFESSIONAL GROUP - PILGRIMAGE EDCS				
28	Kurisumala-1	90	MD	PF	64	SAPP A.kadavu	75	MD	PH
29	Kuttikkayam	58	MD	PF	65	SAPP K.kunnu	63	MD	PH
30	Kuzhimavu-1	122	MD	PF	66	SAPP Karimala	66	GL	PH
31	Kuzhimavu-2	125	MD	PF	67	SAPP Pudussery	96	GL	PH
32	Mannakudi-1	72	ST	FN	68	SAPP V.chetta	61	MD	PH
33	Mannakudi-2	89	ST	FN	69	SAPP Vallithodu	80	MD	PH
34	Mannakudi-3	91	ST	FN	USER GROUP EDCS				
35	Mattupetty-1	77	MD	FN	70	Firwood & Thatching Grass	98	MD	FT
36	Mattupetty-2	87	MD	FN	71	Grazier EDC	88	MD	GR
37	Moolakayam-1	73	MD	PF	72	Kollampattada-(W)	27	MD	FT

Category : SC-Scheduled Caste, ST-Scheduled Tribe, MD-Mixed, GL-General
 Major issues : PF-Poaching and Felling, FN-Fishing and NWFP, GR-Grazing,
 FT-Firewood and thatching grass, PH-Pollution and habitat degradation

4.3.1.3 Micro-planning

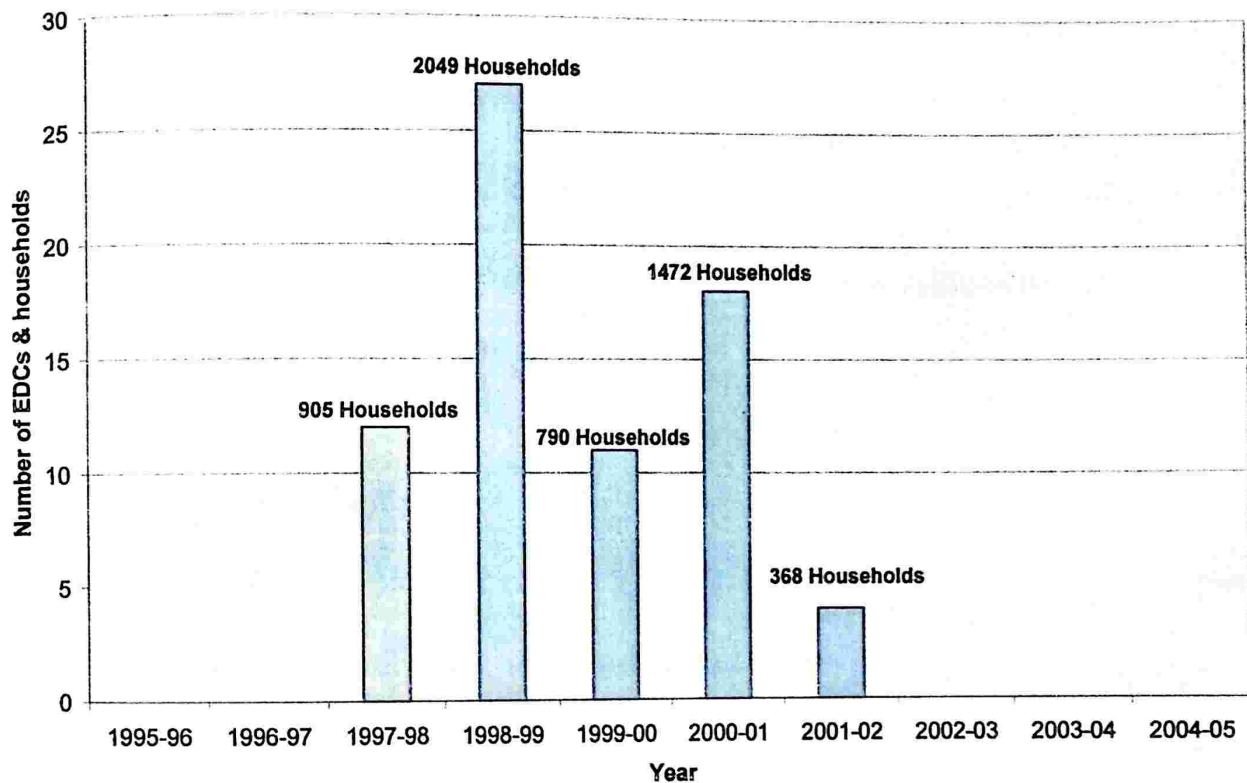
Immediately after the identification of impact zone and priority settlements/villages, the process of micro-planning was started. In few other sites like Gir National Park, Great Himalayan National Park, etc., the task of micro-planning was given to prominent NGOs and the results of these arrangements were not very encouraging (World Bank 2004, Wani and Kothari, 2007). In PTR the task of micro-planning was carried out by teams of selected field staff, local Non-Governmental Individuals (NGIs) and a sociologist engaged as contractual staff under the project. The micro-planning was first initiated in tribal settlements and was gradually extended to other areas. Participatory Rural Appraisals carried out during the process of micro-planning provided opportunity of mutual learning and understanding of the program to staff as well as communities. Model micro-plans were prepared and got approved. A broad norm of Rs. 12,500/- per household was adopted for the preparation of micro-plans. Copies of micro-plans were made available to the EDC members in local language for ensuring transparency.

4.3.1.4 Constitution of Ecodevelopment Committees

As per the provisions of GOs issued by Government of Kerala during 1996, EDCs were constituted in prioritized settlements. All the 72 EDCs of PTR were established over a period of 4 years, maximum being formed during second year of the project (Figure 4.5). Even though a general norm of about 80 households per EDC was followed to ensure better coherence and interaction within the community, the number of members in different EDCs varied considerably (Kuzhimavu 2 EDC with 125 members and Tribal Trekkers EDC with 20 members). Care was taken to include all SC, ST and women headed households in the EDCs. General Body of each EDC had membership of two adult members (male and female) from each household. Similarly, the Executive Committee of each EDC also had 50% representation from SCs/STs and women members. Two

representatives of voluntary agencies/ NGOs were also included in the Executive Committee. Chairperson of the EDC was one of the community members and Member Secretary being the forester of the concerned area.

Figure 4.5: Establishment of EDCs in PTR



PTR had the innovation of constituting EDCs on different criteria. Out of 72 EDCs, 56 were village based and these were called *Neighbourhood EDCs*. The other EDCs were constituted based upon the management issues. 13 EDCs related to pilgrimage and ecotourism had been categorized as *Professional group EDCs*. Out of these, *pilgrimage related* professional group comprised of 6 EDCs and the other *ecotourism related* professional group had 7 EDCs. Members of professional group EDCs had some professional expertise which could be used for the benefit of the community and the reserve. The third category of 3 EDCs had been designated as *User group EDCs*. Members of these EDCs were allowed to use some of the forest resources (fuel wood, thatching grass and grazing) in identified fringe areas of the reserve with the objective of reducing this resource use over a time. The members of the professional group EDCs

could also be the members of Neighbourhood mother EDCs but the duplication of inputs to these members was avoided. It was presumed that the professional groups EDCs are transition EDCs and these should merge into Neighbourhood EDCs in the time to come. The proportion of SCs, STs and other communities differ significantly in the four EDC groups.

4.3.1.5 Inputs

As part of the IEDP, inputs not only financial terms but also in terms of efforts and capacity were provided. The following section describes the financial and qualitative inputs provided as part of the IEDP.

4.3.1.5.1 Financial investments

During IEDP period, an amount of Rs. 3,227.51 lakhs had been invested on different activities of PTR. Broadly the investments had gone in three major areas of the management. These are Improved PA management, Village ecodevelopment program, Effective and extensive support for ecodevelopment. The last item covered two important areas of investments i.e. Environmental education and awareness program and impact monitoring and research. (Table 4.4).

Table 4.4: Total financial investment under IEDP

S. No.	Major component	Investment (Lakhs)
1	Improved PA Management	1852.16
2	Village Ecodevelopment Program	1150.32
3	Effective and Extensive Support for Ecodevelopment	
	• Environmental Education and Awareness Program	109.16
	• Impact Monitoring and Research	115.87
	Total	3227.51

Source: World Bank Supervision Mission Report June 2004.

Looking at the overall picture, it is seen that maximum investments had gone in improved PA management in PTR (57%). Village ecodevelopment (VED) program had also been adequately addressed with about 35% investment. However, the component of Education and research had received minimum investments. Under research component, 122 short and long term studies were carried out by the project contract staff, local institutions and talented individuals/groups.

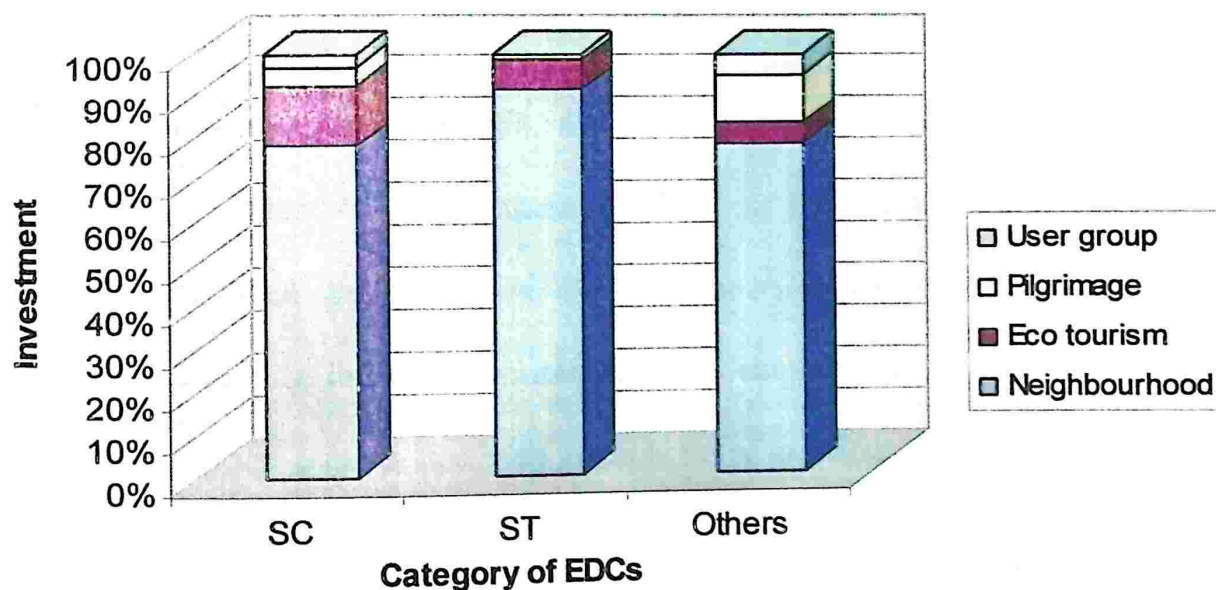
4.3.1.5.2 Investment on village ecodevelopment

In PTR, out of the total investment of Rs. 1150.32 lakhs on VED, an amount of Rs. 757.75 lakhs was invested on 5,584 households of 72 EDCs for micro-plan activities. The average investment per household on ecodevelopment activities has been Rs.13,570/- which is little more than the proposed per household investment of Rs. 12,500/- under the project (Table 4.5). Of the four categories of EDCs of PTR, pilgrimage based professional group (SAPP) EDCs have received minimum per household investment whereas the investment on ecotourism based professional group EDCs has been higher. About 19% of the investment has gone to tribal households which have strong linkages with PTR. Schedule caste families have received about 25% investment (Figure 4.6). Strikingly, SC/ST populations were found to be significantly different in Neighbourhood EDCs ($\chi^2 = 90.63$, $df = 2$, $p < 0.01$), Professional group-ecotourism based EDCs ($\chi^2 = 127.43$, $df = 2$, $p < 0.01$), Professional group-pilgrimage based EDCs ($\chi^2 = 135.36$, $df = 2$, $p < 0.01$), and User Group ($\chi^2 = 58.65$, $df = 2$, $p < 0.01$). It was clear that the population structure was highly variable, influencing the response to various investments, both fiscal and program initiatives.

Table 4.5: Investment on different EDC groups for village ecodevelopment

Group of EDCs		No. of EDCs	No. of Households				Investment (Rupees in lakhs)	
			SC	ST	Others	Total	Total	Per Household
Neighbourhood		56	1108	948	2464	4520	614.11	0.14
Professional Group	Eco tourism	7	197	72	141	410	65.74	0.16
	Pilgrimage	6	66	15	360	441	44.17	0.10
User group		3	44	2	167	213	33.73	0.16
Total		72	1415	1037	3132	5584	757.75	0.14

Figure 4.6: Investment on different community groups



Different EDCs also received varied investments. In the sampled EDCs, data revealed that the maximum investment per household has gone to Professional group EDCs (Table 4.6). Neighborhood and User group EDCs have received almost similar investments. Within the Professional group EDCs, PETS EDC has received nearly three times more per household investment compared to what was originally provided in the project (Annexure VI). A comparison of the investments per household amongst Pilgrimage based Professional group EDCs revealed that SAPP Valiyanavattam EDC received much higher investment than other counterpart EDCs (Table 4.6).

Table 4.6: Component wise investment received by sampled EDCs

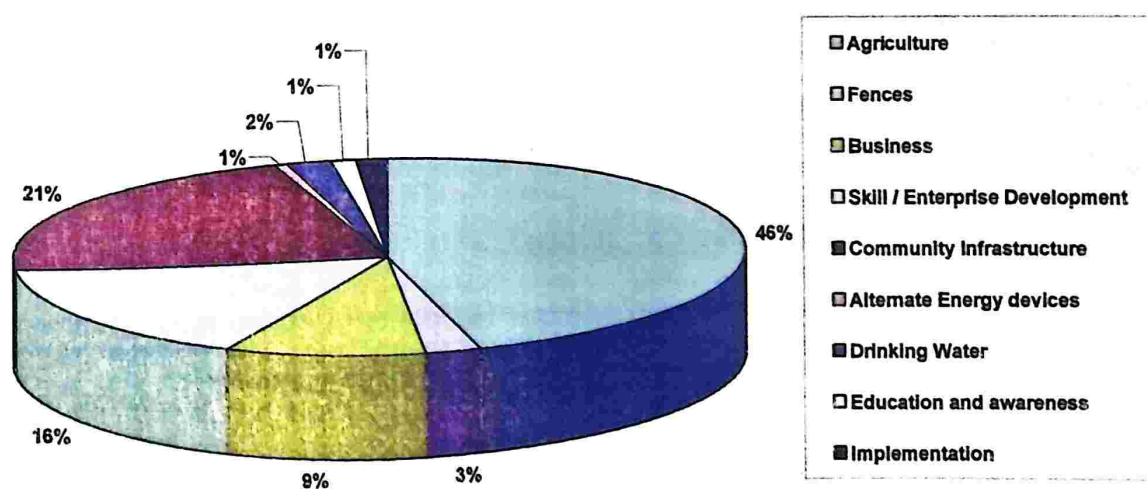
Sl. No.	Category of EDCs	Investment (Rupees in Lakhs)				Total	Per HH
		Income generation	Community Infrastructure	Community Welfare	Implementation		
1	Neighbourhood	144.00	25.62	8.08	2.72	180.41	0.15
2	Professional - Ecotourism	26.36	12.87	0.94	0.62	40.79	0.19
3	Professional - Pilgrimage	2.5	11.7	0	0.14	14.34	0.22
4	User group	3.64	0.11	0	0.3	4.05	0.15
	Total	176.5	50.29	9.01	3.78	239.59	
	Average	8.4	2.39	0.43	0.18	11.41	0.16
	Maximum	15.93	11.7	1.9	0.31	22.94	0.35
	Minimum	0.36	0	0	0.05	2.79	0.10

VED investments had been made on four broad groups of activities i.e. income generation support, community infrastructure, community welfare and project implementation support. For income generating activities, the major investments had gone for improvement of agriculture (46%), small business (21%) and enterprise development (18%). Under enterprise development and business support, a number of beneficiaries particularly women were benefited. Small loans had been availed by women through SHGs for initiating micro enterprises and self employment initiatives through group business activities. Support had been given both for individual as well as group activities. Many activities of the program were women centric (Vermi composting, group business, SHG activities etc.). The major community welfare activities have been drinking water supply, education/awareness and provision of alternate energy devices (Figure 4.7.). The investments on community welfare had been very small but these have played an important role in generating the trust of the EDC members (focus group discussions with executive committees). A variety of community infrastructure in the form of approach roads, community halls, furniture, and materials required for pilgrimage shops etc. has been provided to the EDC members. Crop protection fences (both live and barbed wire), trenches and protection walls were created as a part of community infrastructure. The major investment in terms of enterprise development was for tourism and pilgrimage

based professional group EDCs. However, women were also targeted for such capacity building programs, particularly through SHGs.

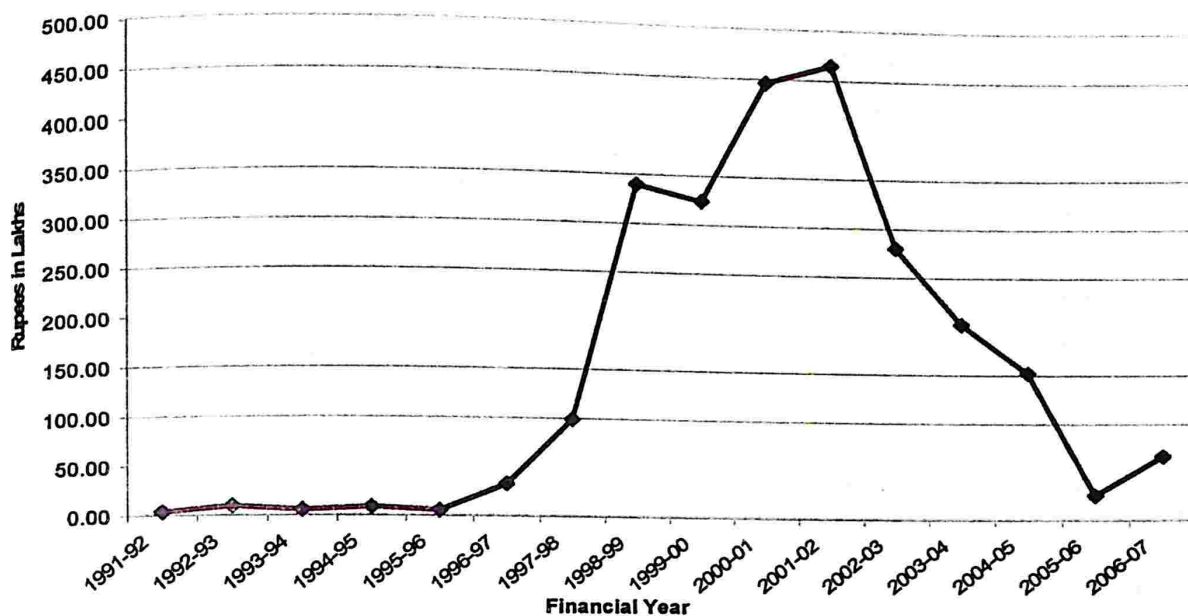
In PTR and other sites of IEDP, the design of the project was kept quite flexible and therefore the investment on alternative community livelihoods and enterprise development varies from site to site as per respective micro-plans. In PTR significant inputs have gone on agriculture improvement and enterprise development activities as compared to other areas like Gir, Ranthambore and Buxa where major inputs have gone on either water harvesting initiatives or crop protection barriers or other community infrastructure. Incidentally in most of the IEDP sites comparable inputs have gone for individual as well as community based activities. Picking lessons from other areas like GHNP and KMTR, PTR has also given a special focus to women centric activities.

Figure 4.7: Investment profile of village ecodevelopment



While looking at the trends of investment, it was observed that even though project provided high investments on village ecodevelopment, some activities related to ecodevelopment had been carried out even before the project and some of these are continuing even after the project (Figure 4.8).

Figure 4.8: Trends of investment under the ecodevelopment program in PTR



4.3.1.5.3 Capacity building

Before the initiation of IEDP, a small team of officers and one local NGO representative was trained in participatory planning tools in Wildlife Institute of India, Dehradun and Ranthambore Tiger Reserve. This team along with few field staff carried out initial participatory appraisals in selected fringe area villages of PTR for generating information required for the project. During the project period the emphasis on training had gradually enhanced. 120 different training programs for local staff and EDC members (18,425 participants) were conducted (Table 4.7). Training programs were also carried out for other stakeholders from outside Periyar (31 training programs and 672 participants). The focus of the training programs was enhanced after the mid-term review of the project. Trainings covered a variety of subject areas which included project awareness and micro-planning, participatory tools for planning, ecodevelopment, enterprise development, pilgrimage management, visitor management and interpretation skills, group dynamics and interpersonal skills, financial management, micro-credits, agriculture improvement, taxi/auto driving, handicraft making, biodiversity monitoring, wildlife census techniques, etc. Twenty four field exchange visits (12 outside the State) were important means of capacity building for 683 persons among staff and EDCs.

Table 4.7: Trainings under the ecodevelopment program

Period	No. of Trainings / Field visits			No. of Participants		
	EDC members & staff	Others	Total	EDC members & staff	Others	Total
A) Pre-IEDP period						
1989-90 to 1994-95	3	3	6	4	27	31
Total	3	3	6	4	27	31
B) IEDP period						
1995-96 to 1999-00	18	1	19	3424	30	3454
2000-01 to 2003-04	102	30	132	15001	642	15643
Total	120	31	151	18425	672	19097
C) Post-IEDP period						
2004-05 to 2005-06	36	14	50	900	362	1262
2006-07	8	35	43	194	1038	1232
Total	44	49	93	1094	1400	2494
Grand Total (A+B+C)	167	83	250	19523	2099	21622

In terms of time effort, about 293 man days had been utilized for different training programs and field visits during the period of IEDP. About 35% of this total time has been spent on exchange field visits. Remaining time had been invested in regular in-house training programs for the EDC members and staff. In addition to this, significant time and effort has also gone in regular EDC meetings which were important platform for mutual learning while doing.

In-house trainings were mostly anchored by technical staff (Sociologist, Ecologist, Economist and Nature Education Officers) of the project. Other trainings were carried out with the technical support of a number of local and national level institutions. These include Gandhigram Deemed University, Dindigul; School of Social Sciences; M.G. University, Kottayam; Kerala Forest Research Institute, Peechi; Forestry College, Kerala Agricultural University, Thrissur and Wildlife Institute of India, Dehradun.

4.3.1.5.4 Awareness

PTR had an already established institutional mechanism for Nature Education and Awareness even prior to IED Project. During pre-IEDP period, 4,233 persons from different target groups had participated in 145 programs. However, majority of these programs were focused on outside participants. After mid-term review of IEDP, the focus gradually shifted to the local communities. During this period, 2141 participants from local communities were covered under different nature awareness programs. However, the major focus was still on outside groups (Table 4.8). Apart from regular nature education programs in the form of Nature Camps, variety of other methods were adopted for awareness generation among the local communities.

Table 4.8: Nature awareness initiatives under the ecodevelopment program

Period	No. of programs			No. of participants		
	EDCs & Staff	Others	Total	EDCs & Staff	Others	Total
A) Pre-IEDP period						
1989-90 to 1994-95	0	145	145	0	4233	4233
Total	0	145	145	0	4233	4233
B) IEDP period						
1995-96 to 1999-00	0	217	217	0	7030	7030
2000-01 to 2003-04	54	217	271	2141	11886	14027
Total	54	434	488	2141	18916	21057
C) Post-IEDP period						
2004-05 to 2005-06	2	79	81	89	2722	2811
2006-07	2	30	32	90	1000	1090
Total	4	109	113	179	3722	3901
Grand Total (A+B+C)	58	688	746	2320	26871	29191

These included extension programs for educational institutions (75 programs and 7000 participants) and EDCs (100 programs and 4000 participants), Academic forums (22 sessions, 7000 participants), Folk-theatre performances and street plays by talented artistes (*Vanambadikal*, 70 programs), regular environmental awareness campaigns like 'Plastic Free Day' (48,3800 participants) and massive rallies in connection with Wildlife Week (5

years and 25000 participants per year), Environment Day celebrations (4 years and 900 participants) and Varshika Kudumba Sangamam of EDCs (1 program and 2000 participants). Other important means of awareness generation had been publication of EDC newsletter (*Sahajeevanam*) and a website for PTR (www.periyartigerreserve.org).

Even though the money spent for awareness programs was only 3.4% of the total project investment, the time and effort in this component was very high. During the project period, about 1,150 man-days of effort has been utilized for these programs and on an average, 57 man-days per year have been spent exclusively for awareness creation of EDC members. At EDC level this time and effort had been highly variable.

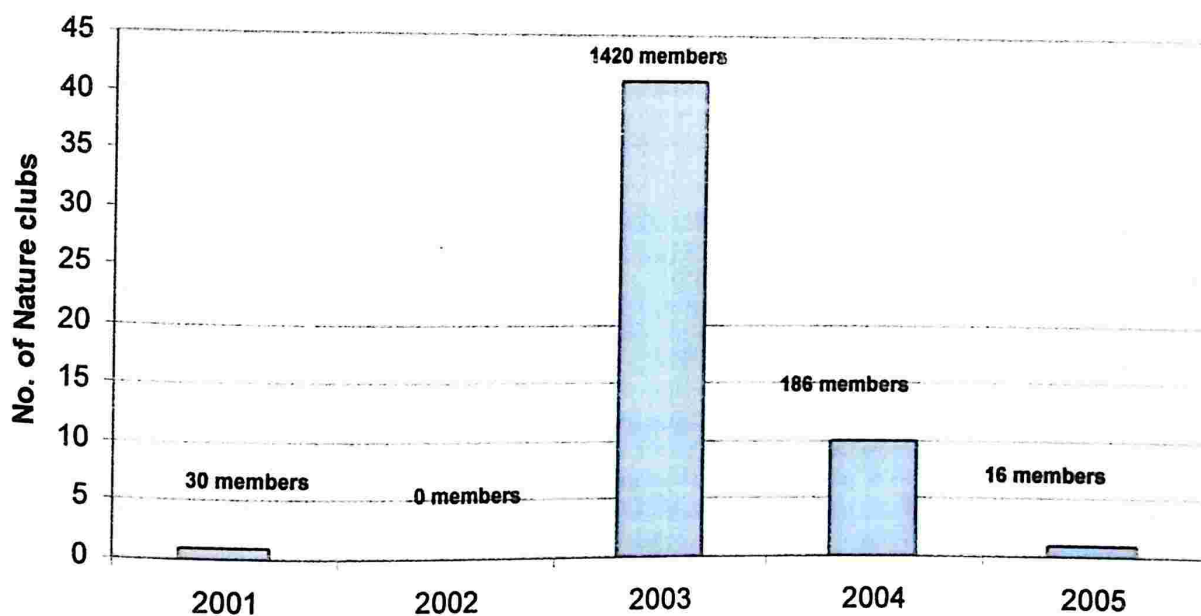
4.3.1.5.5 Institution building

IEDP had brought in major institutional changes in PTR. Institution building process had been continued during the project and post project period. This process can be seen in terms of institutional structures as well as improved community organization through generation of social capital. 72 EDCs established during IEDP organized themselves in two Confederations (Periyar East and Periyar West). These confederations had been supporting some of the common programs of their EDCs. Another important step in institution building had been the establishment of a Micro-plan Implementation Support Team (MIST) which comprised of staff and NGIs. The role of this team was to facilitate different meetings/activities and micro-planning of the EDCs.

GHNP and KMTR had already demonstrated successful community welfare initiatives by formation of SHGs. Establishment of SHGs and Nature Clubs had been similar important initiative in PTR. 52 EDCs have established 159 SHGs with 2450 members in PTR. These SHGs have a capital of about 19.23 lakhs for supporting different income generating

activities and other day-to-day needs of the members. More than 75% of these SHGs are of women members. Similarly 53 Nature Clubs with a membership of 1652 children have been constituted in the last phase of IEDP with the objective of awareness generation and building a constituency of young children for conservation of PTR in the coming future (Figure 4.9). During this process PTR management was also able to network with other academic institutions for the activities related to capacity building and generation of baseline information. The process of institution building which informally started in Pre-IEDP period, had provided an initial advantage to the IED project, which later brought in systematic process of micro-planning and additional resources required for implementation of the micro-plans.

Figure 4.9: Evolution of SHGs and nature clubs in PTR



4.3.2 Issues of India Ecodevelopment Project

IEDP brought in major changes in the management of PTR. The exclusive approach of management got transformed in to an inclusive and participatory approach. Management of PTR no longer remained as the management of wildlife and habitats but it also included the management of fringe area people. Community livelihoods and participation of local

people became important issues. Ecotourism came up as one of the important options of linking livelihoods and PTR protection. In spite of these gains, there were many new issues which came up after the termination of IEDP. One of the major issues was the sudden drop in the level of investment in PTR ecodevelopment program. The expectations of the communities also became high from PTR management. The massive institutional structure in the form of EDCs created during IEDP required the umbrella of regular management for their functioning. There were other issues related to the sustainability of ongoing ecotourism programs, continuation of awareness programs for the communities, arrangements for uninterrupted communication with EDCs, continuation of contractual staff of IEDP who had played significant role during the project period, capacities of the frontline staff to handle ecodevelopment initiatives, and extension of ecodevelopment program to the communities which could not be covered during IEDP. Management of PTR tried to address some of these issues in Post IEDP-period.

4.3.3 Post-India Ecodevelopment Project initiatives

The management of PTR tried to address some of issues raised above after the termination of IEDP in June 2004. Major initiatives in Post-IEDP were as under.

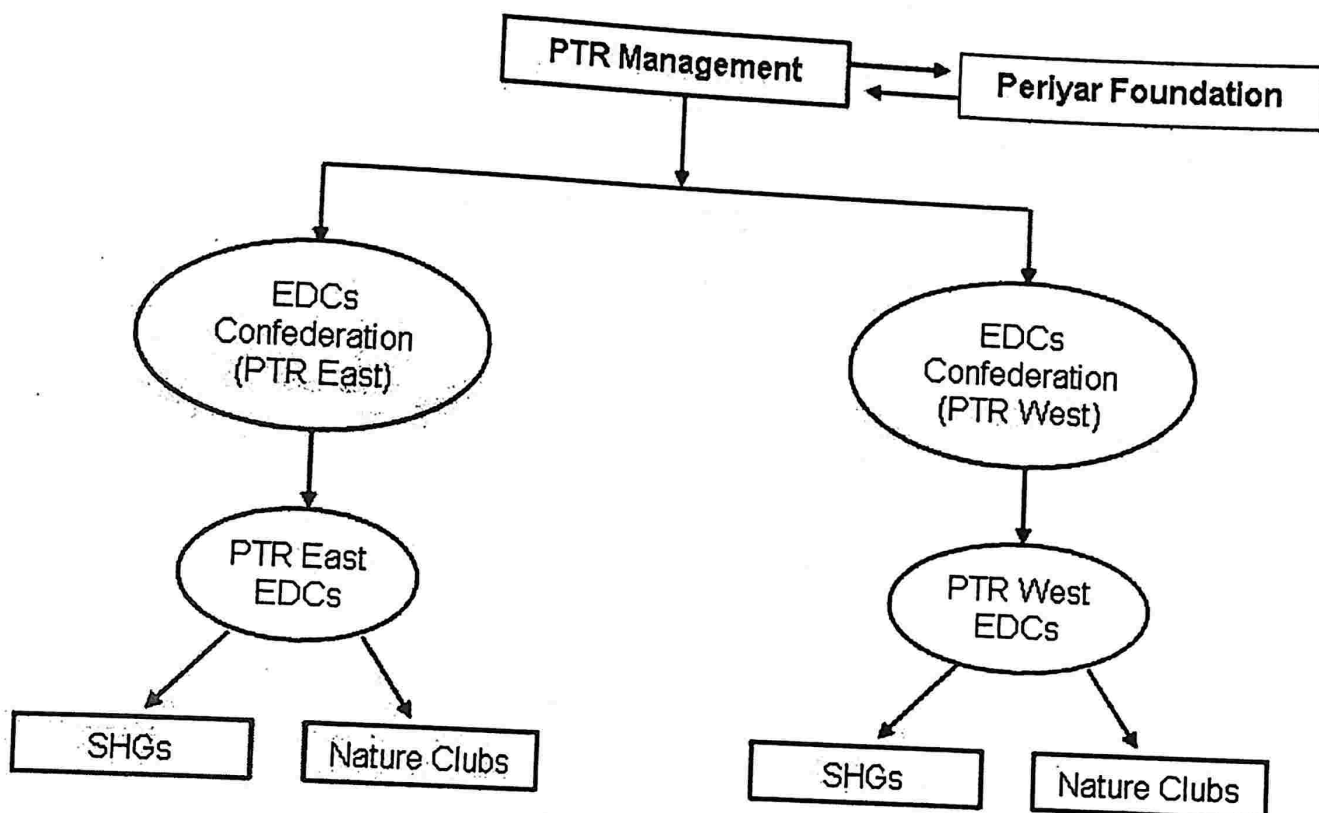
4.3.3.1 Establishment of Periyar Foundation and new institutional arrangements

Government of Kerala ordered for establishment of a trust named Periyar Foundation, as a mechanism of sustainability of IEDP initiatives. The Periyar Foundation had a flexibility of an NGO and an authority of a government. This was the first time in the county that such a trust was constituted by the government with the twin objective of biodiversity conservation and livelihood support to the local communities in PTR and its adjoining landscape. Governance structure of the Foundation provided space for involvement of other stakeholders both at the decision/policy level (Governing Body) and at

implementation level (Executive Committee). Institutional mechanisms of SLCC and PALIC under IEDP expired with the completion of the project. Governing Body and Executive Committee of the Foundation had emerged as alternative institutional mechanism for continuation of the program in Post-IEDP period. The contract staff of IEDP ultimately became as a technical wing of the Foundation and started supporting some of the programs of ecodevelopment committees and other local institutions (Panchayat, line agencies and EDC confederations) as well as those biodiversity conservation initiatives which are normally not covered under the regular government budget.

Government of Kerala also introduced an additional cess, called ecodevelopment surcharge on the visitors of PTR. The income through this surcharge is pooled in the kitty of the Foundation for running its programs. Foundation has also the scope of raising its incomes from regional, national and international sources in the form of donations and institutional charges undertaking research and capacity building programs. In the recent past Foundation has been given such additional responsibilities by Forest and Wildlife Department, Tourism Department and Local Self Government of Government of Kerala. It has a larger facilitating role and does not enter into execution of activities except training and research programs being undertaken by its technical staff. With the establishment of Foundation the new institutional arrangements for linking PTR and EDCs have been evolved (Figure 4.10).

Figure 4.10: Existing institutional mechanism in PTR



4.3.3.2 Financial flow in Post-India Ecodevelopment Project

Since its establishment, the Foundation has ploughed back an amount of Rs.146.27 lakhs from its income to PTR and fringe area communities (Table 4.9). Data revealed that about 31.48% of the total investments of the Foundation have gone for community welfare activities. The investments of the Foundation for the communities have gradually increased from 18.40% during 2004-05 to 41.40% during 2006-07. From the minutes of the meeting of the Executive Committee of the Foundation, it is also evident that the financial support to the EDCs has again started flowing after IEDP. However, to begin with this support has been extended to only selected EDCs which have revisited and revised their micro-plans.

Table 4.9: Periyar Foundation - Post IEDP investments

Year	Income			Expenditure			
	ED Sur-charge	Others	Total	Adminis-tration	BD Support	VED	Total
2004-2005	42.47	0.01	42.48	13.08	1.50	3.28	17.86
2005-2006	78.26	1.51	79.77	26.22	14.54	11.08	51.84
2006-2007	90.86	6.76	97.63	19.86	25.03	31.69	76.58
Grand Total	211.60	8.28	219.87	59.15	41.07	46.04	146.27

4.3.3.3 Park welfare fund, ecotourism and livelihoods

Another institutional development initiative during IEDP has been the establishment of a corpus called Park Welfare Fund. This was initiated as a small fund created through the contributions of the EDCs for dealing with emergencies (medical treatment, legal support etc.) for EDC members and staff while working in the interior areas of PTR. Since 2004, the scope of this fund has been widened. Now the incomes from major ecotourism programs of PTR were being pooled in this fund which supports the livelihoods of EDC members involved in ecotourism programs. The Park Welfare Fund has generated an amount of Rs. 84 lakhs for the EDCs involved in major ecotourism programs of PTR.

4.3.3.4 Capacity building and awareness

In Post-IEDP period the thrust on capacity building and generation of conservation awareness has continued through the Periyar Foundation and staff of its technical wing. After the establishment of the Periyar Foundation, 93 training programs (involving 1094 participants from local community/staff and 1400 from other stakeholders) on varied subjects were carried out during 2004-05 and 2005-06 (Table 4.7 and 4.8). However, the focus of the trainings is gradually seen shifting to outside stakeholders in the Post-IEDP period.

4.4 DISCUSSION

In India, pioneer community based initiative of biodiversity conservation was undertaken in Kalakad Mundanthurai Tiger Reserve (KMTR) and Great Himalayan National Park (GHNP) under the banner of Forestry Research Education and Extension Project (FREEP) between 1994 and 2001 (World Bank 2000, Melkani, 2001). IEDP was the second such major pilot project implemented in seven sites in the country for evolving community based management of PAs. This project is larger both with respect to the investments and the coverage of the area. With an investment of Rs. 3227/- lakhs (17.30% of the total project cost) significant changes have been brought in the management of PTR (World Bank 2004). Ecodevelopment investments in PTR were lower as compared to Gir National Park and Buxa Tiger Reserve where 66% and 46% of the total budget was utilized for these activities, respectively (PEACE 2004). This investment is much higher as compared to the neighboring site of Kalakkad-Mundanthurai Tiger Reserve where similar program was implemented earlier under FREE Project of World Bank (WII 1999).

Optimally, at least five components comprise an ICDP strategy, including: (1) research for planning, monitoring, and evaluation (2) conservation of the resource base and environmental management (3) social and economic development (4) institutional strengthening and (5) balancing the interests of stakeholder groups. These project components should be supplemented by assistance to ensure an enabling policy environment (Brown and Wyckoff-Baird 1995). A careful look at the inputs into the ecodevelopment program at PTR suggests a similar pattern.

The major achievement of the ecdevelopment program in PTR has been in terms of management approach. The traditional isolationist protectionist approach of PA management has given way to participatory approach and now fringe area communities have a stake in the management of the reserve. Active as well as passive support from the

communities has provided additional vigil for PTR and reduction of resource use from the reserve. It has been proved in many cases that systematic multi-stakeholder participation, and more equitable sharing of decision-making and benefits, generates more effective programs (Greenberg and Brown 2006). In moving beyond merely 'consultative' models of participation to ones that more fundamentally and durably engage communities, the Periyar experience has paved way for more such successful initiatives in the country. Local community acceptance of and participation in conservation objectives is fundamentally important. If the community development components of ICDPs continue to grapple only weakly and in an *ad hoc* manner with poverty, powerlessness, and the pressure on land and resources outside of protected areas (Mogelgaard 2003), then key stakeholders will likely continue to threaten PAs. Programs that rely on diverse disciplinary input, but do not provide practical power and benefit sharing to communities and local stakeholders are 'weakly' integrated, and are less likely to succeed (Margoluis et al. 2001).

The potential success of ICDPs is conditioned by the economic, social, political, and population pressures faced by communities located near important biodiversity resources. Conventional conservation approaches have been relatively ineffective in addressing these complex issues on the vast, economically active landscapes that surround many PAs. Considering the ecological consequences of those human pressures, the survival of biodiversity is tied directly to active community support for – or at least clear acceptance of – protection efforts. Recognizing the fact that most of the costs (including the opportunity costs) of conservation, particularly in developing countries, are borne by forest-edge communities, while the benefits accrue mainly to global communities and future generations (Wells et al. 1992) the objective of IEDP was to evolve new approaches for bridging this gap of costs and benefits in context of PAs. Comparing with the adjoining site of KMTR, there has been lot of emphasis on providing alternative livelihoods through variety of enterprise development. In PTR about 50% of the ecodevelopment component

money was utilized for this (WII 1999, TNFD 2004). To be successful all material benefits should be clearly linked to the conservation action (Murphree 1991, Dardani et. al. 1992, Johannesen 2004a, Johannesen 2004b). Linkages between development and conservation activities can sometimes be strengthened by directing the activities toward groups or individuals whose current actions threaten the PA. This was successfully demonstrated in PTR when the *ex-Vayana* bark poachers were organized into an EDC which is now contributing for protection of the PA and livelihoods of these people through innovative ecotourism programs. Thus park destroyers have converted into park protectors.

As per the Implementation Completion Report (ICR) of FREEP (2000), the processes in formation of local level institutions and micro-planning were left much to be desired in GHNP. One of the major reasons for this had been inadequate awareness and communication with the local communities at the time of initiation of the program (World Bank 2000, Wani and Kothari 2007). Taking lessons from such initiatives, a number of steps for awareness generation and building of social capital among the EDC member were undertaken in PTR.

It has been realized that even most well formulated ICDPs cannot succeed unless there are interconnected institutions in place for implementation. Therefore, projects professionals must focus not only on how to design a more effectual ICDP, but on how to construct positive working relations between projects and the institutions under which they function (Gezon 1997). Also it is now accepted that establishment of strong village-level institutions can be the single most effective behaviour which contributes to the conservation of biological resources (McNeely 1988). The ecodevelopment program has broadened the constituency for conservation of PTR through the formation of institutions at various levels such as EDCs, SHGs and Nature Clubs as well as the Periyar Foundation. Given the wide range of activities it is unlikely, and generally inadvisable, to rely on a

single institution to implement these varied components (Brown and Wyckoff-Baird 1995). Initiatives of awareness and dialogue have generated some amount of social capital among the communities for conservation as well as their own development.

According to the Theory of Island Biogeography (MacArthur and Wilson 1967), smaller habitat pockets sustain less biodiversity. The implication is that conservation areas have to be large if they are to serve a conservation purpose. Extending biodiversity conservation initiatives through the approach of ecodevelopment beyond PTR landscape is another issue which requires additional resources and collaborations with other stakeholders. A paramount difficulty in reconciling ecological and socio-economic priorities at landscape level is knowing what weight to give each in the event of conflicts of objectives. This is particularly true in adjoining tea estates surrounding PTR which are facing serious labour unrest problems due to economic problems of the industry. Scaling up community-level work to landscape or ecosystem scales greatly increases the complexity of first-generation ICDPs, and will require innovative capacity building and decision-making processes. Establishment and functioning of Periyar Foundation is one such innovative step forward that has provided an opportunity to look beyond the PA boundaries, and plan in terms of the PTR landscape. Already there is another project of World Bank being planned for the landscape level initiatives biodiversity conservation. The concept of Periyar Foundation has been picked up even at the national level (See guidelines for National Tiger Conservation Authority – Tiger Conservation Foundation 2007). Lessons of ecotourism initiatives are being used in other PAs of Kerala (Eravikulam National Park, Chinnar and Parambikulam Wildlife Sanctuary). These lessons are being used for developing the guidelines for planning ecotourism in other Project Tiger area.

Although significant contributions were seen due to the implementation of IEDP, it has brought up many new issues also. In PTR the IEDP was implemented over a period of

nearly 10 years, about 90% of the investments seem to have been made in a period of less than 6 years due to administrative delays. After the implementation of this project the average annual fund flow seems to have tripled in PTR and in the post IED period it has again come down. Maintaining reasonable level of investment is a challenge for Foundation and PTR management. In fact the project life cycles progressed from a focus on development activities in their early stages, through a transitional period of institutional strengthening, and toward a longer-term focus that roughly balanced conservation and development activities. Results suggest that the ICDP or ecodevelopment concept, as practiced in PTR, has been successful at building capacity for and interest in conservation amongst local communities. However, success has come over a period of more than a decade, suggesting that prior conclusions about ICDP failures may have been based on unrealistic expectations of the time needed to influence behavioral changes in target populations (Baral et al. 2007).

An important lesson from the implementation of Integrated Rural Development Projects is need to carefully monitor the social impacts, paying particular attention to the distribution of income from development activities, both within and between communities in or adjacent to proposed conservation areas. This is another second generation issue relevant to PTR, particularly with respect to Professional Group EDCs involved in ecotourism and pilgrimage management. Filer's (1992) 'alienation/demoralization' effect refers to alienation from traditional social structures and value systems. The development of ecotourism, for instance, by increasing exposure to outside cultural mores can lead to cultural erosion. The disaffection of key groups (particularly youth), who become detached from the ecodevelopment process, may be a problem over time. This is likely to happen, for instance, as the cash demands of such groups manifests itself in the form of growing resentment against traditional and introduced conservation management restrictions on their activities. Communities in alternative income generating programs

like ecotourism and pilgrimage may bring in these new issues in future. Therefore the initiatives for building of social capital will be very important. The management of PTR has to be dynamic enough to deal with these issues.

ICDPs will not meet their stated objectives unless adequate attention is devoted to the policy environment. Numerous studies (Leonard 1989, World Bank 1990) have demonstrated that projects have been stymied in their efforts because the policy environment, including economic, agricultural, and other resource policies, have worked counter to the project activities. In project design, it is important to review the relevant policies that can impact a project, identify changes necessary to enable project success, and assess the feasibility of achieving the policies' changes.

Continuation of the awareness programs for local communities, sustainability of livelihoods, evolving appropriate mechanisms for management of Community development Funds (CDFs), transparent systems of monitoring etc. are other important issues for PTR in the coming future.

Thus to conclude, in the back drop of an enabling legal and administrative environment and with an investment of Rs. 3,227.51 lakhs, ecodevelopment inputs were provided in PTR through the formation of 72 EDCs, 120 education and awareness programs for local staff and EDC members and inputs in institution building and strengthening. To ensure the sustainability of the program post IEDP, Periyar Foundation was setup to ensure biodiversity conservation through livelihood security of local communities and financial and institutional continuity of the ecodevelopment program.

Assessment and Implications on Park Management

5.1 INTRODUCTION

To protect charismatic fauna, essential habitat and migration corridors in ever-widening “landscapes”, conservation programs have typically oscillated between an emphasis on Protected Areas (PAs) managed by conservation biologists, and approaches advocating wider participation and broad-based socio-economic development to reduce anthropogenic threats to biodiversity (UNDP 2000). Many program designs reflect the wish to create both positive development and conservation outcomes, in what are frequently described as ‘win-win’ objectives. While effective in limited domains, these established methods do not constitute a complete or integrated program approach. This troubling *status quo* underlines the need for fresh thinking and a significant shift in program approaches within the conservation and development communities (Greenburg and Brown 2006).

Integrated Conservation and Development Projects (ICDPs) or ecodevelopment as referred to in India, attempt to link biodiversity conservation in PAs with social and economic development in surrounding communities. Questions about the effectiveness of ICDPs surfaced since the implantation of the first generation projects in the early 1990, when researchers and practitioner raised concerns about what was needed for these projects to be more successful. It was realized that these projects have been hampered by factors such as insufficient resources, short-lived fads shaping strategies and programs, top down approaches, competition between conservation organizations, uncertainty over the appropriate extent of stakeholder involvement in the design and implementation of conservation activities, and counter productive conservation policies. Perceived needs included adequate funding over longer time frames, more direct linkages between

development and conservation components, incorporation of monitoring programs from the start, building on local knowledge, promoting active participation of community stakeholders, selection of appropriate sites and appropriate program designs (Wells and Brandon 1992 a b, Brown and Wyckoff – Baird 1992, Larson et al. 1998).

ICDPs are actually experiments using new methodologies in conservation and sustainable development to balance ecological processes as well as anthropogenic concerns. As such, these are not based on a body of tested knowledge, but rather are the building blocks of theory and future efforts. They employ innovative, experimental approaches to conservation of biodiversity and ecologically sound resource management. The idea is to reconcile park management with local needs and aspirations by emphasizing social and economic development among local communities. As such ICDPs have managed to attract the lion's share of the funding for biodiversity. But so far the results have not been very encouraging. Important unanswered questions remain, and there is still an on-going debate whether the ICDP focus on development dilutes biodiversity conservation goals or the inward-looking protectionist alternative is doomed to failure (McShane and Wells 2004). As the struggle to balance conservation and development continues, the need to evaluate what works and what doesn't becomes increasingly important. If successful, these approaches may provide viable alternatives for sustainable development with equity, where the use of the ecosystem is truly sustainable and local people benefit equitably (Brown and Wyckoff – Baird 1992).

The current chapter is devoted for detailed analysis of the impacts of various investments and activities undertaken for different EDCs under IEDP. To get the answers for the research questions assessment was carried out with respect to various outputs and outcomes related to different levels of objectives as stated in chapter one of the thesis. The

parameters of assessment covered change in socio-economic conditions of the local communities, their resource use patterns, attitudes of local communities and staff, strength of village level institutions and to a limited extent status of habitat in the selected pockets of the impact zone of the Periyar Tiger Reserve (PTR).

5.2 METHODOLOGY

Detailed methodology for the assessment of impacts of the ecodevelopment initiatives has already been discussed in Chapter III. In the first step stratified random sampling was carried out to arrive at the appropriate sample size of the communities and the staff. Twenty one EDCs and 10% random sample of the households in each of the above 21 selected EDCs (154 households) was taken up for assessment. Similarly a stratified random sample of 73 staff and officials from 5 strata was picked up for assessment of attitudes. Assessment of communities was carried out at two levels i.e. at the level of executive committee of EDCs and at individual household level, using questionnaire based interviews. Staff attitude survey was carried out administering the questionnaire to the respondents through the concerned officer in-charge of the area or by post or email.

For the component of habitat status, vegetation composition and structure in six different sites in the impact zone was studied for ecological assessment so as to generate a baseline for the future detailed studies. Broad parameters of vegetation in different sites were also compared to understand the trends.

The quantitative data generated through interviews and questionnaires could be used as such for further analysis. The qualitative responses were however first interpreted and then converted into quantitative scores or grades for required analysis. During the process of analysis the data was put to appropriate statistical tests (Please refer to Chapter III for details). To find answers to the research questions the interpretation of the analyzed data

was done in the richest domain of social and ecological theories as well as the existing literature. Where ever possible the comparisons were made with respect to the situation before IEDP (till 1995-96) and IEDP (2005-2006).

5.3 RESULTS

For the purpose of this study the impacts of IEDP on different parameters are discussed below:

5.3.1 Socio economic conditions of local communities

This study attempted to capture the general well being of the communities rather than the household income levels alone.

5.3.1.1 Economic status

Analysis of the households' data revealed that as compared to the years before the implementation of IEDP, the incomes of the EDCs have increased significantly ($t = -2.87$, $df = 20$, $p < 0.01$). The overall increase in income level was about 24%. User group EDC showed highest improvement in the incomes (about 70%) followed by Neighbourhood EDCs (about 38%). In case of Professional group EDCs the improvement in income level was marginal (about 9%). Among professional group of EDCs, pilgrimage based EDCs showed about 19% improvement in their incomes as compared to Ecotourism based EDC where the increase was about 10%. Comparative picture of incomes of different EDCs is given as Table 5.1. Interestingly the incomes for *Ex-Vayana* Bark collectors EDC fell sharply by about 65% in comparison to what they were earning before. That is why the overall increase in the income level of professional group—ecotourism based EDCs seemed to have come down.

Table 5.1: Income patterns of sampled EDCs before and after IEDP

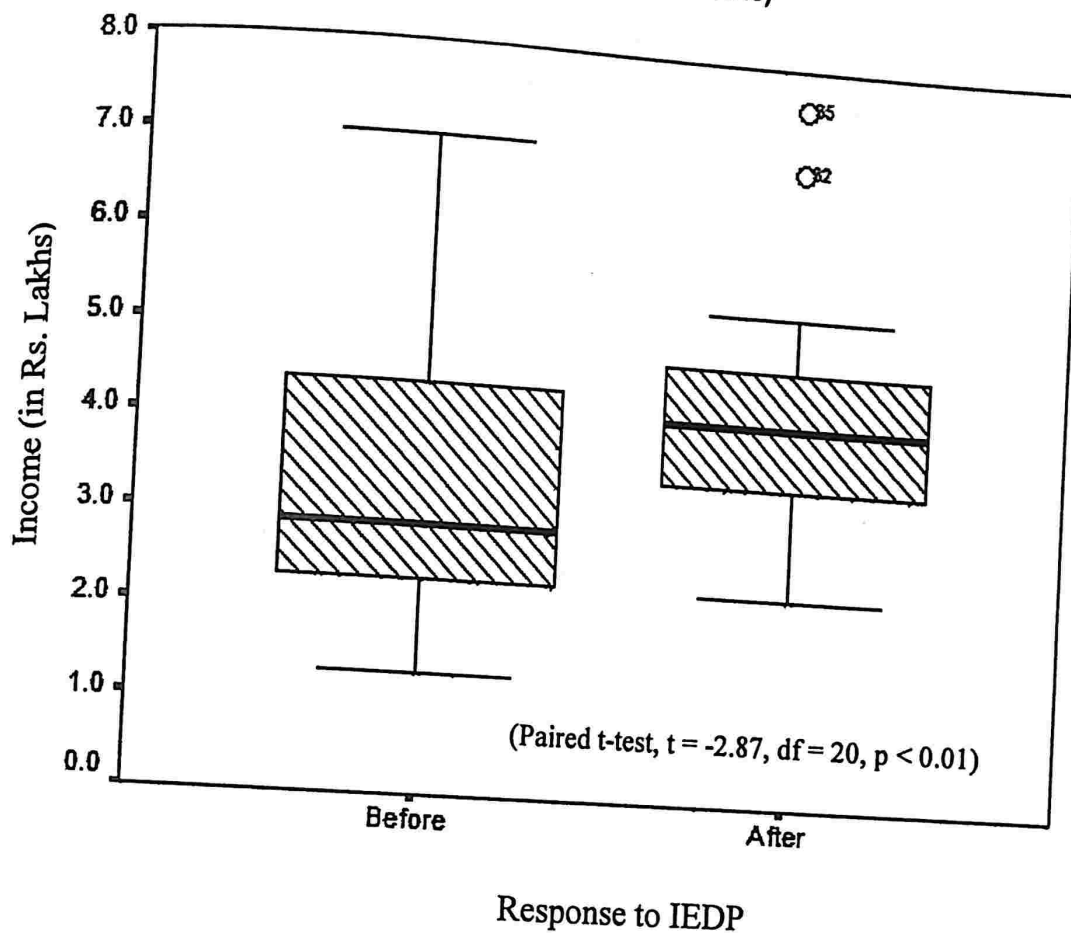
(n = 21 EDCs, 154 HHs)

Name of the EDC	Forest Consumptive		Forest Non consumptive		Non Forest		(Rupees in lakhs) Total	
	Before	After	Before	After	Before	After	Before	After
NEIGHBOURHOOD								
Anakkallu	0.35	0.05	0.00	0.00	2.31	3.47	2.66	3.52
Attathodu 1	0.99	0.04	0.62	1.55	1.68	2.53	3.28	4.11
Ceylon Pon Nagar	0.81	0.08	0.10	0.87	2.07	2.99	2.98	3.95
Chottupara	0.76	0.00	0.00	0.00	1.80	4.40	2.56	4.40
Gandhi Nagar	0.24	0.00	0.48	0.58	0.73	2.11	1.45	2.69
Kuttikayam	0.65	0.11	0.35	0.79	1.29	4.42	2.29	5.32
Kuzhimavu 1	2.90	0.17	0.62	2.15	1.22	2.83	4.74	5.14
Mannakudi 1	1.43	0.90	0.00	0.46	0.48	1.49	1.90	2.85
Mattupetty 2	0.74	0.58	0.00	0.10	2.29	3.42	3.03	4.10
Mookampetty 2	0.61	0.06	0.15	0.25	1.64	3.21	2.41	3.52
Moozhikal	0.96	0.00	0.64	1.18	2.09	6.24	3.69	7.42
Paliyakudi	1.49	0.83	0.66	1.26	0.35	2.65	2.49	4.74
Sathram Colony	0.97	0.06	0.82	1.20	2.59	2.78	4.38	4.04
Springvalley	0.78	0.13	0.00	0.00	6.21	7.46	6.99	7.58
Vallakkadavu 2	1.07	0.16	0.05	0.38	3.60	4.29	4.71	4.83
Total	14.73	3.15	4.49	10.77	30.34	54.29	49.57	68.20
ECOTOURISM								
Ex-Vayana Bark collectors	6.44	0.00	0.00	1.92	0.11	0.36	6.55	2.28
KFDC-Kochupamba	0.11	0.00	0.00	0.00	2.78	4.67	2.89	4.67
PETS Thekkady	0.12	0.00	1.68	2.94	0.16	1.26	1.96	4.20
Tribal Trackers	0.06	0.00	0.00	1.79	1.24	0.72	1.30	2.50
Total	6.73	0.00	1.68	6.65	4.29	7.01	12.71	13.65
PILGRIMAGE								
SAPP Valiyanavattam	2.37	0.17	0.94	2.35	1.19	2.77	4.49	5.29
Total	2.37	0.17	0.94	2.35	1.19	2.77	4.49	5.29
USER GROUP								
Kollampattada Women	0.84	0.00	0.00	0.00	0.90	2.96	1.74	2.96
Total	0.84	0.00	0.00	0.00	0.90	2.96	1.74	2.96
Grand Total	24.67	3.32	7.11	19.76	36.72	67.03	68.50	90.11

There was lot of variation in the change of income levels within the different EDCs of the same group. For example, within the Professional group-ecotourism based EDCs, PETS Thekkady and Tribal Trackers EDCs had almost doubled their incomes. Similarly, KFDC-Kochupamba EDC showed about 62% increase in the income after initiation of ecotourism programs. Discussions with household respondents and officials of KFDC revealed that the organization was running into financial losses and management was finding it difficult to timely disburse the wages to their workers. In fact the ongoing ecotourism programs initiated under IEDP were contributing significantly towards the financial kitty of KFDC, which was being used for payment of wages to these workers. Ecotourism initiatives had come handy to absorb the shocks of poor financial conditions of KFDC. All the households interviewed revealed that they were not aware about the overall transaction of the ecotourism money as this was being done by the officials of KFDC. Therefore, even though the program has led to improved incomes of the households, due to lack of transparency, the stakes of the EDC member could not be built for the conservation of PTR. This is a clear case of weak linkages between conservation and development.

The general pattern in the income level of EDCs was that the income has increased to a significant level after implantation of IEDP. Interestingly, there was high variation in incomes of the EDCs before IEDP, and this variation got narrowed down after the implementation of the project (Figure 5.1). The pattern clearly demonstrates that the beneficial effect of IEDP activities had percolated down to most of EDCs ensuring homogenous growth and equity.

Figure 5.1: Income levels of EDCs before and after IEDP
(n = 21 EDCs, 154 HHs)

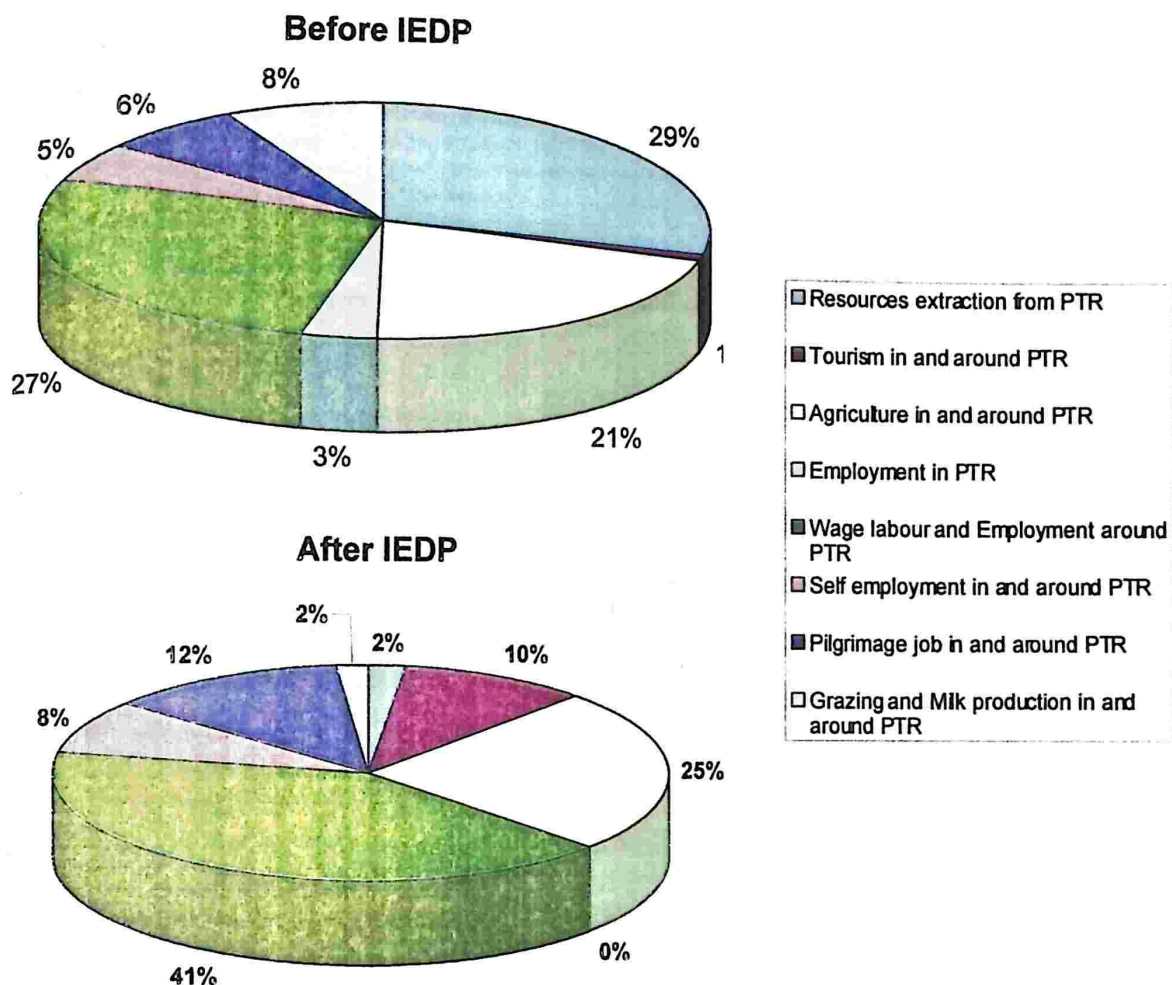


5.3.1.2 Income patterns

There was a significant change in the income patterns of the sampled EDCs. Looking at the overall picture of the income, share of the incomes from resource use activities of PTR has come down from 29% to 2% after the implementation of ecodevelopment program. Similarly, the share of grazing incomes has come down from 8% to 2% during this period (Figure 5.2). Simultaneously there is increase in the contribution of other components in the overall income of the sampled EDCs (agriculture from 21% to 25%, tourism from 1% to 10%, wage labor in and around PTR from 27% to 41%, self-employment 5% to 8% and pilgrimage from 6% to 12%).

Figure 5.2: Source of income of sampled EDCs

(n = 21 EDCs, 154 HHs)

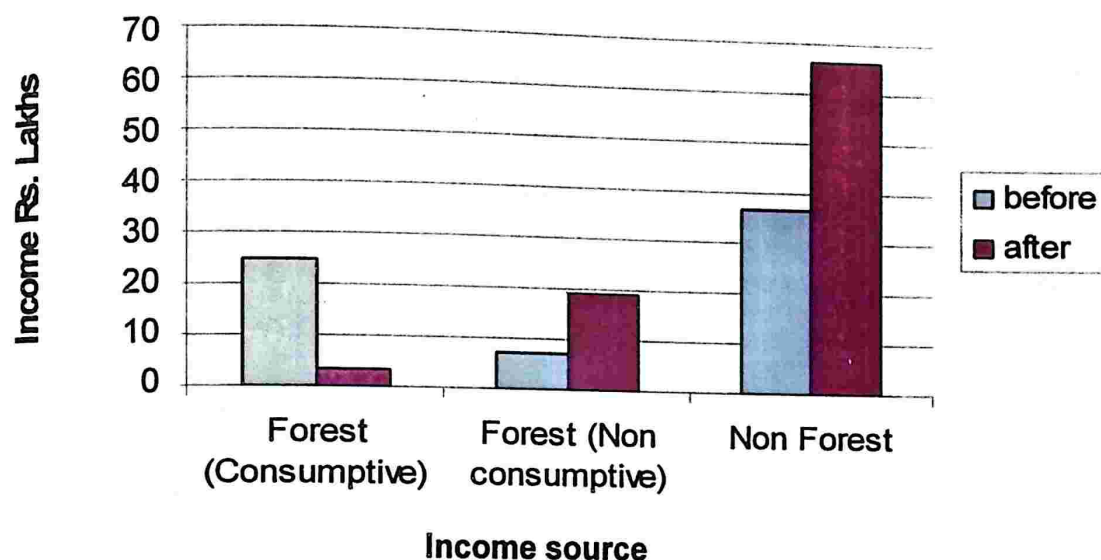


Out of the total income of the households in sampled EDCs, the income from forest consumptive activities of PTR has come down sharply (about 87% of the previous level before IEDP) and the share of the forest non-consumptive activities of PTR (ecotourism and pilgrimage) have gone up (Figure 5.3). The share of ecotourism income has increased by about 178% as compared to the situation prior to IEDP. Similarly, the contribution of non-forestry based activity has also increased their income by compensating the reduction of forest resource based income.

It is also revealed that the user group (Kollampattada women EDC) and professional group EDCs have totally weaned away from forest resources at least for the purpose of their incomes and they have adopted non-consumptive sources of income for their livelihood.

Figure 5.3 Overall incomes of sampled EDCs

(n = 21 EDCs, 154 HHs)



5.3.1.3 Community well being

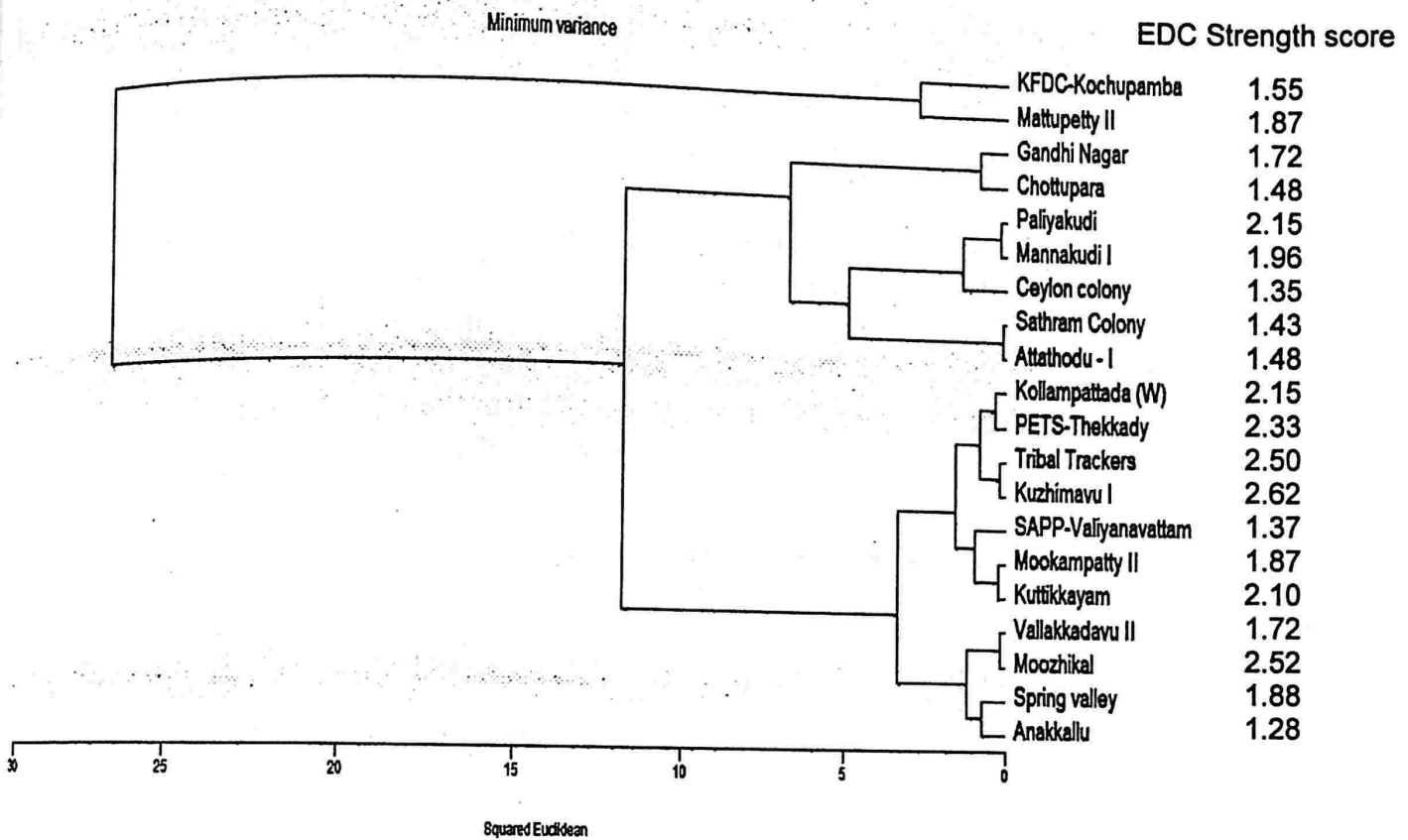
From time to time different types of indices have been used for the interpretation of well being of human populations. Some of these indices include Human Development Index (HDI), Gender Empowerment Measure (GEM), and Human Poverty Index (HPI). These indices basically reflect on the level of socio economic empowerment of the human communities so that they are in a position to avail the available opportunities, and ensure security of economy, education, health and quality of life. In the report of Kerala Planning Board (2006), these indices have been used for understanding the well being of people of the state of Kerala. For the purpose of this study, few important parameters were taken for assessing the socio-economic condition of the communities covered under ecodevelopment program. These parameters were condition of housing, other basic amenities like electricity and communication, landholding, literacy, sanitation, health and drinking water facilities. Even though this list was not exhaustive, the composite score of these parameters could provide broad understanding of the conditions of the sampled EDCs. Data available from household survey was used to give equal scoring to each of the

above parameters to arrive at the composite score for the well being of an EDC. Comparative picture of well being of different EDCs is given below in Table 5.2.

Table 5.2: Socio-economic well being of sampled EDCs in PTR
(n = 21 EDCs, 154 HHs)

Name of the respondent / EDC	House	Amenities	Land	Literacy	Sanitation	Health care	Drinking water	Average score
Neighbourhood EDC								
Anakkallu	2.17	2.00	2.67	1.50	3.00	2.00	3.00	2.33
Attathodu - I	1.71	1.57	1.86	1.00	0.71	1.00	2.00	1.41
Ceylon colony	1.67	1.33	1.17	1.00	0.50	2.00	3.00	1.52
Chottupara	2.00	1.86	1.57	1.71	1.57	2.00	1.00	1.67
Gandhi Nagar	2.00	2.48	1.10	1.45	2.10	2.83	1.00	1.85
Kuttikkayam	2.14	1.43	1.71	1.14	2.71	2.00	3.00	2.02
Kuzhimavu I	1.57	1.71	1.71	1.29	3.00	3.00	3.00	2.18
Mannakudi I	1.86	1.14	1.43	0.86	1.14	3.00	3.00	1.78
Mattupetty II	0.29	1.29	0.00	1.00	0.43	2.00	1.00	0.86
Mookampatty II	1.86	1.43	2.00	1.57	2.43	2.00	3.00	2.04
Moozhikal	2.11	2.22	2.22	1.56	2.22	2.00	3.00	2.19
Paliyakudi	1.78	1.22	1.89	1.00	1.56	3.00	3.00	1.92
Sathram Colony	1.56	1.33	2.00	1.11	1.00	1.00	2.00	1.43
Spring valley	2.13	2.50	2.63	1.88	2.88	2.00	2.00	2.29
Vallakkadavu II	2.22	2.44	1.78	1.33	2.33	2.00	3.00	2.16
Ecotourism EDC								
KFDC- Kochupamba	0.00	0.22	0.00	0.78	0.00	0.00	1.00	0.29
PETS-Thekkady	1.88	1.53	1.13	1.10	2.25	2.63	2.75	1.89
Tribal Trackers	2.11	1.69	1.64	1.51	2.91	2.95	2.97	2.25
Pilgrimage								
SAPP- Valiyanavattam	2.14	1.59	1.58	2.06	2.61	2.12	2.12	2.03
User group								
Kollampattada (W)	2.02	2.07	1.07	1.51	2.70	2.64	2.64	2.09

Figure 5.4 Clustering of EDCs based on socio-economic well being variables (n = 21)



All the sampled EDCs were categorized based on hierarchical cluster analysis (minimum variance method). The cluster analysis revealed two broad groups of EDCs (Figure 5.4). The first group (hereafter named Cluster 1) comprised of two EDCs i.e. KFDC Kochupamba and Mattupetty-II. The remaining EDCs further formed two sub groups (hereafter called Cluster 2a and 2b). These three clusters were remarkably different from each other. Cluster 1 could be explained by the representation of landless and estate laborers. Cluster 2a was mostly of EDCs with limited skills for various income generating activities, they had land or they have some regular livelihood source. Cluster 2b comprised of those EDCs which had either sufficient landholdings or adequate skills or both to run certain enterprise activities. The pattern is actual reflection of the over all strength of EDC (Figure 5.4). The strength of the EDCs was found to be related to its skill/capacities i.e. where skills capacities existed/were developed the EDCs were performing better (Figure 5.5). The overall well being was found to be significantly correlated to indicator variables

representing quality of life such as health (Pearson correlation, $r = 0.6$, $p = 0.009$), sanitation ($r = 0.4$, $p = 0.05$) and drinking water ($r = 0.4$, $p = 0.06$). It was also seen that in general the EDCs in cluster 2b which had better landholdings or skills, also demonstrated good institutional strength of EDCs. SAPP Valiyanavattam and Anakkallu were probably exceptions that were not performing well. This could be explained on the basis of the level of conflict which these EDCs were undergoing. Similarly in cluster 2a Paliyakudi and Mannakudi were exceptions because of the strength of their women SHGs as well as the cultivation of black pepper which fetched them regular yearly income. Therefore, for good performance of any EDC its well being alone may not be sufficient. While empowerment of women and other under privileged groups added to the working capability of the EDC, factors like mutual conflict acted as serious drags on the performance of the EDC.

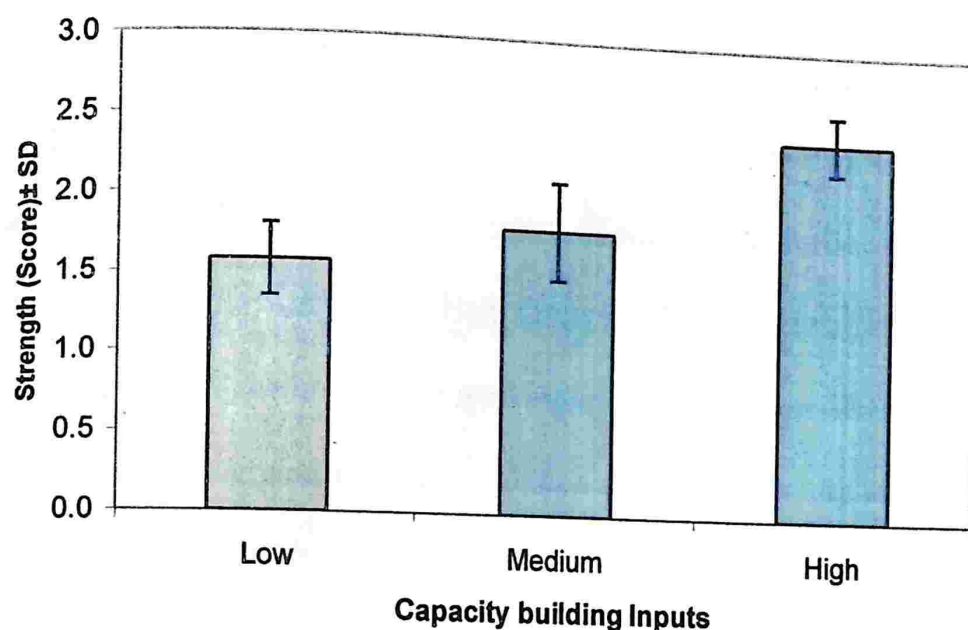
Wealth ranking of few EDCs was carried out by School of Social Sciences (2002) to understand the socio-economic status of communities. Although this assessment could not be directly compared with current study due to difference in methodology, some broad trends could be understood for few of the EDCs. It was revealed that the trends of improvement in the well being of households continued for Paliyakudi, Satharam, Ceylon colony (Cluster 2a) and Mattupetty-II EDCs (Cluster 1).

5.3.1.4 Cultural and societal revival

Earlier, the tribal communities enjoyed rich social culture and organized values were in place. Over the years, these systems got diluted due to political and social upheavals, and market forces, making the community vulnerable to external exploitations. The IEDP intervention contributed to the cultural and social revival in many of the tribal EDCs. About 70% of the respondents have shown desire to re-establish their old traditions of folklores, dances, festivals, and strengthen the traditional institutions (e.g. village head).

Figure 5.5 Strength of EDC w.r.t. capacity level

(n = 21 EDCs, 154 HHs)



For instance, a group of youth in Mannakudi has started a small ecotourism program in the name of tribal heritage, espousing the various customs, tools and the knowledge systems of this community. Even in other neighborhood EDCs, over 80% of the respondents showed active involvement in the local festivals and other cultural events, and appeared to take pride in conservation campaigns as an integral part of their social events. This suggests that the communities had become aware of the value of clean environment, and as a case in point, in most cultural programs, clean plastic campaigns were prominent.

5.3.1.5 Women empowerment

Women empowerment was one of the major successes of the program. Out of the total sampled populations of 265 households, 118 were represented by women members (Table 5.3). In addition to this, there were 55 women represented in the executive committees of the EDCs. These members had power to intervene in any financial decisions if they desired and they could refuse to sign the cheque. Through their representation in the EDCs, they were in a position to raise the concerns about gender discrimination if such

situations occurred. Kollampatada-Women EDC was exclusively represented by women, while in Periyar east women from different EDCs formed a group called Vasanthseena. These unique women forces have been helping the park management in patrolling some of the vulnerable areas along interstate border for the last more than four years without any remuneration. In addition, the empowerment of women had further been demonstrated by the formation of only-women Self Help Groups (SHGs). In total, 45 women SHGs with representation of 677 members were working in the area. These SHGs had working capital of 7.54 lacs in the sampled EDCs. Circulation of this money was as high as 66%. It was because of these SHGs that women were able to access adequate health and education facilities for their families. According to the general statement of women members, SHGs are their 'mini banks' which are of great support for them as well as their families. In many of the sampled EDCs, the loan recovery has improved because of the SHGs.

Table 5.3: Women involved in IEDP in sampled EDCs

(n = 21)

Category	Neighborhood EDCs	Professional Group EDCs		User group EDCs	Total
		Ecotourism	Pilgrimage		
Households covered under IEDP	4520	410	441	213	5584
Members covered for assessment	230	23	7	5	265
Women members	113	0	0	5	118
Women executive members	45	5	0	5	55
Women headed households	3	4	0	0	7
Women exclusive EDCs	0	0	0	1	1
Women SHGs	43	0	0	2	45
Women SHG members	652	0	0	25	677
Women SHG capital (Rs. lakhs)	7.27	0	0	0.27	7.54
Women SHG money in hand (Rs. lakhs)	2.41	0	0	0.15	2.56
Women SHG money in circulation (Rs. lakhs)	4.86	0	0	0.11	4.98

5.3.2 Resource use patterns

Under IEDP initiatives inputs have been provided to the local communities for strengthening their livelihoods by supporting their on farm activities, developing alternative enterprise based livelihoods like ecotourism as well as limited sustainable use of fuel wood and fodder in small pockets of PTR with the overall objective of minimizing illegal resource use and enhancing the protection of the park through support of the local communities. The assessment of households of the sample EDCs revealed following changes with respect to resource use in the PA.

5.3.2.1 Fuel wood

It was revealed that there is a significant decline in the fuel wood use from PTR in all the EDCs (Paired T-tests, $t = 3.37$, $df = 20$, $p < 0.01$). Overall reduction of about 57% in the fuelwood consumption was observed in the sampled EDCs (Figure 5.6). The maximum reduction (about 85%) was seen in the case of user group EDCs which probably were most dependent group on firewood for their livelihood earnings before IEDP. Majority of the user group members were women who had shifted to other alternatives particularly through their SHGs. The reduction in the case of Neighbourhood EDCs was also significant (about 56%). Professional group EDCs showed comparatively less reduction in their dependency on firewood. Some of the EDCs like Anakallu had totally stopped the use of firewood. This was because of the functioning of LPG agency being run by Periyar West confederation in the area and availability of some fuel wood in their homesteads. Assessment also revealed that even though overall reduction of firewood has been very high, the reduction in the number of firewood collectors was marginal (Figure: 5.7). Reduction level for sale of firewood has come down by about 74% and the same for self use was observed as 36%. Some fuelwood collection still continues both for sale as well as self use.

Baseline studies (SoSS, 2002) revealed a reduction of 41.12% in firewood consumption during the implementation of IEDP. This study revealed that the consumption of firewood had now decreased by 57% as compared to Pre IEDP period.

Figure 5.6: Change in quantum of fuel wood collection
(n = 21 EDCs, 154 HHs)

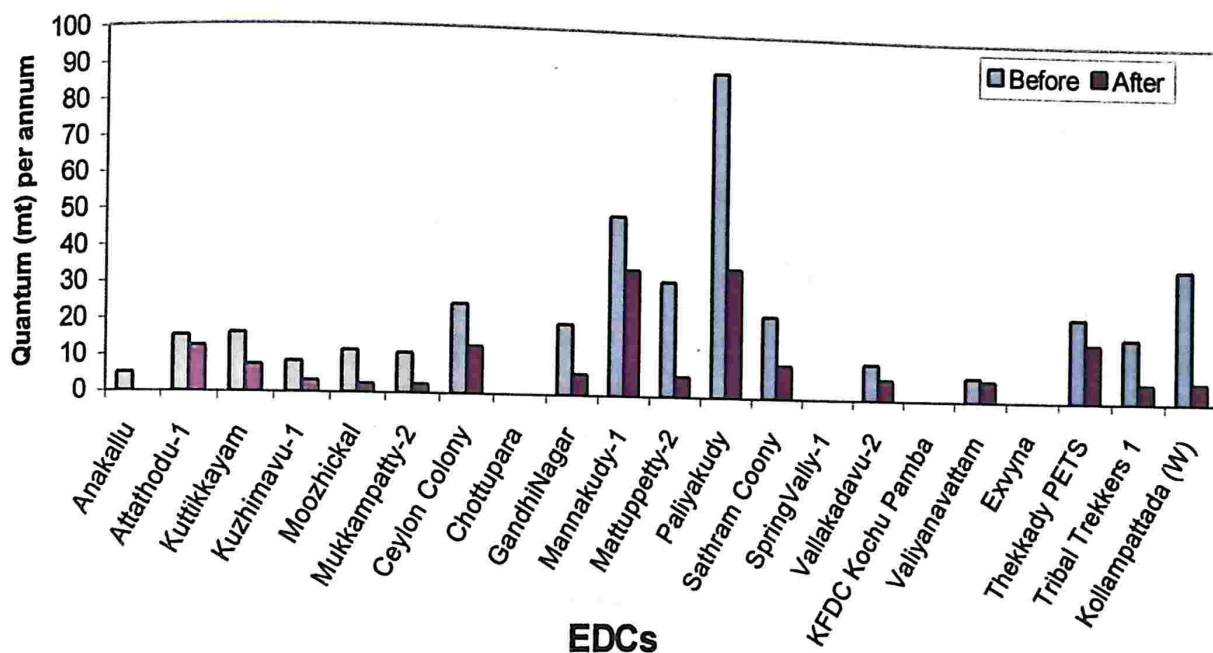
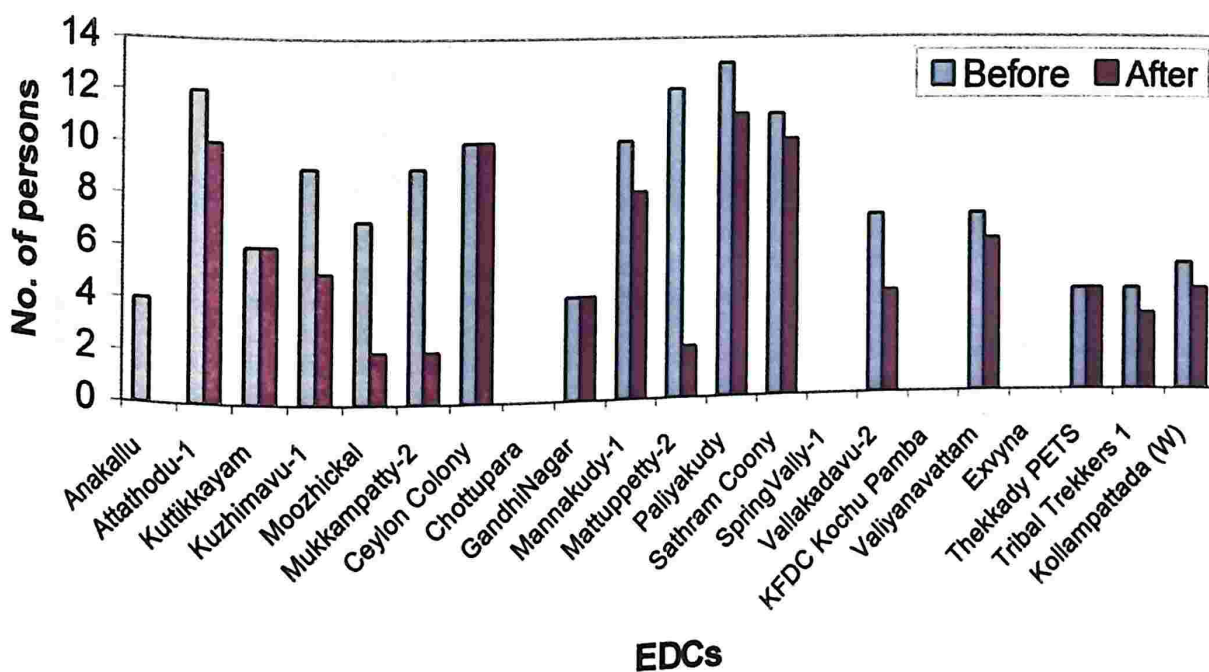


Figure 5.7: Number of persons engaged in fuel wood collection
(n = 21 EDCs, 154 HHs)



5.3.2.2 Fodder and grazing

Before IEDP about 2000 cattle were reported entering PTR for grazing both from Kerala and Tamil Nadu side (Singh et al. 1995). Current assessment of sampled EDCs revealed that there was a significant reduction (about 87%) in the fodder consumption in PTR as compared to Pre IEDP period ($t = 3.09$, $df = 20$, $p < 0.01$). The reduction in case of professional group EDCs (tourism based) and user group Kollampadda EDCs was 100%. Both pilgrimage based professional based EDCs and Neighbourhood EDCs showed reduction of about 86%. The total number of cattle in PTR reduced marginally (from 224 to 180) in the sampled EDCs. Professional group EDCs (Ecotourism based) have totally sold their cattle (Figure 5.8 and 5.9). Presently the grazers EDCs regulates the cattle numbers and areas of grazing in the fringe areas of PTR

Figure 5.8: Quantum of fodder use in sampled EDCs
(n = 21 EDCs, 154 HHs)

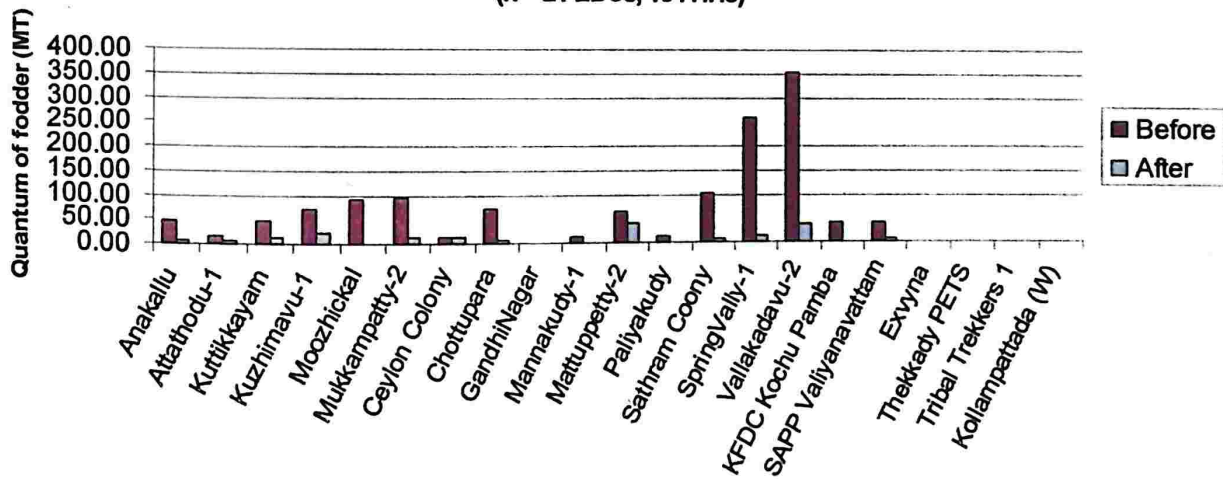
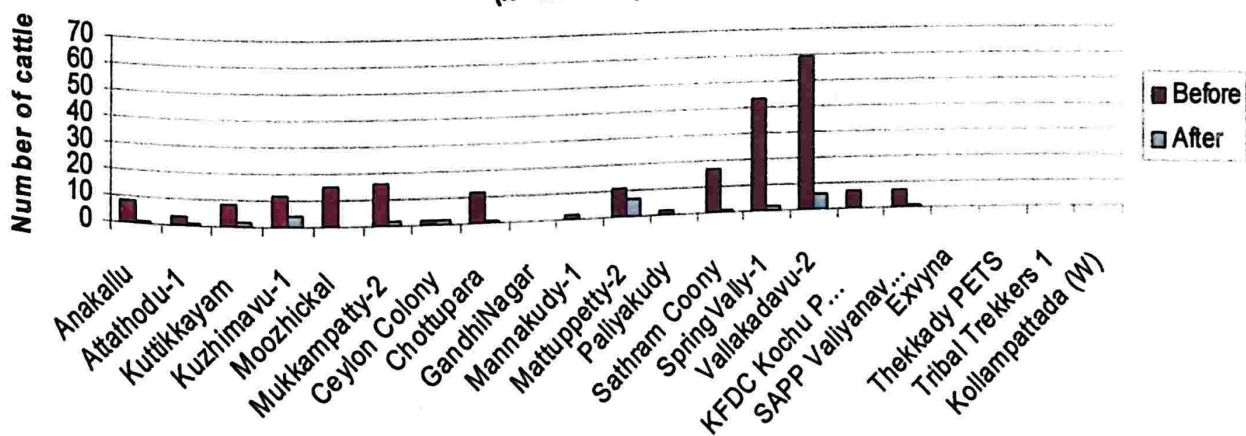


Figure: 5.9: Number of cattle in sampled EDCs
(n = 21 EDCs, 154 HHs)



5.3.2.3 Non Wood Forest Products

The position of NWFP consumption in sampled EDCs before and after the IEDP is given below in Table 5.4. It is revealed that there is significant reduction in the level of NWFP collection in PTR. The collection of *Vayana* Bark, Dammer, White Pepper, Cardamom and Turmeric has totally stopped in the sample EDCs. The households revealed total stoppage of hunting. Fish had been one of the major consumption particularly by Tribals. It is revealed that even fish consumption has come down to less than half during this period. The pressure of reed collection has also reduced remarkably. Looking at the number of households involved in NWFP collection it is seen that reduction is as high as 60% (Wilcoxon Signed Ranks test, $Z = -3.42$, $df = 20$, $p < 0.01$).

Table 5.4 Yearly consumption of NWFPs before and after the program

(n = 21 EDCs, 154 HHs)

Name of NWFP	Unit	Before			After		
		No. of HHs	No. of person engaged	Quantity Collected per year	No. of HHs	No. of person engaged	Quantity Collected per year
Cane	Bundle	4	4	246	2	2	100
Reeds	Bundle	17	26	3272	9	15	328
Reeds leaf	Bundle	8	8	233	1	1	20
Bamboo	Bundle	1	1	60	1	1	2
Thatching grass	Bundle	12	31	304	3	6	90
Vayana bark	Kg.	8	8	9400			
Pepper	Kg.	1	1	90			
Cardamom	Kg.	4	4	620			
Ponnamppoo	Kg.	6	6	625			
Turmeric	Kg.	1	1	200			
Kodampuli	Kg.	7	7	330	1	1	10
Dammer	Kg.	2	2	50			
Honey	Kg.	9	9	249	1	1	5
Fishing	Kg.	11	11	4652	10	10	2246
Hunting	Kg.	2	2	480			
Sand	Load	3	3	467	1	1	20
Total		96	124		29	38	

As compared to the years before the formation of EDCs, there was a significant difference in fuel wood extraction (Paired T-tests, $t = 3.37$, $df = 20$, $p < 0.01$), fodder collection ($t = 3.09$, $df = 20$, $p < 0.01$), and household income ($t = -2.87$, $df = 20$, $p < 0.01$). Similar statistical significance was observed in the number of people engaged in NTFP collection (Wilcoxon Signed Ranks test, $Z = -3.42$, $df = 20$, $p < 0.01$).

5.3.3 PA-People interaction

Assessment of households and executive committees of sample EDCs revealed significant changes with respect to park people conflicts i.e. PA protection and human-wildlife conflict as given below.

5.3.3.1 PA protection

Due to continuous involvement of the local communities, the protection of the park has improved. The households were involved in different activities of protection. This included fire protection, providing information of illegal activities, patrolling with or without staff and clean plastic drives of the tourism and pilgrimage zone. Overall participation of the households was high in fire protection, clean plastic and patrolling. However, their contribution for information giving remained low (Figure 5.10).

Among the different categories, Neighborhood EDCs had lower participation in patrolling and information giving while Professional Group-pilgrimage EDCs did not contribute for these activities at all. On the other hand, involvement of Professional Group-ecotourism and User Group EDCs was high in patrolling of the areas and information giving. Interestingly, the User Group EDCs, which are solely represented by women, had highest contribution in patrolling but they were not seen in fire protection activities. It appears that the contribution to different protection activities was related to their stake in the forest area. For instance the Professional Group – tourism EDCs were more likely to respond to

fire as this would have direct correlation with the tourism activities. Similarly the maximum participation of User Group EDCs in patrolling could possibly be explained by their interest for resources which they had to protect from others. Also, since they were benefiting from the department investments, their non action in patrolling would attract negative response from the department.

In addition the ecotourism programs of PTR had provided significant support for protection in terms of the man hours in patrolling while undertaking tourism and other visits to the forests (Table 5.5).

Table 5.5: Contribution of ecotourism programs for protection of PTR

Programs	Additional Patrolling (Man hours)		
	Guest	Guides	Staff
Tiger Trail	9960	22200	4440
Bamboo Rafting	22563	12645	2529
Jungle Patrol	7557	1662	831
Border Hiking	7965	5544	1386
Nature Walk	7746	1014	0
Jungle Inn	636	636	0
Total	56427	43701	9186

In terms of illegal activities in the forest, majority of the respondents (c 85%) reported significant reduction in fire, ganja cultivation, poaching and illicit felling after the implementation of IEDP (Table 5.6). This seems to be correlating with the offence records of the department for the last 10 years (Figure 5.11).

Figure 5.10: Level of involvement of sampled EDCs in protection activities
(n = 21 EDCs, 154 HHs)

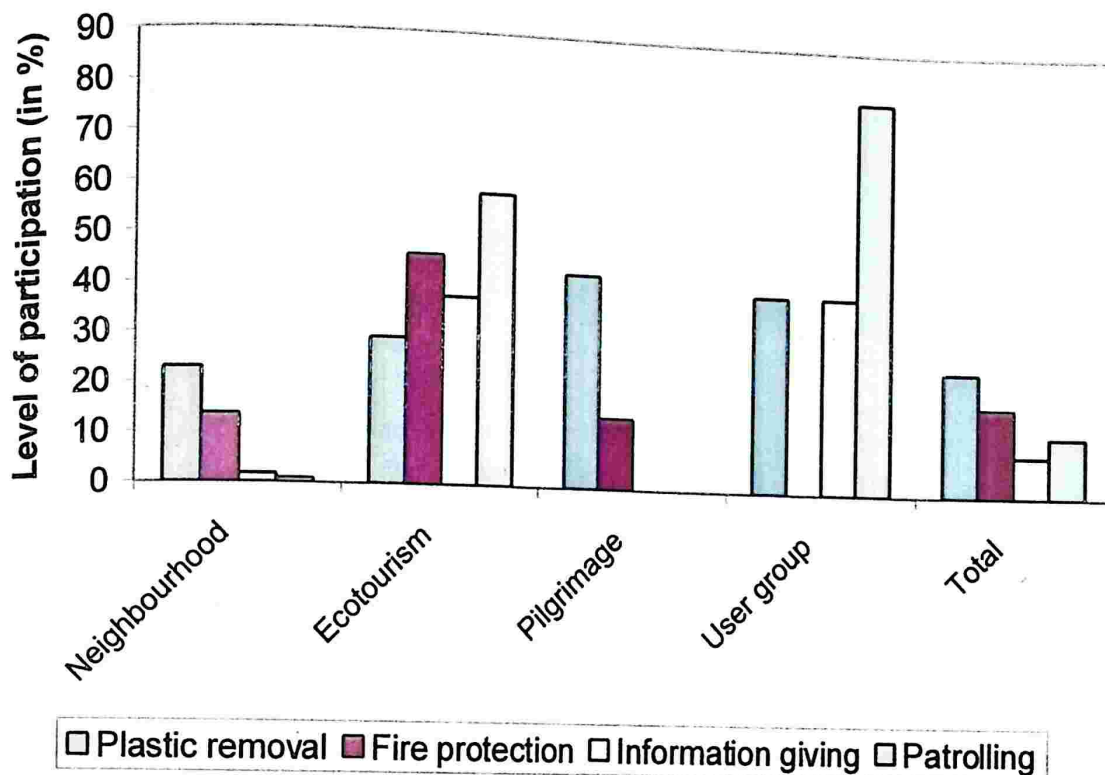


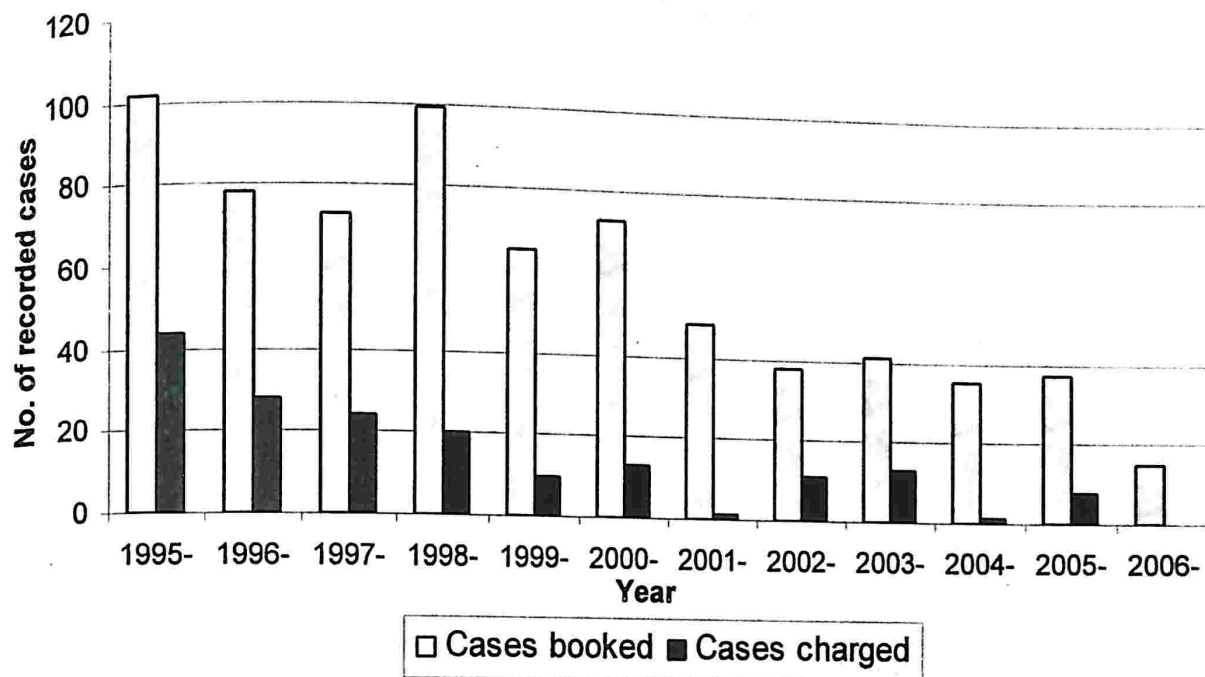
Table 5.6: Responses of HHs regarding protection problems of PTR

(n = 21 EDCs, 154 HHs)

Name of the EDC	Total	Fire				Ganja cultivation				Poaching				Illicit felling			
		Reduced	No change	Increased	Don't know	Reduced	No change	Increased	Don't know	Reduced	No change	Increased	Don't know	Reduced	No change	Increased	Don't know
Neighborhood EDCs	118	102	9	7	0	104	0	0	14	112	1	0	5	111	3	0	4
Professional group Eco-tourism EDCs	24	21	2	0	1	15	0	0	9	20	0	0	4	18	2	0	4
Professional group Pilgrim EDCs	7	7	0	0	0	7	0	0	0	7	0	0	0	7	0	0	0
User group EDCs	5	5	0	0	0	3	0	0	2	5	0	0	0	5	0	0	0
Total	154	135	11	7	1	129	0	0	25	144	1	0	9	141	5	0	8

Comparing the responses of the households with the official records of PTR there seems to be lot of similarity. Over the years, the offence level has come down both with respect to wildlife and general forests offences.

Figure 5.11: Status of offence in PTR between 1995 and 2006



Source: PTR Annual Progress Reports

There has been lot of contribution of some of the EDCs in detection of offences and apprehending the offenders. As per the records of *Ex-Vayana* EDC, they assisted in detection of 40 cases between 1998 and 2001 (Table 5.7).

Table 5.7: Detection of cases by *Ex-Vayana* Bark collector EDC between 1998 and 2001*

Year	Number of cases	Number of persons arrested
1998	18	21
1999	7	5
2000	9	14
2001	6	7
Total	40	47

Source: Records of *Ex-Vayana* EDC

* Data available only up to 2001

5.3.3.2 Wildlife attack and crop damage

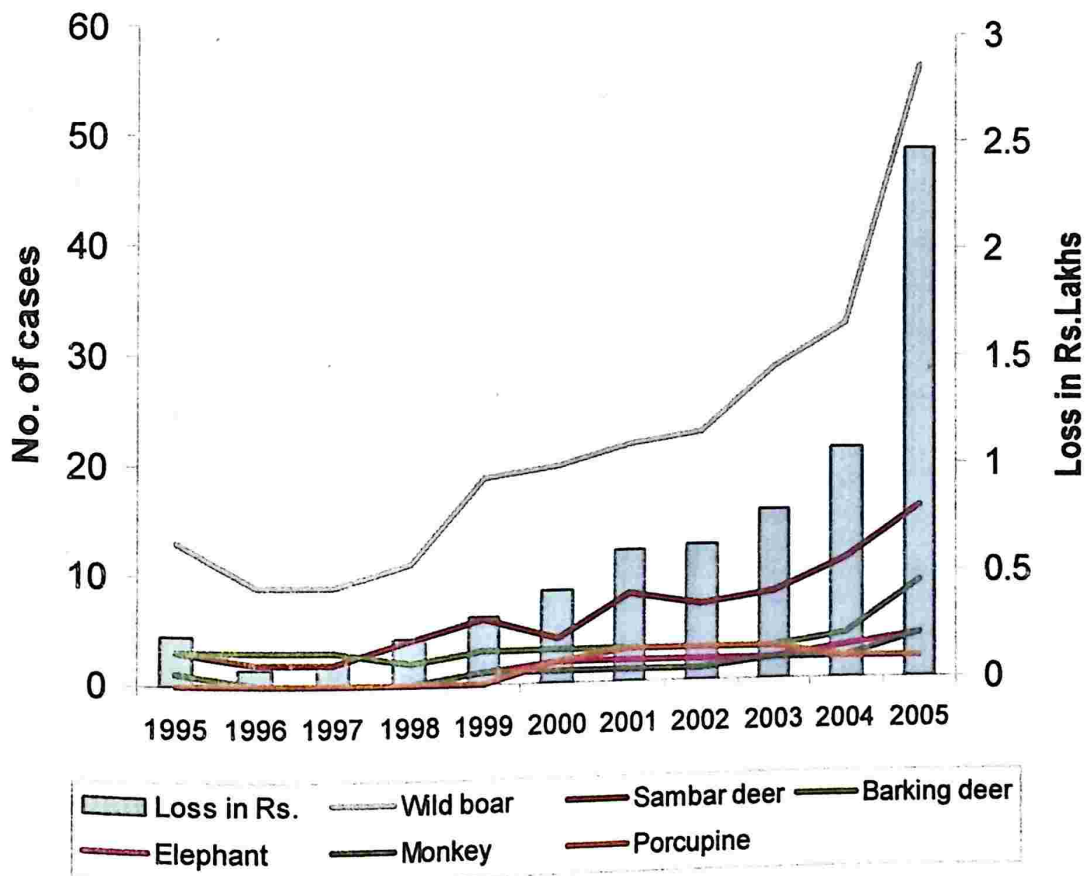
Though PTR did not experience serious wildlife conflict issues in the past, the situation appears to be changing rapidly in the recent years, particularly with respect to crop

damage. The household data reveals that there were only three cases of cattle lifting by tiger and a single case of human injury by wild boar in 2000 and 2003 respectively.

As reported by the sampled households, there had been marked increase in the number of crop damage cases and related financial losses since 1995 (Figure 5.12). Wild pig had all along caused more damage, which increased exponentially in the recent years. Among the other species, sambar and barking deer were also involved in substantial number of crop damage cases. Though the loss was relatively less before 2000 and the sharp increase in crop damage by wild pig seems to have inflicted heavy financial loss over the years (Figure 5.12).

Figure 5.12: Year-wise crop damage in PTR

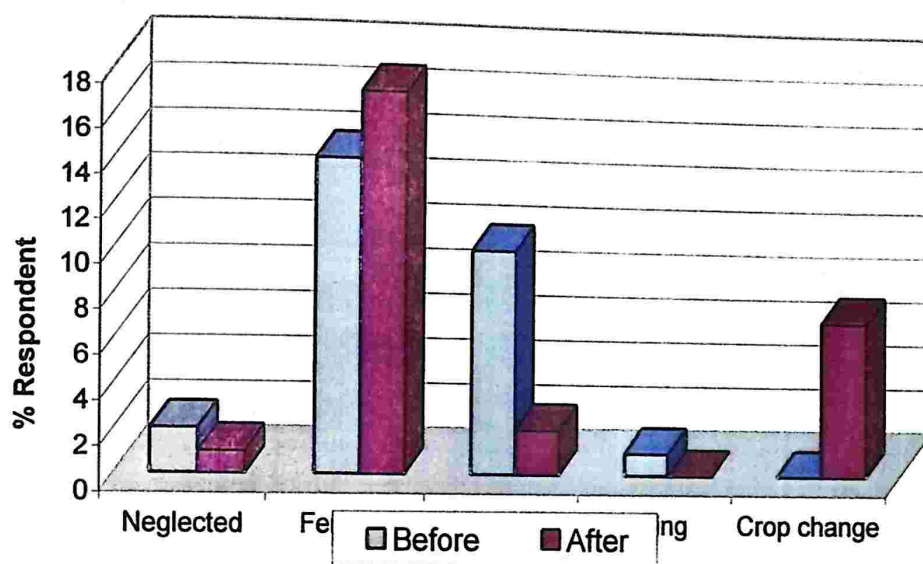
(n = 21 EDCs, 154 HHs)



The communities responded to the crop damage by various ways within their capacities. This included use of fences, crackers, killing of animals and change in the crop patterns. They also neglected crop raiding if it was not substantial. The response pattern seems to have changed over the years. Previously communities guarded their crops by their

proactive and physical presence, which is reflected in the large number of people using crackers and counter killing (Figure 5.13). However, now they have resorted to more fences and change of crop patterns.

Figure 5.13: Change in mitigation strategies adopted by sampled EDCs
(n = 21 EDCs, 154 HHs)



5.3.4. Attitudinal changes

Traditionally participation was not the mandate of PA management. Therefore, there were no baselines available for attitudes of staff and the local communities. The attempt of the assessment was to understand the existing attitudes of these two main stakeholders after the implementation of IEDP. The results of attitude survey are discussed below.

5.3.4.1 Attitude survey of staff

Assessment for the staff attitude was carried out to understand different parameters of PTR conservation and the impacts of IEDP. The results of the study revealed that in general, there was high level of recognition about the overall impact of the program, improved protection of PTR and better trust between staff and communities all across different categories of staff (Table 5.8). It is also revealed that the program started as a top driven

initiative in the beginning but gradually the involvement of frontline staff has improved during the process of implementation. Even though the frontline staff was cautious to adapt the new approach of management, they have high level of acceptance with respect the impact of the program on protection. Assessment also reveals that media has comparatively high level of involvement in IEDP as compare to other stakeholders i.e. panchayat, political leaders and NGOs.

Table 5.8: Attitude survey of staff of PTR

(n=73)

Components of VEDP	Categories of Staff					Overall
	P & D Officers	C & S Officers	Executive Officers	Frontline Staff	Support Staff	
Understanding	3.0	2.4	2.2	1.4	1.9	2.2
Participation	2.1	2.5	2.1	0.8	1.2	1.7
Overall impact	3.0	2.8	2.7	2.2	2.3	2.6
Wildlife Protection	3.0	2.8	2.8	2.4	2.6	2.7
Employment generation	2.4	2.4	2.6	1.8	2.4	2.3
Mutual interaction of staffs	2.6	2.4	1.7	1.5	2.1	2.1
Attitude of staff to communities	2.4	2.8	2.3	1.9	1.9	2.3
Attitude of communities to staff	2.8	2.6	2.4	2.1	2.5	2.5
Involvement of other stakeholders	2.2	1.3	1.5	1.2	1.1	1.5
<i>Panchayath</i>	2.2	1.4	1.6	1.2	1.1	1.5
<i>Political Leaders</i>	2.2	1.2	1.2	1.1	0.9	1.3
<i>NGO</i>	2.2	0.8	1.4	1.4	1.4	1.3
<i>Media</i>	2.2	1.6	1.7	1.2	1.1	1.6

5.3.4.2 Attitude survey of communities

In general, all the EDCs have high level of acceptance about the impact of IEDP except KFDC, Kochupamba, which remained low in its understanding, participation as well as ownership of the program (Table 5.9). Most of the EDCs have given low scoring with respect to the understanding of the program. In general, the Professional Group and User Group EDCs demonstrated higher level of positive attitudes towards IEDP initiatives.

Table 5.9: Attitude survey of communities

(n = 21 EDCs, 154 HHs)

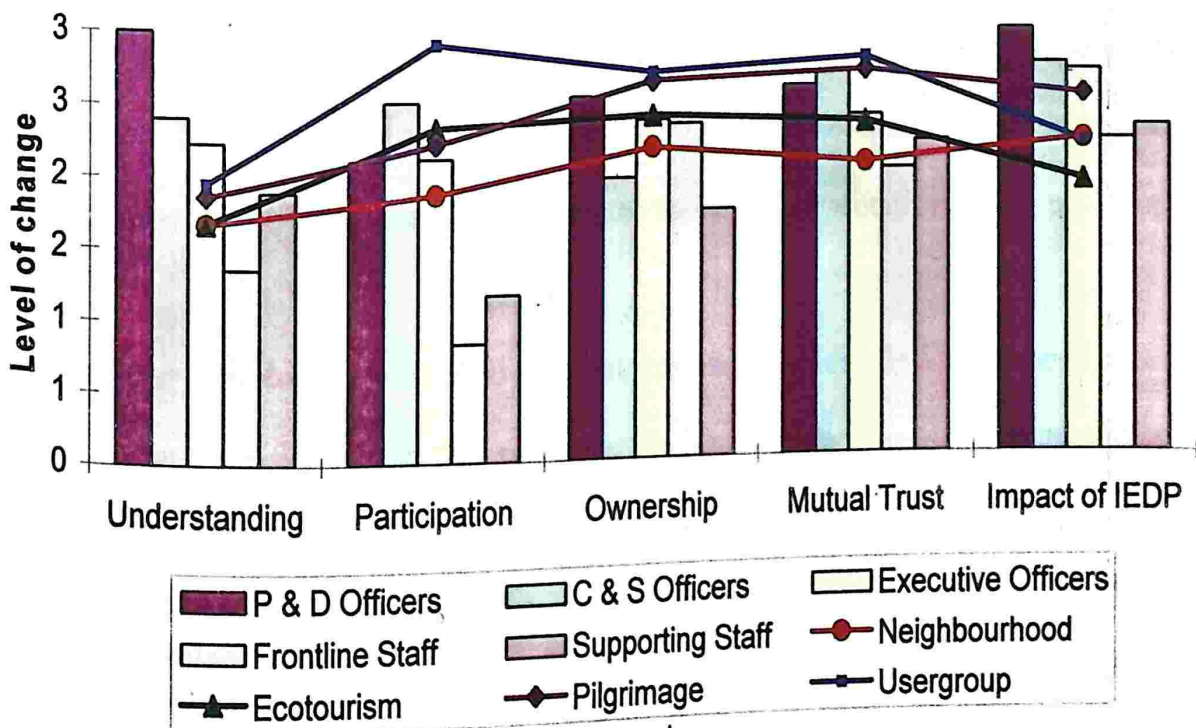
Name/type of EDC	Under standing	Participation	Ownership	Relation between staff and communities	Impact of IEDP
NEIGHBOURHOOD					
Anakkallu	1.88	1.33	2.33	1.83	2.25
Attathodu 1	1.89	1.57	2.29	2.29	2.27
Ceylon Pon Nagar	1.75	2.08	2.33	1.50	2.02
Chottupara	1.08	1.22	2.00	1.44	2.31
Gandhi Nagar	1.70	2.00	1.80	2.20	1.78
Kuttikayam	1.61	2.29	2.14	2.43	2.07
Kuzhimavu 1	2.40	2.70	2.70	2.70	2.53
Mannakudi 1	0.64	1.43	1.29	2.29	2.16
Mattupetty 2	1.53	1.69	2.06	1.88	2.45
Mookampetty 2	2.04	1.79	1.93	2.43	2.39
Moozhikal	2.19	2.44	2.33	2.33	2.55
Paliyakudi	1.23	2.25	2.20	2.10	1.85
Sathram Colony	1.68	1.55	2.40	2.30	2.38
Springvalley	1.53	1.63	2.44	1.50	2.39
Vallakkadavu 2	1.83	2.00	2.44	1.67	1.94
total	1.67	1.86	2.18	2.06	2.22
PROFESSIONAL GROUP – ECOTOURISM					
Ex-Vayana Bark collectors	1.69	3.00	2.88	3.00	2.09
KFDC-Kochupamba	0.78	0.28	1.83	1.67	1.31
PETS Thekkady	1.89	3.00	2.14	2.71	2.29
Tribal Trackers	2.31	3.00	2.75	2.00	2.03
total	1.67	2.32	2.40	2.35	1.93
PROFESSIONAL GROUP – PILGRIMAGE					
SAPP Valiyanavattam	1.86	2.21	2.64	2.71	2.54
total	1.86	2.21	2.64	2.71	2.54
USER GROUP					
Kollampattada vanitha	1.95	2.90	2.70	2.80	2.20
Total	1.95	2.90	2.70	2.80	2.20
Grand Total	1.79	2.32	2.48	2.48	2.22

The attitudes of both the staff and the community showed significantly positive change towards the program and overall conservation of the area. Specifically there was perceptible improvement in ownership, mutual trust and impact of IEDP. The senior level staff and User Group EDC responded high in all the parameters throughout the program (Figure 5.14). Among the staff, though there was variation with respect to understanding and participation, there was high ownership, mutual trust and expressed positive impact of

the program cutting across various hierarchal levels of staff. Among the EDCs, User Group faired better in all the parameters while the Neighbourhood responded relatively low. However, the User Group EDC (with all women members) appeared to be proactive in terms of participation, ownership and mutual trust, their relative performance on the understanding of the issues and expressed view on impact were below expected line. On the contrary, the Neighbourhood EDCs seemed to show a cautious approach of participation and mutual trust, but their relative appreciation was high on the ownership and impact of the program. Professional group ecotourism EDCs had the lowest understanding of the program and appreciation of the impact. Interestingly, Professional group pilgrimage EDCs expressed the highest impact of the program, perhaps as a response to tangible benefits, which also reflected in the ownership and mutual trust. However, their participation and understanding were relatively very low (Figure 5.14).

Figure 5.14: Change in attitudes of staff and communities

(n = 21 EDCs, 154 HHs)



5.3.5 Institutions and their strength

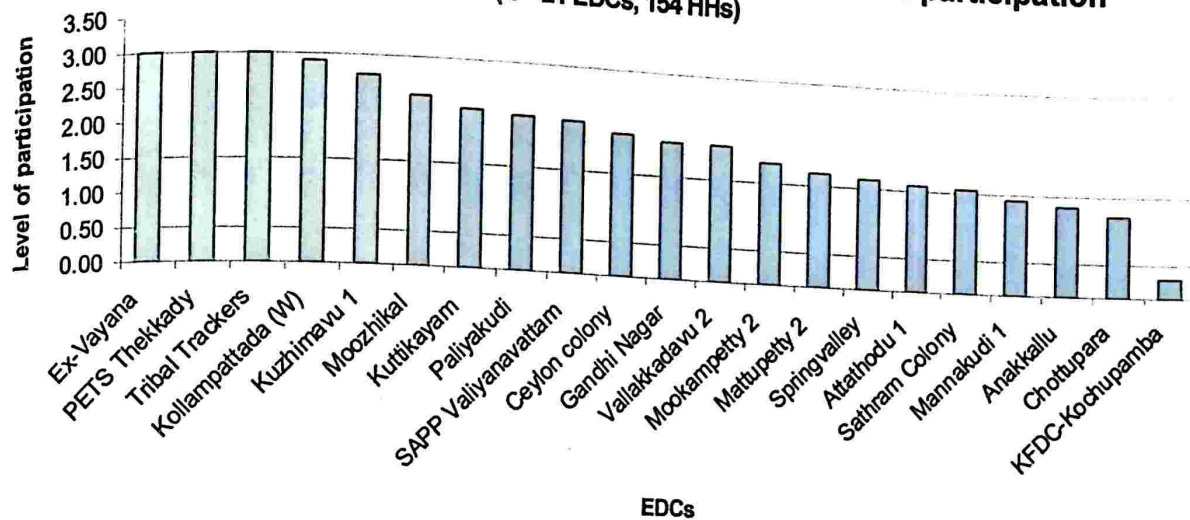
The success of ecodevelopment program largely depends upon the strength of institutions. The most important of these are village level institutions i.e. EDCs. If these EDCs have to be viable in the long term, the issues related to social structure, economic condition and the level of capacities need to be understood and acted appropriately. The following specific details present these factors based on empirical data from the representative households.

5.3.5.1 Community representation and participation

The Government Order issued for the implementation of the program mandated the membership of two adult members (male and female) from each household, aiming at unbiased representation of membership. All the households in a village have to be part of the EDC. The GO also prescribed the inclusion of all women headed households. As stated earlier, the executive committee has adequate representation of Schedule Castes and Scheduled Tribes members, ensuring adequate decision making opportunities to less advantaged section of the society. Further, it was the requirement to have at least three women members in the executive committee. These instructions ensured that the institutions functioned without prejudice, benefiting all sections of the society equitable manner. The data from the field substantiates that these expectations were put in practice.

From the household data, the level of participation was identified and scored as 1 for low, 2 for medium and 3 for high. For example, the households who only attended meetings or training programs were given lower score of 1. The households who took part in developmental activities alone were given a score of 2. The maximum score of 3 was given to the households who actively participated in the conservation and protection activities of the PTR. From these, a consolidated score (i.e. average) were arrived at for each EDC. The EDCs were ranked on the basis of the average score for level of participation (Figure 5.15).

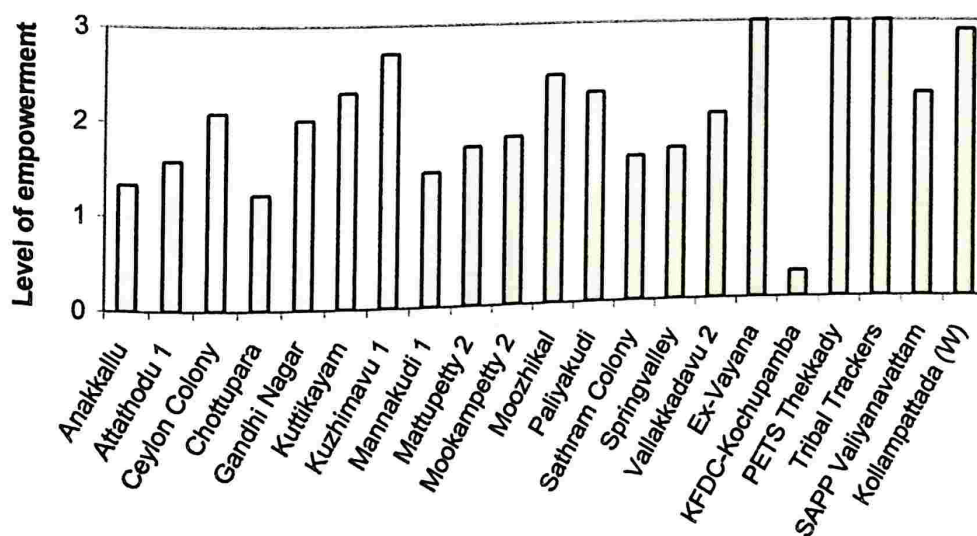
Figure 5.15: Ranking of EDCs in terms of their level of participation
(n = 21 EDCs, 154 HHs)



5.3.5.2 Empowerment of women and marginal groups

Women empowerment has been one of the major successes of the program, with major impetus from SHGs. Many of the EDCs had women SHGs, but their contribution to overall strength of the EDC was highly variable. While arriving at the level women empowerment in an EDC, the factors like the presence/absence of SHGs, their level of functioning (whether or not active), total financial capital and its circulation were considered. These factors contributed to scoring of each EDCs in term of women contribution to its overall strength. Figure 5.16 presents the varying level of women empowerment with respect to the strength of the sampled EDCs.

Figure 5.16: Level of women empowerment in the sampled EDCs
(n = 21 EDCs, 154 HHs)



5.3.5.3 Decision making and conflict resolution

The decision making and conflict resolution mechanisms are the most important components of the strengths of the EDCs. The household data provided an in-depth understanding about the different types of conflicts being faced by the EDCs and the way the issues were addressed. The major conflicts were related to loan and selection of beneficiaries (Table 5.10). The conflicts were resolved within community by various strategies such as mutual dialogue, mediation by Secretary/Chairman of the EDC, and a decision in executive committee or general body. There were relatively few situations where the EDCs could not resolve the conflicts. Depending upon these strategies, the EDCs were scored for the strength of their conflict resolution mechanisms on a scale of 1 to 3 (Figure 5.17).

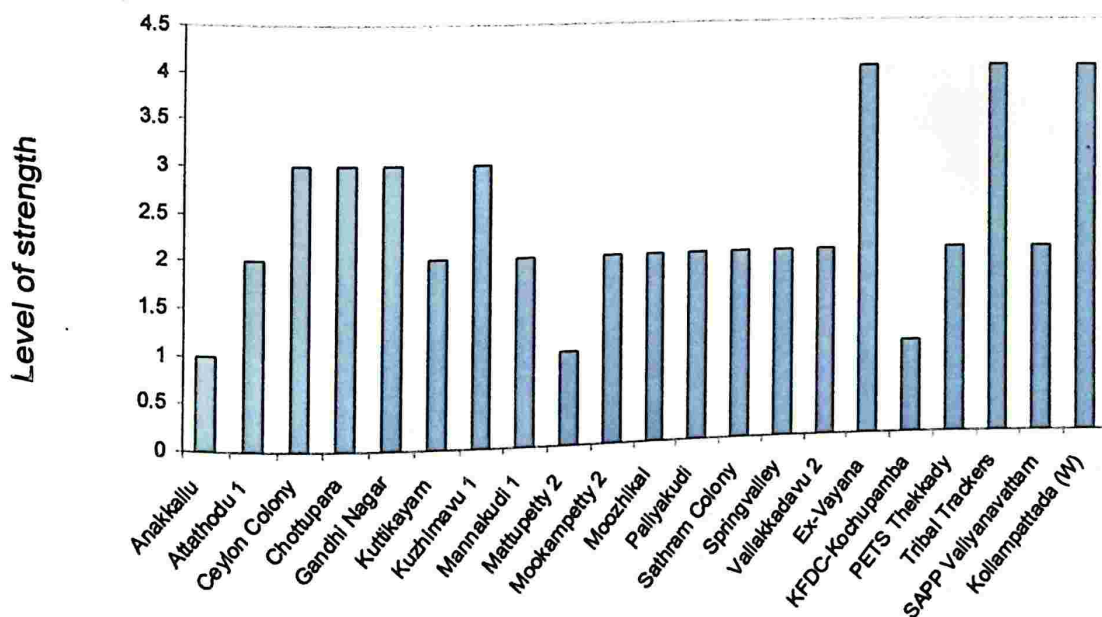
Table 5.10: Conflicts and resolution mechanisms within sampled EDCs

(n = 21 EDCs, 154 HHs)

Name of EDC	Type of Conflicts							Conflict resolution methods			
	Nil	Loan	Beneficiary	Election	Transparency	Protection	Internal conflicts	Mutual dialogue	Secretary/Chairman	EC / GB	Still not resolved
Neighborhood	26	58	17	1	3	1	20	56	37	6	14
Ecotourism	4	12	1	6	0	1	3	12	1	2	1
Pilgrimage	2	4	1	0	0	0	0	1	3	0	1
User group	4	0	0	0	0	0	2	5	0	0	0
Total	36	74	19	7	3	2	25	74	41	8	16

Figure 5.17: Strength of conflict resolution mechanisms

(n = 21 EDCs, 154 HHs)



EDCs

5.3.5.4 Economic status

The economic status of different EDCs was arrived at based on (a) the financial investment on village ecodevelopment, (b) the level of CDF generated within the EDC, and (c) CDF management. The EDCs were ranked on the basis of above parameters on a scale of 1 to 3. The score for financial investment was determined by the total average investment across the EDCs, in that if the EDC had received the funds within the average limit, it was given a score of 2, while the ones receiving above average and below average limits were given a score of 3 and 1 respectively.

Similarly for the CDF, the EDCs were given the score of 1 for below one lakhs, 2 for between one and two lakhs, and 3 for more than two lakhs. The CDF management was scored based on loan recovery statistics, and the EDCs were assigned a score of 3 for recovery above 70%, 2 for between 50 and 70%, and 1 for below 50%. Additions of all these scores from the three parameters were converted into percentage to reflect the relative economic status of the EDCs (Figure 5.18), and status of individual EDCs from different categories is presented in Table 5.11.

Figure 5.18: Overall economic status of sampled EDCs

(n = 21 EDCs, 154 HHs)

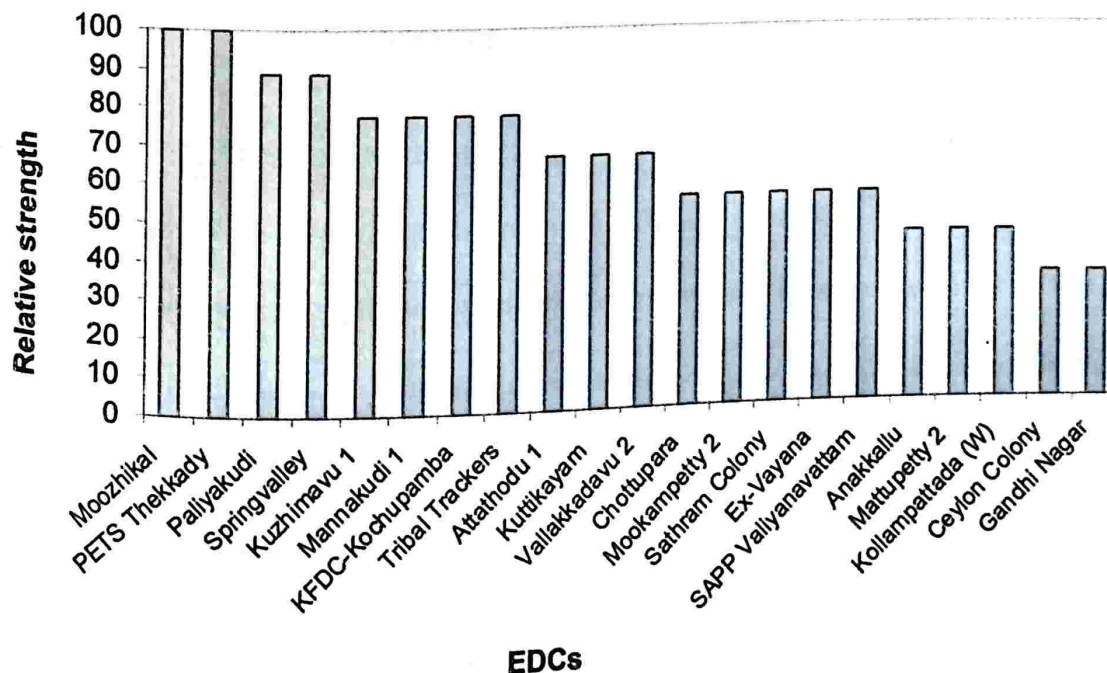


Table 5.11: Details of investment, CDF and its management by EDCs
(n = 21 EDCs, 154 HHs)

Name of EDC	Investment	CDF	CDF Management	Total	Total in %
Anakkallu	1.0	2.0			
Attathodu 1	3.0	2.0	1.0	4.0	44.4
Ceylon Colony	1.0	1.0	1.0	6.0	66.7
Chottupara	3.0	1.0	1.0	3.0	33.3
Gandhi Nagar	1.0	1.0	1.0	5.0	55.6
Kuttikayam	2.0	3.0	1.0	3.0	33.3
Kuzhimavu 1	3.0	1.0	3.0	7.0	77.8
Mannakudi 1	2.0	3.0	2.0	7.0	77.8
Mattupetty 2	2.0	1.0	1.0	4.0	44.4
Mookampetty 2	2.0	1.0	2.0	5.0	55.6
Moozhikal	3.0	3.0	3.0	9.0	100.0
Paliyakudi	3.0	3.0	2.0	8.0	88.9
Sathram Colony	3.0	1.0	1.0	5.0	55.6
Springvalley	3.0	3.0	2.0	8.0	88.9
Vallakkadavu 2	2.0	3.0	1.0	6.0	66.7
Neighbourhood total	2.3	1.9	1.5	5.7	63.7
Ex-Vayana	1.0	2.0	2.0	5.0	55.6
KFDC-Kochupamba	2.0	3.0	2.0	7.0	77.8
PETS.Thekkady	3.0	3.0	3.0	9.0	100.0
Tribal Trackers	1.0	3.0	3.0	7.0	77.8
Ecotourism total	1.8	2.8	2.5	7.0	77.8
SAPP Valiyanavattam	3.0	1.0	1.0	5.0	55.6
Pilgrimage total	3.0	1.0	1.0	5.0	55.6
Kollampattada (W)	1.0	1.0	2.0	4.0	44.4
User group total	1.0	1.0	2.0	4.0	44.4

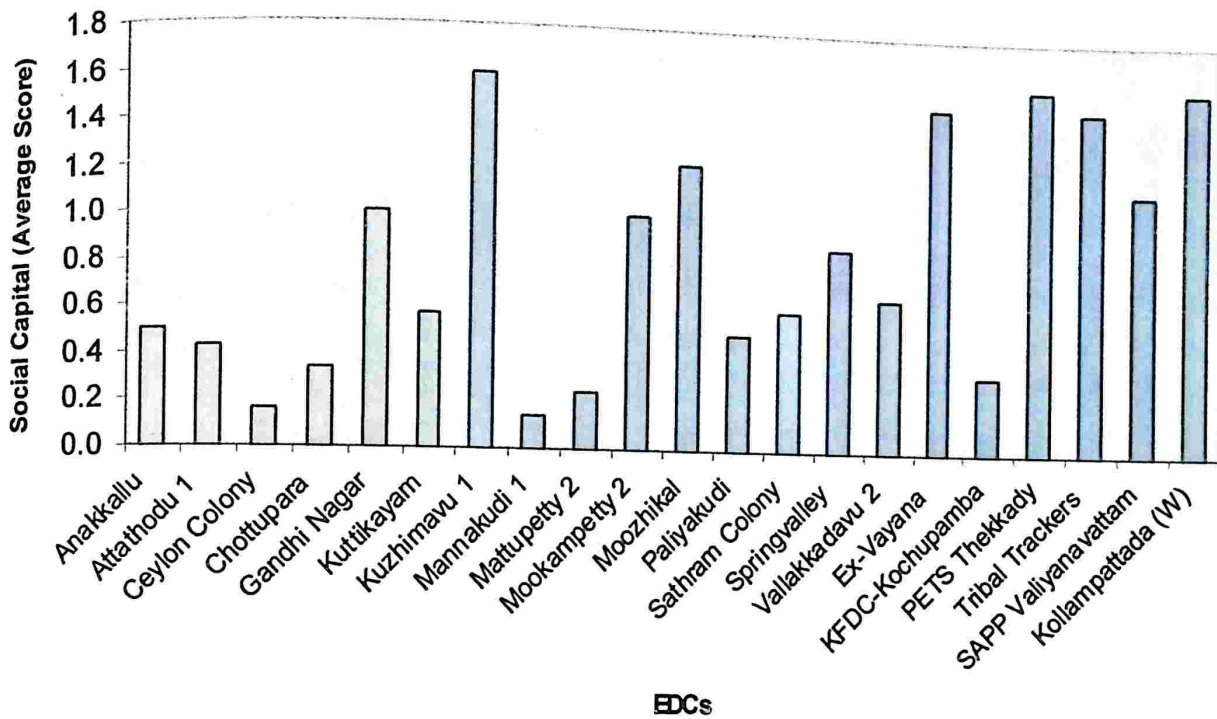
5.3.5.5 Social capital

Importance of social capital for sustainable development is recognized by the anthropologists and sociologists. It has an important role in building of institutions, networks and their supporting norms and values for success of ICDPs. The social capital in the current assessment was seen at the individual level as well as at the level of the EDCs. The interviews conducted at the households levels targeted the parameters such as the willingness for working as a group, level of their satisfaction in community initiatives, and their ability to network. These were scored which ranged from 'no social capital' (0) to 'high social capital' (3), and an average score for EDC was calculated from the household data. There appeared to be high variation in the social capital among the EDCs

(Figure 5.19), and strikingly, Ceylon Colony, Mannakudi, Mattupetty and KFDC Kuchupamba had very poor social capital.

Figure 5.19: Overall social capital of sampled EDCs

(n = 21 EDCs, 154 HHs)



The scores from above parameters were combined to estimate the overall strength (Figure 5.20; Annexure VII), and performance of the EDCs (Figure 5.21).

Figure 5.20: Overall institutional strength of sampled EDCs

(n = 21 EDCs, 154 HHs)

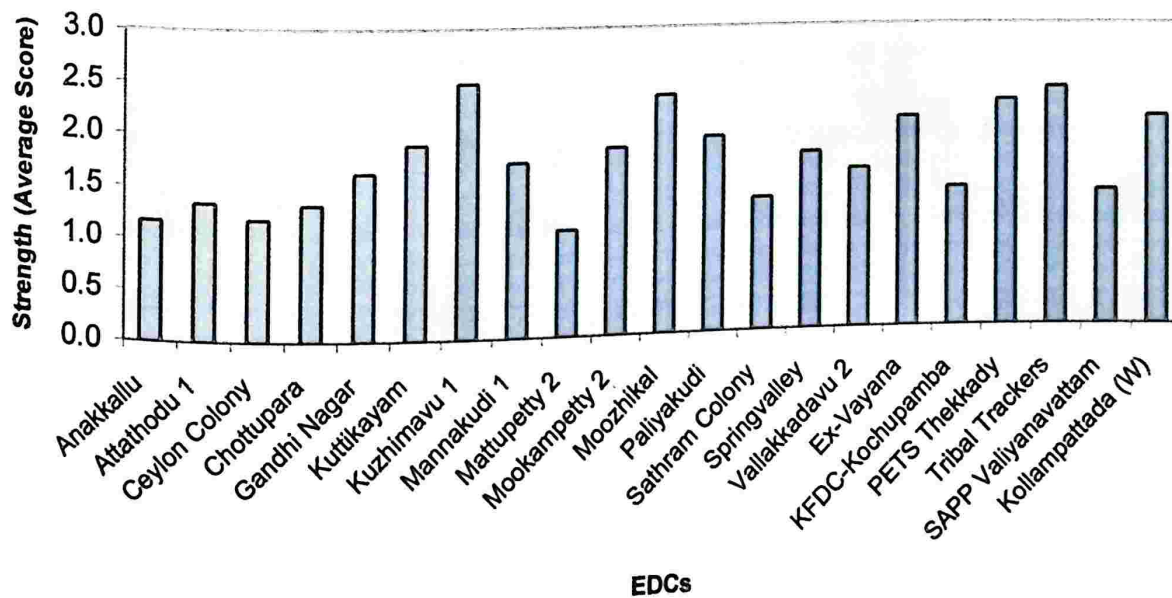
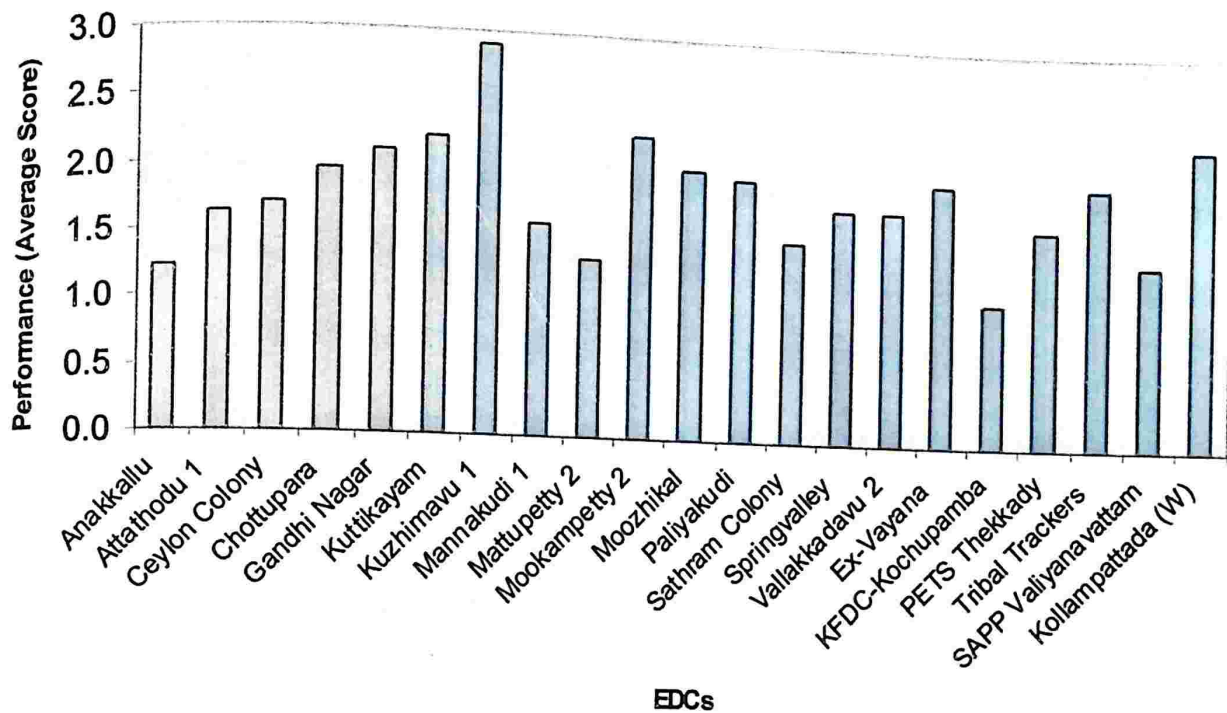


Figure 5.21: Overall performance status of sampled EDCs
(n = 21 EDCs, 154 HHs)



5.3.6 Habitat status in the impact zone

The period for which ecodevelopment initiatives were implemented in PTR is quite short and it may take some time to see the impact of this in terms of habitat improvement. The only preliminary information about damages to the vegetation and some broad composition is in the form of information generated through technical staff of Periyar Foundation (Balasubramanian 1999 a and b). Since there was no scientific baseline generated for different representative sites of impact zone, it was not possible to make any comparative assessment of the status of habitat conditions now and prior to IEDP. However the efforts to obtain vegetation data in this study purely served to describe the current status of the vegetation structure and composition, and also to establish a baseline that may be useful for future studies.

5.3.6.1 Vegetation structure and composition

There was variation with respect to the types of impacts in different parts of the impact zone. Therefore, six representative sites were picked up from different parts of impact zone with different types of impacts. While site at Kokra represented an area where both fuelwood collection and grazing were prevalent, Anjuruli site had only the pressure of firewood collection. In both these areas the pressure of firewood collection was huge due to its sale in the market. In Vanchivayal the pressures of fuelwood and grazing were mostly for self use and there was limited element of sale. Kokara, Anjuruli and Vanchivayal represented the middle altitude moist deciduous forests of Thekkady,

In Koruthodu and Pamba Valley there were pressures of tree cutting (for firewood and timber) as well as grazing. However the sale of fuelwood was limited. The general vegetation of these sites was low altitude moist deciduous forests. The site at Sabarimala traditional path represented an area with huge seasonal pressures of pilgrimage. In this area there was the impact of fuelwood and pole collection as well as solid waste and plastic pollution due to large influx of pilgrims. Sabarimala had largely low altitude moist deciduous forests with small patches of semi evergreen vegetation. Comparative picture of the status and composition of vegetation in these different sites is given as follows:

The total density of trees in Kokkara site was 1050 trees ha⁻¹, of which the maximum proportion was accounted by *Actinodaphne malabarica* (21%), *Vitex altissima* (28%) and *Tabernaemontana heyneana* (20%). The total basal area of the site was 39.8m² ha⁻¹, of which *Actinodaphne malabarica* had the maximum of 39%. The IVI value was highest for *Actinodaphne malabarica* (78.7) followed by *Vitex altissima* and (40.0) and *Tabernaemontana heyneana* (31.2).

The total density of trees in Anjuruli site was 990 trees ha⁻¹, of which the maximum proportion was accounted by *Cinnamomum malabatum* (19%) followed by *Tabernaemontana heyneana* (10%). The total basal area of the site was 69.9 m² ha⁻¹, of which *Lagerstroemia microcarpa* accounted maximum (14%) followed by *Artocarpus hirsutus* (10%) and 7% each by *Dalbergia latifolia* and *Anogeisus latifolia*. The IVI value was highest for *Cinnamomum malabatum* (33.1) followed by *Terminalia paniculata* (29.0), *Tabernaemontana heyneana* (21.8) and *Lagerstroemia microcarpa* (21.3).

The total density of trees in Koruthodu site was 960 trees ha⁻¹, of which the maximum proportion was accounted by *Actinodaphne malabarica* (15%) followed by *Terminalia paniculata* (13%) and *Artocarpus hirsutus* (8%). The total basal area of the site was 101.5 m² ha⁻¹, of which *Terminalia paniculata* accounted maximum (23%) followed by *Artocarpus hirsutus* (15%). The IVI value was highest for *Cinnamomum malabatum* (33.1) followed by *Terminalia paniculata* (43.7), *Artocarpus hirsutus* (32.1) and *Actinodaphne malabarica* (30.8).

The total density of trees in Pampa valley site was 950 trees ha⁻¹, of which the maximum proportion was accounted by *Actinodaphne malabarica* (13%) followed by *Terminalia paniculata* (11%). The total basal area of the site was 98.9 m² ha⁻¹, of which *Terminalia paniculata* accounted maximum (19%) followed by *Dalbergia latifolia* (12%) and *Artocarpus hirsutus* (11%). The IVI value was highest for *Terminalia paniculata* (39.6) followed by *Actinodaphne malabarica* (27.2).

The total density of trees in Sabrimala site was 579 trees ha⁻¹, of which the maximum proportion was accounted by *Myristica malabarica* (13%) followed by *Terminalia paniculata* (9%). The total basal area of the site was 20.6 m² ha⁻¹, of which *Ficus* sp. accounted maximum (20%) followed by *Kingiodendron pinnatum* (11%) and *Bombex*

ceiba (10%). The IVI value was highest for *Myristica malabarica* (33.3) followed by *Ficus* sp. (25.7), *Dysoxylum beddomei* (20.4) and *Kingiodendron pinnatum* (18.8).

The total density of trees in Vanchivayal site was 570 trees ha⁻¹, of which the maximum proportion was shared by *Terminalia paniculata* and *Actinodaphne malabarica* (25% each) and followed *Cinnamomum* sp and *Grewia tilifolia* (18% each). The total basal area of the site was 52.0 m² ha⁻¹, of which *Terminalia paniculata* contributed the most (32%). The IVI value was highest for *Terminalia paniculata* (107.6) and followed by *Actinodaphne malabarica* (55.8) and *Cinnamomum* sp. (46.6).

5.3.6.2 Diversity patterns

The highest species richness was in Anjuruli and lowest in Vanchivayal, maximum diversity was in Anjuruli (3.044) and minimum in Vanchivayal (1.692) and maximum evenness was in Pampa valley (0.9554) and minimum in Kokkara (0.770). In most of the sites the evenness values show that the species were evenly distributed.

Table 5.12 Species richness, diversity and evenness in different sites in the study area

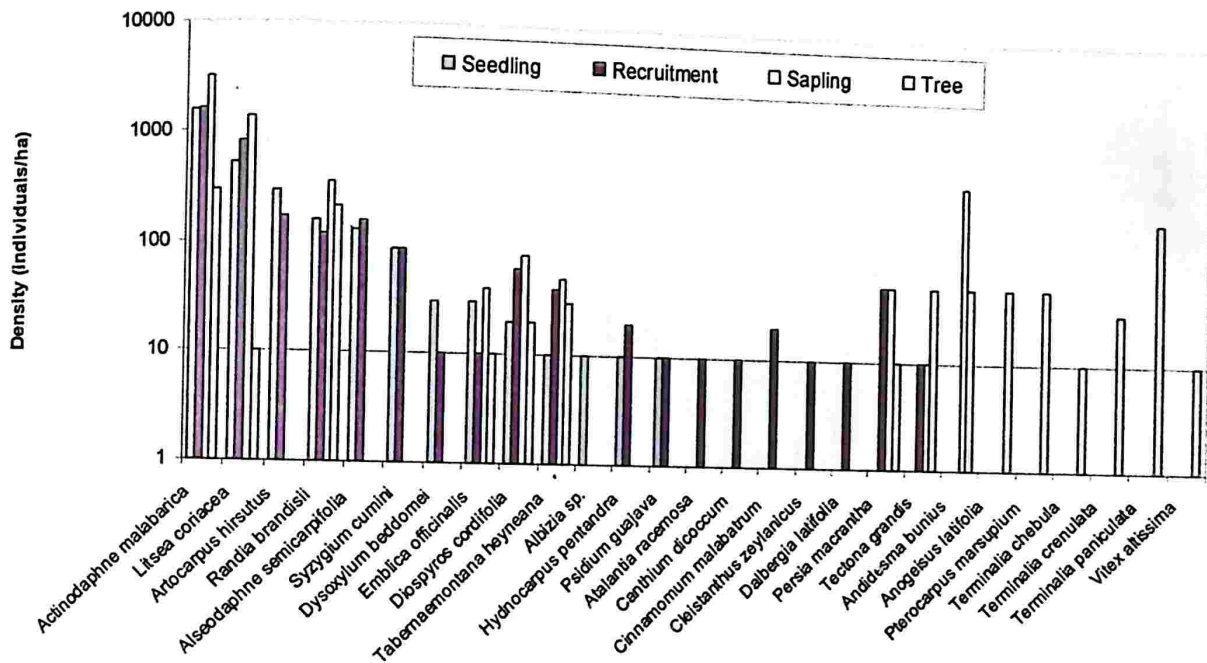
Sites	Species richness	Diversity (Shannon & Weiner, H')	Evenness
Kokkara (n = 10)	15	2.085	0.770
Anjuruli (n = 10)	32	3.044	0.878
Koruthodu (n = 10)	22	2.868	0.928
Pampa Valley (n = 10)	18	2.810	0.954
Shabrimala (n = 10)	32	3.198	0.923
Vanchivayal (n = 10)	9	1.692	0.945

5.3.6.3 Population structure

In general, the population trend of various tree species in Kokkara site is given in Figure 5.22. The species like *Actinodaphne*, *Litsea*, *Randia*, *Phyllanthus emblica*, *Diospyros*, *Tabernaemontana* have shown all the girth classes. However, species like *Albizzia*,

Hydnocarpus, *Atalantia*, *Canthium*, *Cinnamomum*, *Cleistanthus* and *Dalbergia* are showing good regeneration in their initial stage i.e. seedling and recruitment. The remaining species viz. *Anogeisus*, *Pterocarpus*, *Terminalia* and *Vitex* have their individuals only in higher girth classes.

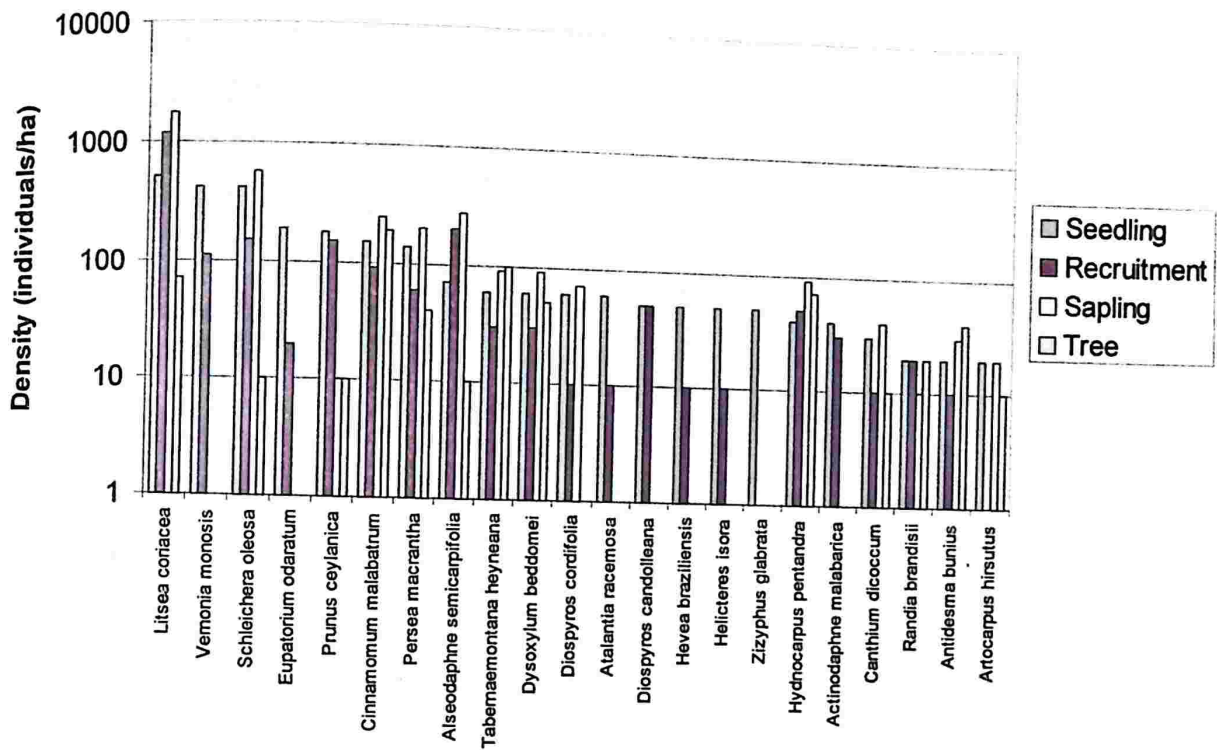
Figure 5.22: Population structure of various species in Kokkara site (n = 10)



In Anjuruli, the species like *Litsea coriacea*, *Vernonia monosis*, *Schleichera oleosa*, *Eupatorium odoratum*, *Prunus ceylanica*, *Cinnamomum malabratrum*, *Persea macrantha*, *Alseodaphne semicarpifolia*, *Tabernaemontana heyneana*, *Dysoxylum beddomei*, *Diospyros cordifolia*, *Hydnocarpus pentandra*, *Canthium dicoccum*, *Randia brandisii*, *Antidesma buniis*, *Artocarpus hirsutus*, *Turpinia malabarica*, *Macaranga peltata*, *Elaeocarpus serratus* and *Stereospermum chelonoides* had shown their individuals in all the girth classes. However, species like *Atalantia racemosa*, *Diospyros candolleana*, *Hevea braziliensis*, *Helicteres isora*, *Zizyphus glabrata*, *Actinodaphne malabarica*, *Celtis orientalis*, *Syzygium cumini* and *Myristica malabarica* had individuals in the seedling and recruitment stages. Most of the species like *Terminalia paniculata*, *Lagerstroemia microcarpa*, *Dalbergia latifolia*, *Semecarpus pinnata*, *Vernonia arborea*, *Celtis wightii*,

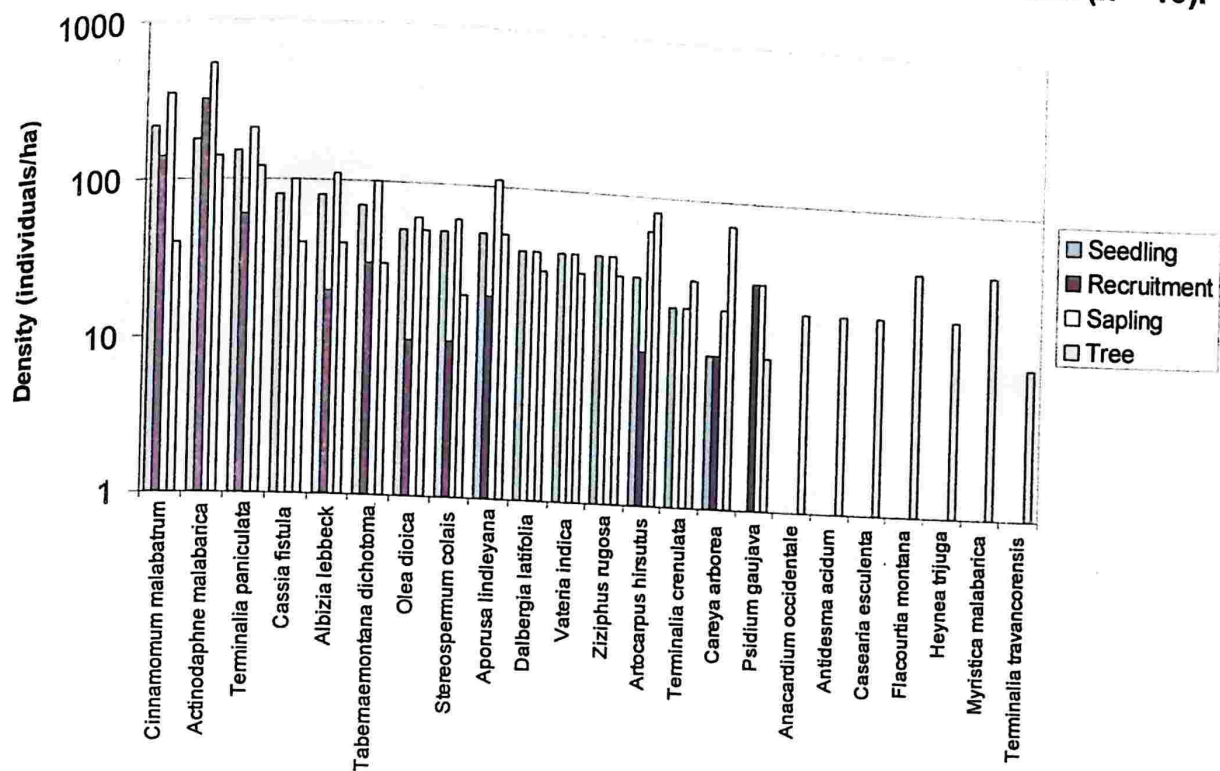
Anogeisus latifolia, *Bischofia javanica*, *Emblica officinalis*, *Tectona grandis*, *Trema orientalis*, *Erythrina indica*, *Ficus hispida* and *Toona ciliata* had individuals only in higher girth classes (Figure 5.23).

Figure 5.23: Population structure of various species in Anjuruli site (n = 10).



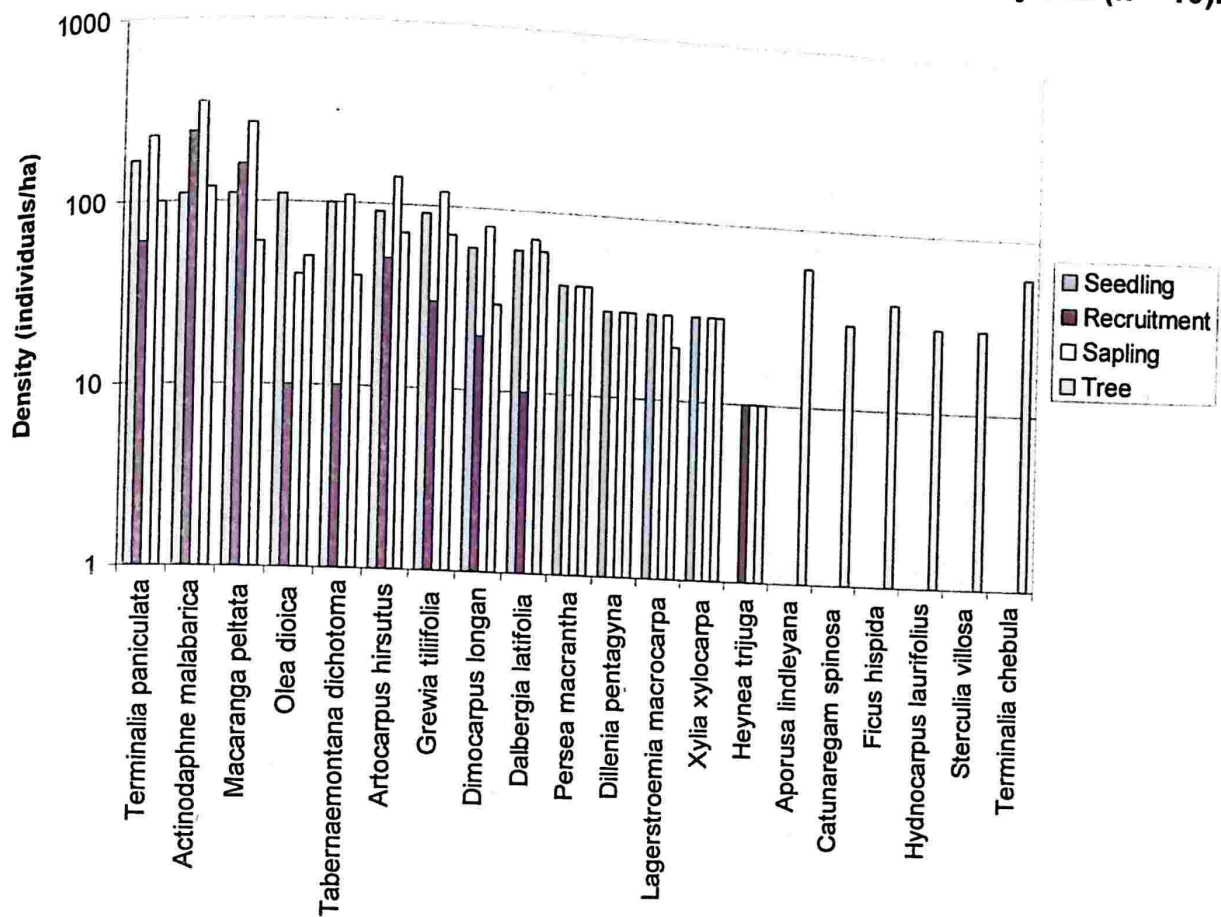
In Koruthodu, the species like *Cinnamomum malabratrum*, *Actinodaphne malabarica*, *Terminalia paniculata*, *Cassia fistula*, *Albizia lebbeck*, *Tabernaemontana dicotoma*, *Olea dioica*, *Stereospermum colais*, *Aporusa lindleyana*, *Artocarpus hirsutus*, *Careya arborea*, *Recruitment class missing*, *Dalbergia latifolia*, *Vateria indica*, *Ziziphus rugosa*, *Terminalia crenulata* and *Psidium gaujava* had individuals in all the girth classes. However, species like *Anacardium occidentale*, *Antidesma acidum*, *Casearia esculenta*, *Flacourtia montana*, *Heynea trijuga*, *Myristica malabarica* and *Terminalia travencorensis* had the individuals only in higher girth classes (Figure 5.24).

Figure 5.24: Population structure of various species in Koruthodu site (n = 10).



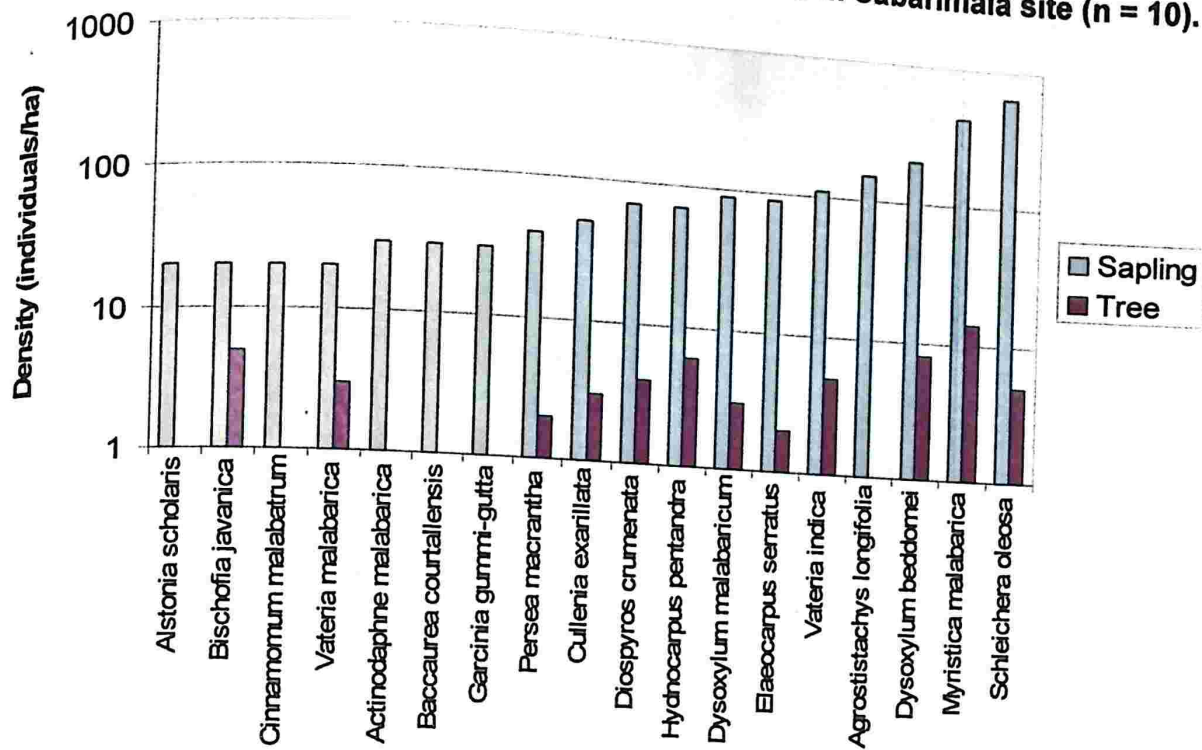
In Pampa valley, the species such as *Terminalia paniculata*, *Actinodaphne malabarica*, *Macaranga peltata*, *Olea dioica*, *Tabernaemontana dicotoma*, *Artocarpus hirsutus*, *Grewia tiliifolia*, *Dimocarpus longan* and *Dalbergia latifolia* had individuals in all the girth classes, however, species like *Persea macrantha*, *Dillenia pentagyna*, *Lagerstroemia macrocarpa*, *Xylia xylocarpa* and *Heynea trijuga* had individuals on higher girth classes and species like *Aporusa lindleyana*, *Cattunaregam spinosa*, *Ficus hispida*, *Hydnocarpus laurifolius*, *Sterculia villosa* and *Terminalia chebula* had individuals in higher girth classes (Figure 5.25).

Figure 5.25: Population structure of various species in Pampa valley site (n = 10).



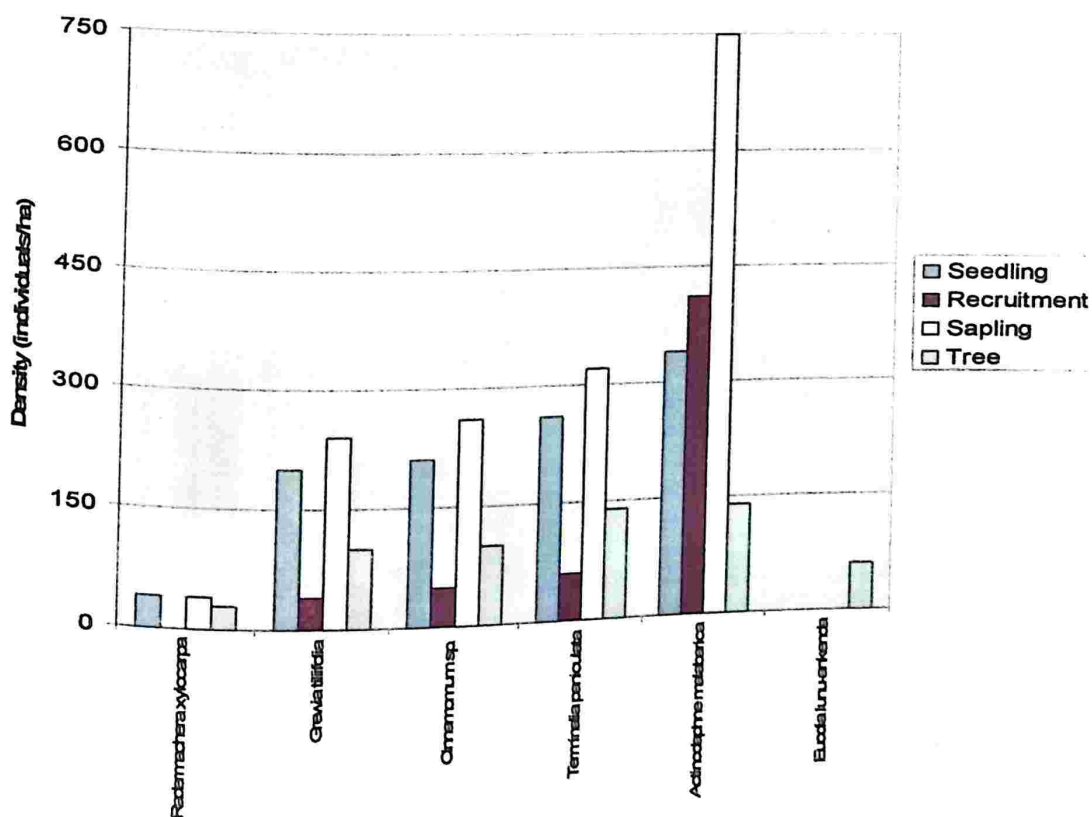
In Sabarimala, due to fire instance, the seedlings and recruitment classes were missing, however, the species like *Alstonia scholaris*, *Bischofia javanica*, *Cinnamomum malabratrum*, *Vateria malabarica*, *Actinodaphne malabarica*, *Baccaurea courtallensis*, *Garcinia gummi-gutta*, *Persea macrantha*, *Cullenia exarillata*, *Diospyros crumenata*, *Hydnocarpus pentandra*, *Dysoxylum malabaricum*, *Elaeocarpus serratus*, *Vateria indica*, *Agrostistachys longifolia*, *Dysoxylum beddomei*, *Myristica malabarica*, *Schleichera oleosa* had the individuals in saplings and tree classes. The species like *Terminalia paniculata*, *Albizia procera* and *Myristica malabarica* had the maximum number of individuals in old girth class i.e. trees. However, other species had less number of individuals in higher girth classes (Figure 5.26).

Figure 5.26: Population structure of various species in Sabarimala site (n = 10).



In Vanchivayal, all the species (*Radermachera xylocarpa*, *Grewia tiliifolia*, *Cinnamomum sp.*, *Terminalia paniculata* and *Actinodaphne malabarica*) shows good regeneration in Vanchivayal region. Among these *Actinodaphne malabarica* had maximum number of individuals in all the classes, however, *Euodia lunu-ankenda* had the individuals in higher girth class (Figure 5.27).

Figure 5.27: Population structure of various species in Vanchivayal site (n = 10).



Looking at different sites it was revealed that there are some positive trends of vegetation similar to the information generated by technical staff of Periyar Foundation during 1999. Vegetation composition of Kokara, Anjuruli, Koruthidu, Pamba Valley and Vanchivayal sites had adequate representation of seedlings, saplings and recruitments to different girth classes of trees for major species of the area. In Sabarimala, however, for many species, representation for upper girth classes was not seen. Regeneration status was also good in all the sites except Sabarimala traditional path. This could be because of fires in Sabarimala area at the time of survey during 2006-07. Adequate representation of different girth classes in different sites, presence of regeneration and recruitments for major species show positive trends in vegetation. Similarly the age class composition of Cinnamon trees which were recklessly debarked and destroyed in PTR during past, was seen to be fairly balanced as per this study. However vegetation might take some time to respond to the reduced resource use pressures of different areas as brought out in section 5.3.2 of this chapter. Vegetation need to be monitored regularly and scientifically in all the representative sites of the impact zone to understand the long-term impacts of the ecodevelopment initiatives on the habitat status of PTR.

5.4 DISCUSSION

Even though all over the world, ICDPs have been implemented with the support of large international funding, literature suggests that the result of this approach have not been very encouraging as compared to the traditional policing approach. It is also argued that although the results of policing approach are immediate, ICDPs may show a greater impact over a long term (Sayer 1999, 2000). However, very few attempts have been made to test these arguments. The potential success of ICDPs is conditioned by the economic, social, political, and population pressures faced by communities located near important

biodiversity rich areas. It is here that the impact monitoring studies over a long time become very important. The present study analyzed the impact of the ecodevelopment program in PTR on socio economic conditions of local communities, their resource use patterns, PA-People interactions, change in attitudes of the primary stakeholders and institutions and their strengths.

Dreze and Sen (1995) viewed that, the standard of living of a society should be judged not by the average level of income but by people's capabilities to lead the life they value. Also, commodities should not be valued in their own right but as ways of enhancing capabilities such as health, knowledge, self respect, and ability to participate actively in community life. Thus human beings have to be seen as subjects rather than the objects of development. Human development is the combination of people's entitlements and attainments relating to education, health and livelihood. These three arenas taken together form day to day experience of development for the people as individual and as members of a community, state or nation (Dreze and Sen 1995). Therefore, while analyzing the impacts of the ecodevelopment program, the study attempted to not only look at the increased incomes of the people but also on the sources of incomes in order to determine if these had developed resilience. The study also attempted to look at community well being, cultural and societal revival and gender issues.

It is clear that the ecodevelopment program has contributed to human well being by not only increasing the income levels but also increasing the proportion of income from legal sources. In case of the *Ex-Vayana* Bark collectors EDC even though the income level had gone down, the overall performance of the EDC seemed to be quite well. These people were treated as forest offenders and looked down in the society in the previous years. Social recognition of the members of this EDC had gone-up after their switch to the

innovative ecotourism program and active involvement in protection initiatives of PTR. This was a unique case of complete transformation where destroyers of the PA had become its protectors. This social recognition and empowerment among the members of this EDC seemed to compensate them for their reduced income levels. It was found that the performance of EDCs depended on the well being of the community e.g. access to basic amenities, landholdings as well as the participation of women. Further the disparities in income in EDCs have reduced. This has been an important achievement of the program in PTR since most of the analyses of ICDPs have pointed out that if the community development and well being components of ICDPs continue to grapple only weakly and in an *ad hoc* manner with poverty, powerlessness, and the pressure on land and resources outside of PAs (Mogelgaard 2003), then key stakeholders will likely continue to threaten PAs. Social services may at the same time help to reduce the 'vulnerability' of poor people. It is the most critical dimension of poverty in relation to environmental entitlements or availability decline, because it emphasises the importance of net asset position in guarding against the 'ratchet' effect by which people may be driven to deplete or degrade environmental resources (Leach and Mearns 1991).

The sustainability of alternative livelihood is an important issue which needs to be monitored regularly. A key challenge for the PA managers is to find ways in which human livelihood can be better integrated with the needs of management (Amend and Amend 1995). Change in the livelihood patterns of the professional groups EDCs seems to be a step in this direction where their dependency on the forest resources seems to have been compensated by incomes from ecotourism and improved management of pilgrimage. However, this needs to be monitored in the light of the market fluctuations and the possibilities of exploitation by middlemen and other vested interest groups. In case of

Neighbourhood EDCs, market support to agriculture is very important. This is particularly important in case of tribals which are more likely to fall in the trap of middlemen.

Surveys of local peoples' attitudes can provide guidance for the policy and management decisions involved in the design, implementation and evaluation of ICDPs (Hill 1991, Parry and Campbell 1992, IIED 1994, Infield and Namara 2001). Through attitude surveys it may be possible to predict how people's attitudes will be influenced by conservation policies, which may in turn allow more effective resource allocation and planning (Badola 1998, Fiallo and Jacobson 1995, Sah and Heinen 2001). The term attitude has been used in relation to and in favor or against response towards one or more stimuli but can also be related with possible conduct and behavior (Bruvold 1973, Murphy and Watson 1991). To determine the success or failure of any policy or program it is important to know the changes in attitudes of the key stakeholders. The present study reveals that the attitudes and perceptions of local people and the forest department staffs are positive for the program. The mutual trust between the management and the community has significantly improved. Their understanding about the program and biodiversity conservation has strengthened the emotional bond with PTR.

Cernea (1987) points out that a major contribution to sustainability comes from the development of grassroot organizations, whereby project beneficiaries gradually assume increasing responsibility for project activities, a high degree of self reliance, a measure of beneficiary control over the management of the organization (Cernea 1985). The EDCs setup under the auspices of the ecodevelopment project in PTR have a meaningful representation of women and the marginal groups, they have achieved varying levels and exhibit the ability for decision making and conflict resolution. It appears that some of these EDCs may have achieved the level of empowerment to mobilize their own capabilities, be

social actors rather than passive subjects, manage the resources, make decisions, and control the activities that control their lives.

As reflected in prevailing conservation approaches, ecological values are seen as most prominent and important to protect in relatively pristine PAs. The ecodevelopment program in PTR has contributed to biodiversity conservation as reflected in the reduction of forest related offences. Vegetation structure in the impact zone shows positive trends however it need to be monitored on a regular and long term basis.

The ecodevelopment inputs in PTR have resulted in increased incomes particularly from non forest sources, reduction in disparities in income, empowerment of women, formation of self help groups and a significant decline in resource use from PTR. Other positive outcomes from the program includes active participation of some of the EDCs in PA protection activities such as fire fighting, patrolling and information giving. There has been a positive change in the attitude of staff and communities and a high level of recognition of the impacts of IEDP. The EDCs have developed social capital, ability to resolve confidence and management their finances to sustain the program in the future.

Chapter VI

Findings of the study and conclusion

Over the past 15 years, Integrated Conservation and Development Projects (ICDPs) have experienced a roller coaster ride in acceptance and popularity. Hailed in the late 1980s as a promising solution to conservation in impoverished developing countries, by the early 1990s ICDP “design dilemmas” began to be noted (Brandon and Wells 1992). By the late 1990s key conservationists were rejecting the premises underpinning the ICDP concept (Terborgh 1999). However, there are in fact almost no contexts where there is not a need to factor in social, economic and ecological considerations associated with the resident populations living in or adjacent to conservation landscapes. This reinforces Larson et al., (1998) point that the ICDP approach is “an essential and primary conservation tool”, and which continues to generate commentary (Worah 2000). The potential success of ICDPs is conditioned by the economic, social, political, and population pressures faced by communities located near important biodiversity resources (Greenberg and Brown 2006). Ecodevelopment initiatives in Periyar Tiger Reserve (PTR) have given a new direction for the management of biodiversity rich areas with the participation of local communities.

6.1 India Ecodevelopment Project in PTR- major issues

Implementation of IEDP in PTR has offered unique experience and learning for the planning and implementation of such programs in future. The present study has brought forth some issues that have major implications for future implementation and success of community based conservation programs in the region.

6.1.1 Issues related to planning for ecodevelopment programs

The planning phase of the ecodevelopment programs is most crucial as it sets the ground for proper implementation. It requires a change in the management approach by building additional capacities both within the staff and the communities. Following major issues emerge from this study with respect to the planning of the program:

6.1.1.1 Process of change

One of the important objectives of ICDPs is to address the social and economic requirements of communities who might otherwise threaten biodiversity and the natural resource base in general (Hughes and Flinton 2001). Therefore these aim to improve relationships between state-managed Protected Areas (PAs) and their neighbors. To make it happen appropriate changes in the existing policy and administrative structures as well as establishment of new institutional mechanisms for allowing community participation and decentralized decision making are needed, prior to the initiation of ICDPs or ecodevelopment programs. The mission of such a program must be crystal clear and shared objectives must be developed between all stakeholders (Muttulingam and Shen, 1999). Without this clarity and understanding, conflicts will inevitably arise among the stakeholders. PTR had the advantage of putting in place required legal and institutional arrangements for IEDP in the beginning of IEDP. However the process of developing a shared vision with the communities remained weak. Some of the EDCs could not perceive their long term stake in the project. More flexibility of time during the preparatory phase could have helped in addressing this issue. This period should have been used for building capacity of the frontline staff and communities for understanding the project objectives, activities and other broad rules of the game. This period should also have been utilized for training of staff and the involvement of frontline staff could have been maximized right from the beginning.

6.1.1.2 Impact zones

Identification of impact zone is very important for understanding the nature, extent and type of impacts around the PA. Impact zones are often very dynamic as well as seasonal (Bhardwaj et al. 1999). Scientific understanding of impact zones provides clarity regarding the issues and broad strategies to be followed for different village clusters right from the beginning. Understanding and mitigating adverse mutual impacts and highlighting the positive impacts are clearly in the interest of affected local communities and PA managements. In PTR the identification of impact zone was done on general understanding and accordingly the villages were prioritized for IEDP. Not all the prioritized villages could be addressed under the project and the pockets of pressures from across Tamil Nadu border remained totally unaddressed. It is revealed from the study that lot of time was spent in working out the priorities of micro-planning for different pockets of villages during the implementation phase which could have been minimized by addressing the issue of impact zone identification right in the preparatory phase of IEDP.

6.1.1.3 Baseline information

Importance of baseline information on various ecological, socio-economic and managerial parameters has already been recognized in a number of studies (WII 1999, 2000). One of the major constraints for this study was lack of baseline information. There was no systematic effort for creating these baselines either in the preparatory phase or during the implementation of IEDP. Some of the baselines could be initiated only after the mid-term review of the project and there is hardly any scientific effort of using these baselines for regular monitoring of the PA. Therefore the issue of building baselines has to be addressed in the beginning of the project and this should form the basis of regular monitoring program of PA. The ecodevelopment projects should allocate adequate resources for this activity in the planning phase and subsequent monitoring during the implementation.

6.1.1.4 Capacity of staff and communities

Different approaches have been used by the ICDPs for building initial capacities about program planning and implementation among communities and staff. One of these strategies has been through awareness campaign to raise the acceptability of conservation goals by the local communities. In PTR conservation awareness programs of pre IEDP has helped in generating support of outside stakeholders but these programs could not address the local communities. It was only after 2001 that this issue was realized and an intensive program of awareness was initiated. Similarly the study reflects on the top driven nature of the program (indicative of good leadership from the managers) in the beginning and half hearted involvement of the frontline staff during the initial phase. The interviews with both the staff and HHs revealed the inadequate capacities of program handling with the frontline staff in the beginning of IEDP. This issue therefore has to be addressed right in the preparatory phase so as to have smooth sailing in the implementation.

6.1.2 Issues related implementation of ecodevelopment programs

6.1.2.1 Period of implementation, fund flow and priorities

Ecodevelopment programs envisage a number of highly process driven and effort intensive activities like awareness promotion, micro-planning and capacity building of both staff and the communities (PEACE 2004). Such programs basically try to address the issue of change in attitudes of the local communities and the working styles of frontline staff. In PTR even though financial investments for ecodevelopment were seen over a period of about one and a half decade, the major funds brought in for the program by IEDP were quite squeezed over a short period of about five years. Sudden increase in the fund flow during IEDP and sharp reduction after IEDP has implications for PA management. Even the actual fund flow was delayed till 1998 leaving only short time for

effective implementation. The process of micro-planning needs time and any attempt to hasten it leads to compromise on the expected results. Further, it is revealed from the study that high investment need not lead to better performance of the EDCs. Many of the EDCs where investments are low but effort on capacity building were consistent, are doing well. This brings forth the issue of a more rational and flexible timeframe for the implementation of such process driven programs as well as careful selection of activities for micro-plan implementation. The investments for infrastructure and capacity building need to be balanced.

6.1.2.2 Flexibility and institution building process

Community institutions are possibly most important, complex and least understood elements in ecodevelopment program. It is through community institutions that individual HHs are reached and involved in the program (Balaraju 1999). The pace of institution building depends upon a number of local, socio-economic and political factors. Flexibility in terms of institution building and time is the key to success. Understanding the heterogeneity of the community and their interest and ensuring the required transparency of actions are extremely important for such programs. The study reveals the innovative and pliable approach of PTR for creation of three types of EDCs (Neighborhood, User Group and Professional Group) based on their occupational patterns, geographical settings and dependency levels. Creation of additional support institutions in the form of Self Help Groups (SHGs) and nature clubs have contributed significantly to the strength of the program. However this was done as a one time initiative over a short period of one and half years and not much further input was provided. As a result some of the SHGs have now become non-functional. For continuity and scaling up of the program, proper networking of SHGs, their linkages with other institutions and their capacity building should have been an on going process. It is important to have flexibility and innovation

with respect to institution building process. Creation of other micro-institutions supporting the EDCs has to be an important and continuing initiative for strengthening the program and managements of these micro-institutions has to become a part of mainstream activity.

6.1.2.3 Staff teams, capacities and their continuity

The study reveals the role of the frontline staff in micro-planning and program implementation. There is a strong co-relation emerging between the leadership of the EDC secretaries with the overall performance of the EDCs. The capacity building initiatives of IEDP for staff and selected communities has given dividends in terms of their ability to perform this new role. Another issue is the continuity and overlap of the staff dealing with the EDCs. KFD had a long-term of vision for ensuring adequate tenures to the officials and the staff and putting competent teams in place. This emphasizes that such programs have to focus on staff teams, their capacities for the new expected roles and their continuity as well as overlap to ensure the sustenance of institutional memories and expertise. In PTR the technical staff has played an important role in mobilization of communities, bringing science into management and bridging a link between the management and communities. This role of the technical staff has to be clearly understood and incorporated in the project design.

6.1.2.4 Conservation development linkages

The mission of ecodevelopment program is biodiversity conservation and the compatible development of the communities is a means to achieve this broad objectives. Most of the time during the implementation managements get lost in the community development and welfare activities and the main agenda is lost sight off. The long term success of any ecodevelopment initiative depends upon strong linkages between the local development and PA protection. PTR management has been particularly cautious about the linkages of

conservation to the broad components of the program. The study also reveals that those EDCs whose stakes and livelihood are directly related to PTR (User group and professional group—ecotourism) are performing better with respect to the protection of PA. Ecotourism programs have particularly helped in building strong linkages of the livelihoods of EDCs members and PA conservation. Similarly in case of many of the professional group EDCs the linkages have to be emphasized and strengthened through proactive implementation of MoUs. Identification of activities having strong linkages for conservation, and wherever these linkages are not direct, careful implementation of MoUs for mutual roles and responsibilities between communities and the PA management, is an important issue. The good will and synergy developed with the fringe area communities has to ultimately be linked to the protection of PA.

6.1.2.5 Adaptability, equity and gender issues

Issue of equity and gender are very important for long term success of ICDP program. The study brings out that the government orders brought out for implementation of IEDP have adequately addressed the issues of gender and representation of other under privileged groups in the program. PTR has been able to focus on women empowerment as reflected in their involvement in the planning and implementation of IEDP activities. The issues of equity have also been partially addressed through initiatives like SHGs and park welfare fund. But greater adaptability is needed to address the issues of equity and empowerment as the program has already entered into second generation.

6.1.3 Issues related to sustainability of ecodevelopment programs

6.1.3.1 Post project arrangements

Establishment of Periyar Foundation and creation of SHGs and nature clubs has provided the institutional sustainability for IEDP. Similarly, the introduction of ecodevelopment

surcharge has initiated steps for financial sustainability of IEDP initiatives. Continuation of contractual technical staff through Periyar Foundation has ensured the ongoing efforts of capacity building and institutional development in post IEDP period. This will be necessary for the social sustainability of the project initiatives. The study reveals that the focus of awareness and capacity building programs for local communities is getting reduced. This needs to be taken care of by PTR management. Issues related to economic, institutional, ecological and social sustainability have to be address well in advance before the expiry of such projects so as to ensure smooth transition of the project into a long term program of the PA.

6.1.3.2 Institutional memories and process documentation

During this study the major constraint was getting information regarding the process as it unfolded in PTR. The focus groups discussion with the different stakeholders and household interviews provided an opportunity of capturing the institutional memories of PTR for pre IEDP as well as IEDP period. This study and the field data generated for the study itself could serve as an important documentation for the institutional development process in PTR since the initiation of the ecodevelopment program. This highlights the need of systematic documentation of such initiatives which can provide important lessons for the future implementation of the program.

6.1.3.3 Social capital

Promotion of social capital has been considered as an important mechanism to rationally reconstruct the society (Coleman 1993). In late 1990s an increasing number of scholars who studied processes of environmental conservation and sustainable rural development in the Third World countries started to turn their attention to social capital as the theoretical framework that best explains success in conservation and development initiatives (Mitraud

2001, Korhonen 2006 and World Bank 2002). During this study assessment of the level of social capital was attempted for different EDCs. This was basically to understand the level of trust generated among households of different EDCs to work as a community and to understand their capacities of conflict resolution as well as networking for their own development and the conservation initiatives of PTR. The study has brought out that the level of social capital varied in different EDCs and it reflected upon their overall strength. Therefore, economic sustainability is only one facet of the program. The long term management of the program initiatives will depend heavily on social sustainability. Building of social capital has to be one of the major issues for the important activities for any ecodevelopment program for its long term impacts.

6.1.3.4 Capacity building and sustainable livelihoods

On-going process of capacity building has its initial role for any ecodevelopment program. Ultimately, the sustainability of the livelihoods of the communities will depend upon the strength of different assets available with them and their ability to overcome the vulnerability of outside factors. The critical linkage between the livelihoods of local communities and the strength of their resources base-human, social, institutional, natural, financial and physical needs to be recognized and addressed if biodiversity conservation has to become a reality. This study reveals the importance of giving adequate attention to strengthening the diverse resource base. The CDFs generated during IEDP are important for the sustainable livelihoods of the communities. Therefore if the program has to sustain its long term impact, management of CDFs has to be given top priority.

6.2 Major factors influencing IEDP success

The success of the IEDP could be gauged by the responses of EDCs in terms of their performance in participation, women empowerment, conflict resolution mechanisms, etc.

The combined score from these factors were used to reflect the performance level of each EDC, and was related to various input parameters under IEDP so that the major factors influencing the performance could be identified. The input parameters were: (i) investment under village ecodevelopment; (ii) investment for income generating activities; (iii) well-being of EDCs; (iv) strength of SHGs; (v) economic status of EDCs, (vi) strength of EDC secretaries, (vii) social capital and (viii) capacity building (training and awareness). It was found that the performance of EDCs had significant positive correlation with strength of SHGs, social capital, well being and strength of EDC secretaries (Table 6.1., Figure 6.1 A, B, C and D). Ironically, the parameters related to direct financial investment and income generating activities did not show significant positive correlations with performance of EDCs (Table 6.1). Similarly, the inputs for capacity building through training and awareness program had only limited effect, and it was striking that there was no significant different in the performance level with respect to low, medium and high level of inputs in this direction (Figure 6.2). The overall results seem to suggest that more than the economic incentives or capacity building inputs, it is the efforts towards ensuring efficient functioning of SHGs, social capital, good leadership in EDC structure, and overall well being of EDC members that are likely to contribute to secure future both for biodiversity and human society. Therefore, it would be prudent to focus on some of these factors while implementing IEDP and any other program with similar vision in the future.

Table 6.1 Correlation of various input parameters and EDC performance

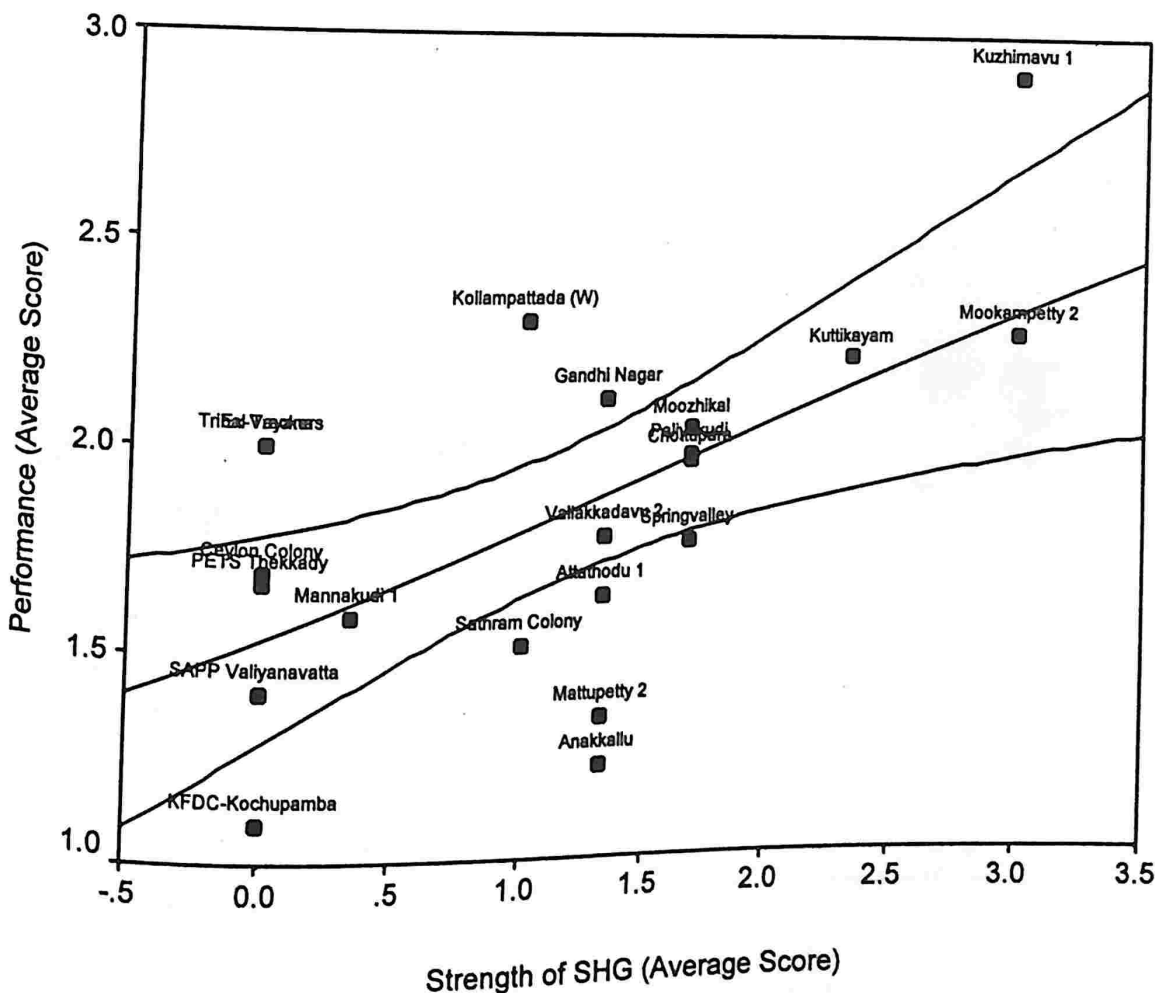
		Correlations							
		SOC_CAP	Secretary	Eco Status	Well being	IEDP_VED	IEDP_Income	SHG	Performance
SOC_CAP	Pearson Correlation	1.000	.482*	.280	.567**	-.070	-.288	.003	.563**
	Sig. (2-tailed)		.027	.218	.007	.765	.205	.990	.008
	N	21	21	21	21	21	21	21	21
Secretary	Pearson Correlation	.482*	1.000	.137	.536*	.21	.21	.21	.21
	Sig. (2-tailed)	.027		.137	.536*	.21	.21	.21	.21
	N	21	21	21	21	21	21	21	21
Eco_Status	Pearson Correlation	.280	.137	1.000	.153	.552**	.523*	.883	.033
	Sig. (2-tailed)	.218	.555		.153	.552**	.523*	.883	.033
	N	21	21	21	21	21	21	21	21
Well_being	Pearson Correlation	.567**	.536*	.153	1.000	-.155	-.277	.258	.542*
	Sig. (2-tailed)	.007	.012	.509		-.155	-.277	.258	.542*
	N	21	21	21	21	21	21	21	21
IEDP_VED	Pearson Correlation	-.070	-.195	.552**	-.155	1.000	.842**	.220	-.066
	Sig. (2-tailed)	.765	.396	.009	.503		.842**	.220	-.066
	N	21	21	21	21	21	21	21	21
IEDP_Income	Pearson Correlation	-.288	-.167	.523*	-.277	.842**	1.000	.364	-.028
	Sig. (2-tailed)	.205	.471	.015	.224	.000		.364	-.028
	N	21	21	21	21	21	21	21	21
SHG	Pearson Correlation	.003	-.034	.058	.258	.220	.364	1.000	.593**
	Sig. (2-tailed)	.990	.883	.804	.259	.338	.105		.593**
	N	21	21	21	21	21	21	21	21
Performance	Pearson Correlation	.563**	.466*	.138	.542*	-.066	-.028	.593**	1.000
	Sig. (2-tailed)	.008	.033	.551	.011	.776	.904	.005	
	N	21	21	21	21	21	21	21	21

*. Correlation is significant at the 0.05 level (2-tailed).

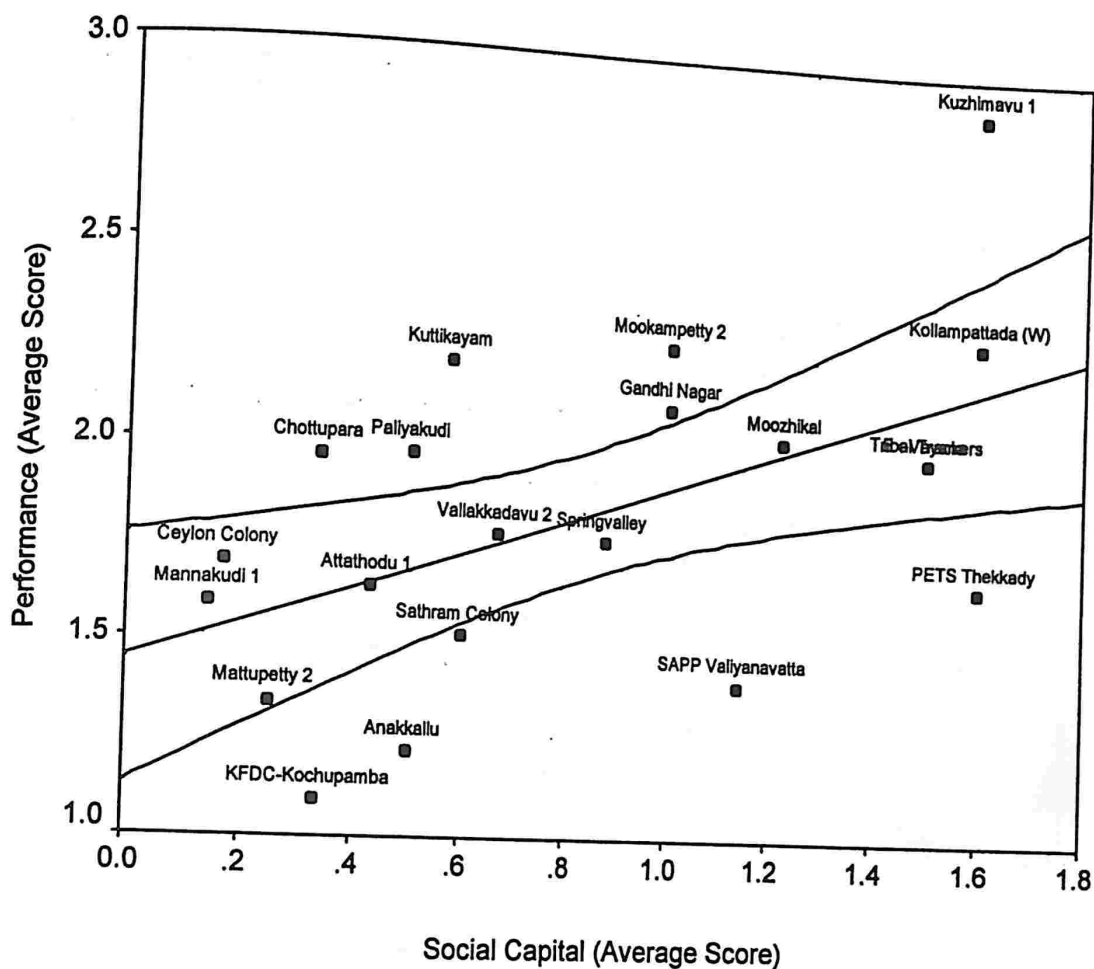
** Correlation is significant at the 0.01 level (2-tailed).

Figure 6.1: Correlation of input parameters with performance index of EDCs

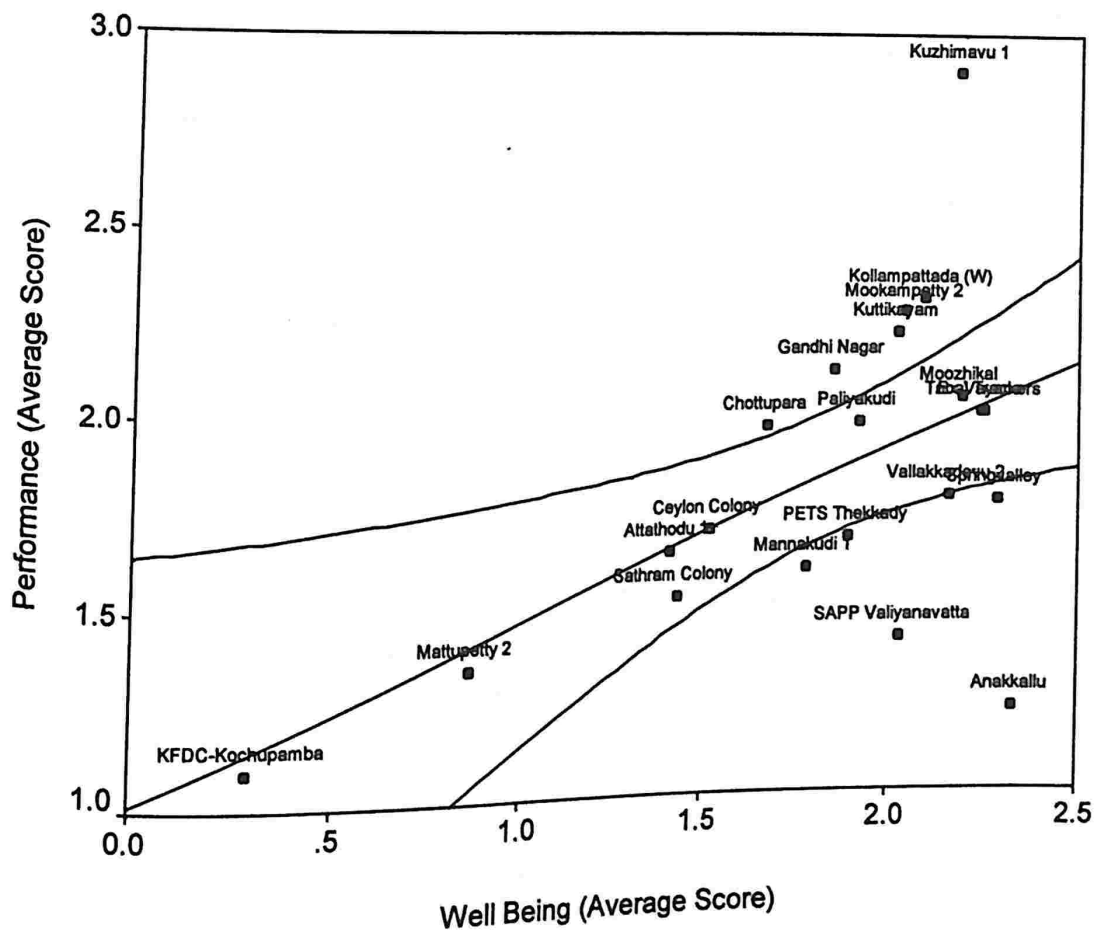
A – SHGs strength and performance



B - Social capital and performance



C - Well being and performance



D - Secretary strength and performance

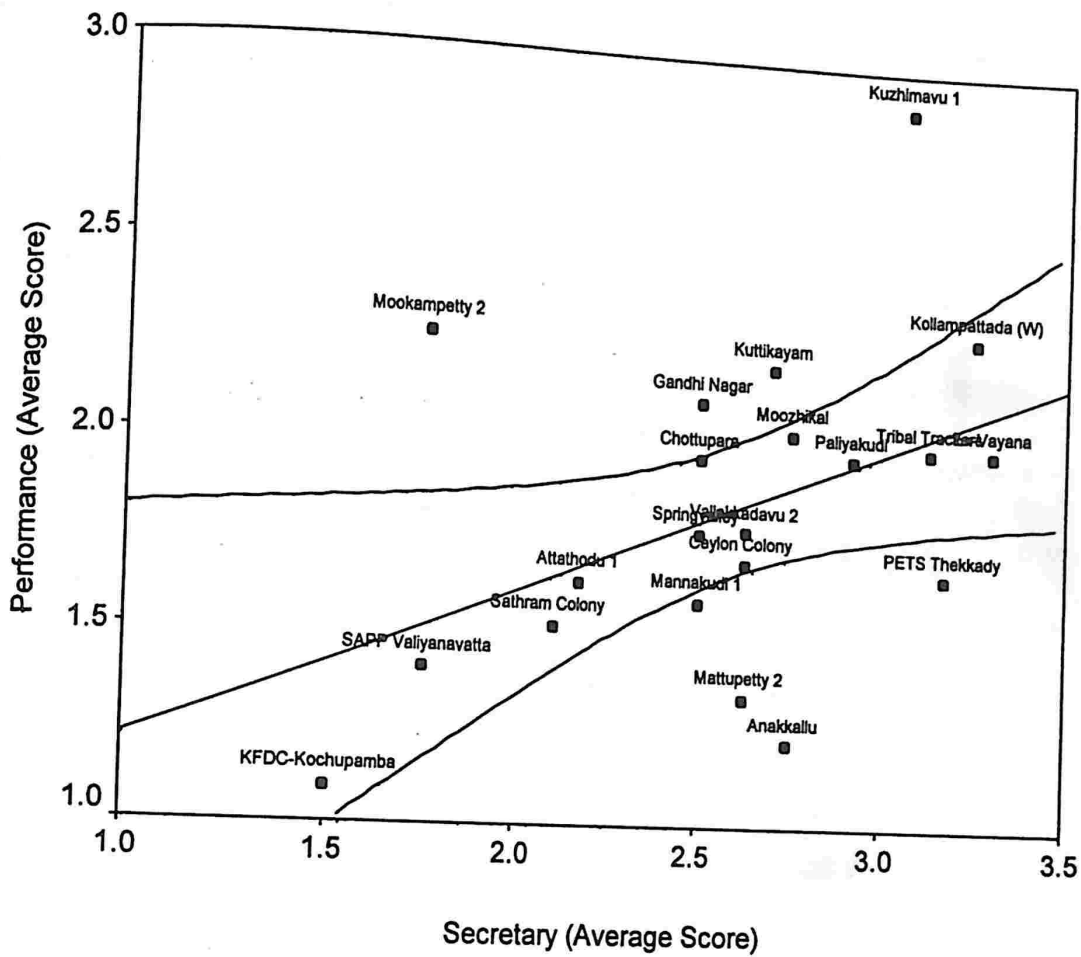
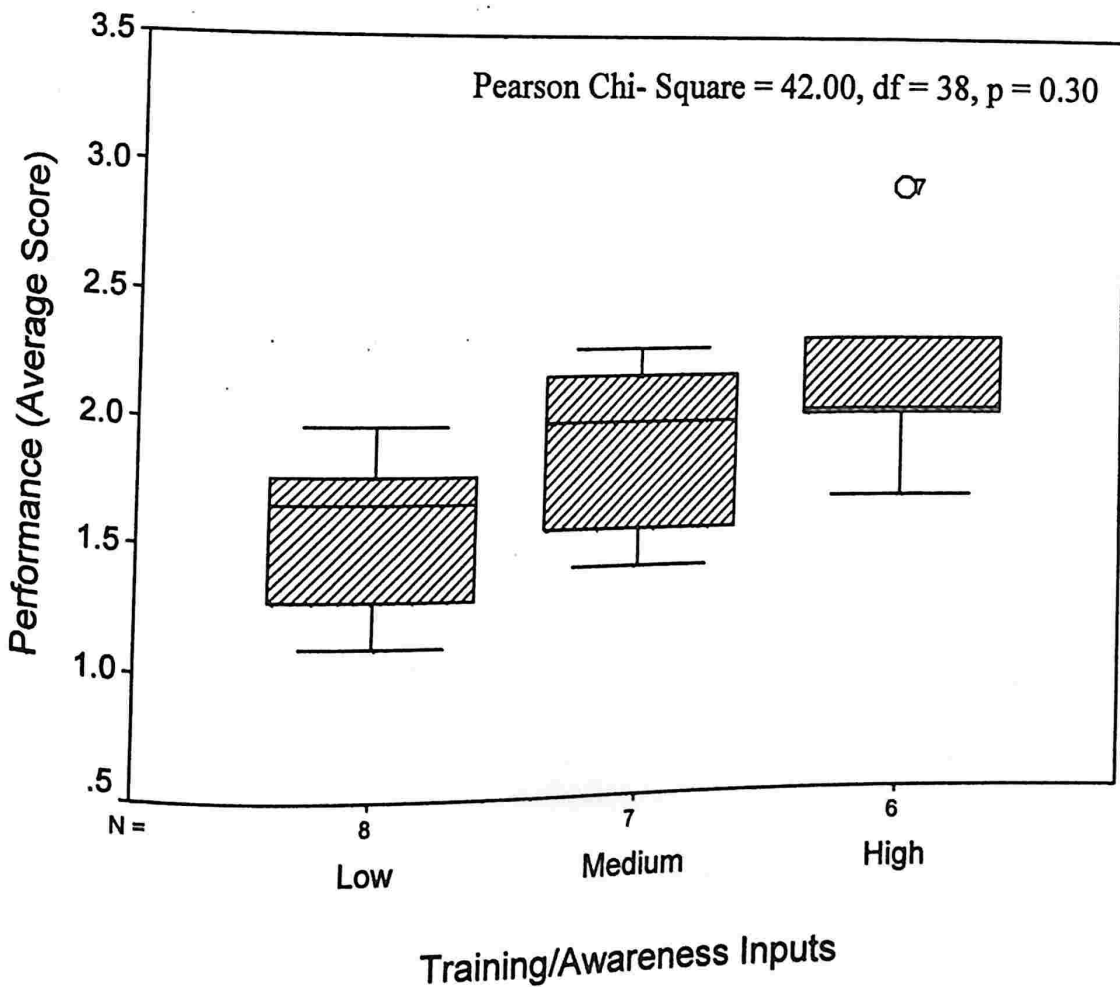


Figure 6.2: Performance of EDCs w.r.t. capacity building



The main lesson that emerges from the PTR experience is that the term participation should not be accepted without appropriate qualifications as most types will threaten rather than support the goals of sustainable PA conservation (Pimbert and Pretty 1995). Although passive participation projects have provided a broader range of benefits to local people and have reduced the cost of conservation (IIED 1994), they suffer from major drawbacks. They are based on the simplistic assumption of a direct, causative relationship between poverty and environment degradation (e.g. Lewis 1988) so that reducing poverty through development activities will automatically reduce environmental degradation. A number of recent studies (eg. Gill 1993, Fairhead and Leach 1994, Leach and Fairhead 1994), have questioned the conventional wisdom - that poverty leads people to over-exploit their natural resource base and a declining natural resource base leads to poverty, and so the process continues in a 'downward spiral' (Durning, 1989). It is infact the focus on processes of institution and social capital building that determine the acceptance, success, and sustainability of the program.

The institutions, relationships, and norms shape the quality and quantity of a society's social interactions (World Bank 1999). The stock of active connections among people, the trust, mutual understanding and shared values and behaviors that bind communities, make cooperative action possible. (Cohen and Prusak 2001, Putnam 2000). Interaction enables people to build communities, to commit themselves to each other, and to knit the social fabric. A sense of belonging and the concrete experience of social networks (and the relationships of trust and tolerance that can be involved) can bring great benefits to people (Field 2003). The development of social capital seems to be one of the greatest achievements of the PTR experience. The challenge for the PTR management is to sustain the social capital generated in face of the dynamic social and economic processes in PTR

and in the surrounding landscape. Therefore, it is infact a combination of social and economic empowerment, and the leadership capacity of the EDC Secretaries under an overall umbrella of enabling legal and management environment that this program can make a meaningful contribution to the biodiversity conservation and human well being.

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PRELIMINARY SURVEY OF VILLAGE EDCS

Annexure I

Objective : To select EDCs for intensive survey

Date _____

1. Name of the EDC _____
2. Village _____
3. Date of establishment _____

Sl. No.	Parameters				
1	Distance from the PA boundary (km)	>0 <0.5	>0.5 <1	>1 <2	>2 <5
2	Number of Members	Male	Female	Total	Families
3	Community (No. of families)	SC	ST	Others	Total
4	Main activities of EDC	Agri. land based	Forest resource based	Forest protection and ecotourism based	Forest protection and pilgrimage based
5	Age of EDC (year)	<1	>1 <2	>2 <3	>3 <4
6	Total amount spent by FD for EDC (Rs.)				
7	Number of family benefited	Contribution from the project fund	Fund generated by EDC	Total	
8	Community Development Fund (CDF) of EDC (Rs.)				
9	Money invested as loan from CDF (Rs.)				
10	Money recovered from invested amount (Rs.)				
11	Value of assets created by EDC (Rs.)				

Questionnaire for detailed survey of Executive Committees of sampled EDCs

Target group: Executive committees of EDCs

General:

Objective: To gather general information about EDC and to know the inputs provided through programme.

1. Name of the EDC:
2. Panchayat:
3. Taluk:
4. Date of establishment:
5. Kind of EDC:

SC	ST	Others	Mixed

6. Total no. of families:
7. Total no. of members:

M	F	Total

8. Total population of EDC:

M	F	C	Total

9. Amount invested:

10. Generated Fund:

In hand (Rs.)	In circulation (Rs.)	Total (Rs.)

11. Assets created:

Kind	Number	Value (Rs.)
Buildings		
Furniture		
Fencings		
Others		

12. Major activities carried out:

Kind of Activity	No. of beneficiaries
Agriculture improvement	
Loan for business	
Buildings	
Skill development	
Others	

13. Capacity building:

Awareness programmes

Name of Programme	Number	Total Participants

Skill development programmes

Name of Programme	Number of times	Total Participants

- Objective: 1. To know about the understanding of the people about the programme.
 2. To examine if there is any change in the quantum of resource use by the people and their socio-economic condition after the implementation of the programme.

Programme awareness:

1. What do you think is the main purpose of Ecodevelopment programme?

Conservation	Livelihoods	Development	Others	Not aware

2. Can you narrate how the programme started in your area and how did you reach the present stage of the programme?

3. How did you get interested in the program?
4. Has the Program affected negatively some aspects of your life

Dependencies:

1. What for has been your dependence on the park before and now and how much?

	Before	Now
Fuel-wood (self use)		
Fuel-wood (sale)		
Timber		
Thatch grass		
NTFP		
Grazing/ Fodder		
Cinnamon bark		
Employment		
Fishing		
Others		

2. Are any new dependencies come up after the programme?
3. Do you think if there is any change in your well being after the programme?
4. If yes what way and how much?

Objectives: To understand the state of attitudes of the people about conservation and the programme.

Park and conservation awareness issues:

1. Could you explain why there is a Park in this area and what are its functions?
2. If you could decide what would you do with the Periyar Tiger Reserve?
3. In your opinion who should take care of Periyar conservation?
4. Do you get any benefits due to the presence of this Park?

Qualitative changes;

1. What in your mind has happened good after the formation of EDC and how?
2. What has happened bad during this time and why you think so?

3. How has you viewed the Park before and now? why?
4. Who is the most important for your EDC and why?
5. Do you think staff is important for your EDC? If Yes then why and if No then why?

Objective: To examine the empowerment of the communities for the sustainability of the programme.

Empowerment:

1. How was your committee constituted?
2. Do you think your committee/ EDC has representation of everybody from the village? If not, how and why?
3. Do all your members know how much money is available in the EDC account?
4. How and by whom the EDC activities are decided and done?
5. Are there times when there are conflicts with in the members?
6. If yes then what kind of conflicts. How these conflicts are resolved and by whom?
7. Who is maintaining the accounts and records for the EDC and why?
8. What do you think will happen if the staff is removed from the EDC?
9. Are you satisfied how programme was designed? Yes No
10. If not how it could have been better designed?
11. How many times in a year EDC meetings are conducted? Gen. Exe.
12. What do you discuss in these meeting?
13. What is the %age of participation in the meetings and why?
14. Were there any NGOs working in your area before? If yes, name?
15. Have any new NGOs come up now? If yes, why?
16. Do you see any role of Panchayat and other agencies in your EDC? If yes what can be their role? What had been they doing before?
17. Will you prefer individual or group activities and why?
18. What problems you have faced in the running of EDC so far? How did you solve these problems?
19. What do you fore see the role of EDC for your next generation?

Questionnaire for Survey of Households of sampled EDCs

ED(a) Questionnaire No. _____ ED(b) Date: _____ ED(c) Target group: SC/ST/Others _____
 ED(d) Interviewer: _____ ED(e) Location of interview _____
 ED(f) Time of start: _____ ED(g) Time of finish: _____ ED(h) Name of respondent: _____
 ED(i) GPS Reading _____

SECTION 1- BACKGROUND & MIGRATION DETAILS

Objective: 1. To gather the basic information about EDC members, their migration and their assets.

1 ED 1. Are you aware of the concept and objectives of village ecodevelopment and EDC? (Indirect question)

Yes 1	No 2
1ED 1.1 What is it?	1 ED 1.2 Why?

1 ED 2 Could you tell me to which EDC you belong to?

1ED2.1 Name of EDC	1ED2.2 Year of joining EDC	1ED2.3 Reason for joining EDC	CT
			CT

1 ED3. Where do you live now?

1 ED 2.1 Place :	1 ED 2.2 State:

1 ED 4 . If your parents migrated to in & around PTR, where did your parents live before shifting?

1ED 4.1 Place	1ED 4.2. State	1ED 4.3. Year of migration							1ED 4.4. Distance of the place	1 ED 4.5. Reason for migration
		Before 1890	1891 - 1900	1901 - 1910	1911 - 1920	1921- 1930	1931- 1940	1941- 1950		
		1	2	3	4	5	6	7		
		1951- 1960	1961 - 1970	1971 - 1980	1981 - 1990	1991- 2000	After 2001	DN		
		8	9	10	11	12	13			

1 ED 5. Name, Age and Qualification of the Members and Non members in your family?

1 ED 4.1 MEMBERS					
Members	A. Name	B. Age	C. Qualification *	D. Main Employment **	E. Marital status ***
1 ED 5.1.1 Male					
1 ED 5.1.2 Female					
1 ED 4.2 NON - MEMBERS					
1 ED 5.2.1 Male	1.				
	2.				
	3.				
	4.				
1 ED 5.2.2 Female	1.				
	2.				
	3.				
	4.				

* 1. Illiterate 2. Primary 3. Secondary 4. Degree 5. PG and above

** 1. Agriculture 2. Wage Labour 3. Service 4. MFP Collection 5. Business 6. Others

*** 1. Married 2. Un married 3. Widowed/Divorced 4. Can not tell.

1 ED 6. HOUSE AND ECONOMY DETAILS OF HOUSE HOLD OBERVED BY INTERVIEWER

Please enter the house details (Not for asking) in the table below

1 ED 6.1 House roof	Thatched 1	Tiled 2	Concrete 3	Concrete and tiled 4	Concrete and asbestos 5	Others OT
1 ED 6.2 Walls	Mud 1	Concrete 2	Leaves and poles 3	Stones 4	Bricks 5	Others OT
1 ED 6.3 Amenities	TV 1	CD 2	Radio 3	Phone 4	Cable TV 5	Electricity 6
1 ED 6.4 Vehicles	Cycle 1	Bike 2	Car 3	Auto 4		
1 ED 6.5 Toilets	Yes 1	No 2				
1 ED 6.6 Waste disposal	Bin 1	Forests 2	Around home 3	Compost pits 4	Burn 5	
1 ED 6.7 Status	Poor 1	Medium 2	Rich 3			
1 ED 6.8 Use of forest products in construction	Very high 1	High 2	Neither high nor low 3	Low 4	Very low 5	Nil 0

1 ED 7. Distance of your residence from PTR boundary .

Km.

1 ED 8. Size of land holding you have

1 ED 7.1 Owned:

Acre

1 ED 7.2 Patta:

Acre

1 ED 9. What is the land value per Acre in your area?

Rs.

1 ED 10. What are the major initiatives of EDC in your area?

SECTION - 2. CHANGE IN SOCIO ECONOMIC CONDITIONS AND DEPENDANCY

(Give time to think)

Objective 2. To understand the change in socio economic status of local communities (EDC members) prior to and after the implementation of ecocodevelopment programme.

Objective 3. To understand the change in the quantum of forest resource use by the local communities after the implementation of ecocodevelopment programme.

6 ED 1. What you were doing **BEFORE** and **AFTER** you becoming a member of the EDC?

2ED1.1 BEFORE JOINING EDC		2ED1.2 AFTER JOINING EDC		2ED1.3 If they changed the job probable reason?
Employee of Forest Department	1	Employee of Forest Department	1	
Employed in other places	2	Employed in other places	2	
Self employed	3	Self employed	3	
No job (Instigate)	4	No job (Instigate)	4	
Grazing and milk production	5	Grazing and milk production	5	
Wage labour	6	Wage labour	6	
Agriculture	7	Agriculture	7	
NWFP collection	8	NWFP collection	8	
Fuel wood collection	9	Fuel wood collection	9	
Fishing	10	Fishing	10	
Forest offences	12	Forest offences	12	
Others (specify)	OT	Others (specify)	OT	
Cant tell	CT	Cant tell	CT	

2ED2. What you & your family would do if the support of ecocodevelopment programme is stopped by Periyar management ?

2ED2.1 Alternative activity	2ED2.2 Worth Rs. Per month
1.	
2.	
3.	

6 ED 3. Kindly tell me how much of monthly income of you & your family is obtained from the following sources **BEFORE** and **AFTER** joining EDC?

(SEE TABLE)

6 ED 4. Could you tell me the details of collection of resources from Periyar Tiger Reserve **BEFORE** and **AFTER** becoming the member of the EDC?

(SEE TABLE)

2 ED 2. Kindly tell me how much of monthly income of you & your family is obtained from following sources BEFORE and AFTER joining EDC in RAINY AND NON RAINY MONTHS?

MEMBERS		A. Extraction of resources from PTR		B. Tourism IN AND AROUND PTR		C. Agriculture IN AND AROUND PTR		D. Employment IN PTR		E. Employment IN AND AROUND PTR		F. Wage Labour IN AND AROUND PTR		G. Self employment IN AND AROUND PTR		H. Pilgrimage JOB IN AND AROUND PTR		I. Grazing & milk production IN AND AROUND PTR		J. 10 JOBS IN micro enterprise/SHG IN AND AROUND PTR		L. Others IN AND AROUND PTR	
		M	N	M	N	M	N	M	N	M	N	M	N	M	N	M	N	M	N	M	N	M	N
2ED2.1 HEAD	2ED2.1B Before EDC																						
	2ED2.1A After EDC																						
	2ED2.1BW Working days																						
	2ED2.1BI Income (Rs.)																						
2ED2.2 WIFE	2ED2.2B Before EDC																						
	2ED2.2A After EDC																						
	2ED2.2AW Working days																						
	2ED2.2AI Income (Rs.)																						
2ED2.3 CHILD 1	2ED2.3B Before EDC																						
	2ED2.3A After EDC																						
	2ED2.3AW Working days																						
	2ED2.3AI Income (Rs.)																						
2ED2.4 Others	2ED2.4B Before EDC																						
	2ED2.4A After EDC																						
	2ED2.4BW Working days																						
	2ED2.4BI Income (Rs.)																						

The details of collection of resources from Periyar Tiger Reserve BEFORE and AFTER becoming the member of the EDC

A. Collection days/month	B. Season months of collection		C. No. of months/year	D. No. of persons per day	E. Hours spent per person	F. Qty. collected/month (Kg/L)	G. Qty. collected in an year (Kg/L)	H. Qty. used at home (Kg/L)	I. Qty. sold to the market (Kg/L)	J. Price per unit (Rs.)	K. Walking distance (km)	L. Place of collection
	B.1 From	B.2 To										
2ED3.13 Cheevakka	2ED3.13B Before											
	2ED3.13A After											
2ED3.14 Pepper	2ED3.14B Before											
	2ED3.14A After											
2ED3.15 Cardamom	2ED3.15B Before											
	2ED3.15A After											
2ED3.16 Reeds leaf	2ED3.16B Before											
	2ED3.16A After											
2ED3.17 Ponnampoo	2ED3.17B Before											
	2ED3.17A After											
2ED3.18 Rudhraksa kotta	2ED3.18B Before											
	2ED3.18A After											
2ED3.19 Turmeric	2ED3.19B Before											
	2ED3.19A After											
2ED3.20 Ginger	2ED3.20B Before											
	2ED3.20A After											

(ONLY TO PEOPLE WHO OWN CATTLE)

6 ED5. Could you tell me the details of grazing in PTR BEFORE and AFTER becoming a member of the EDC?

		A. No. of animals you own			B. No. of animals you send to PTR	C. No. of days you send animals to PTR	D. No. of months per year you send to PTR	E. No. of persons accompanying	F. No. of days per month the person is accompanying	G. Hours spent /day	H. Money saved/cattle by sending to PTR	I. Total milk/day from animal sent to PTR	J. Used at home	K. Sold at market	L. Price per Lt.	M. Location	N. Distance sent
		Total No.	V	I													
2ED5.1 Cattle	2ED5.1B Before																
	2ED5.1A After																
2ED5.2 Goat	2ED5.2B Before																
	2ED5.2A After																

V- Vaccinated

NV-Not vaccinated

I- Insured

NI- Not Insured

SECTION - 3 MAN ANIMAL CONFLICTS

Objective 4. To understand the extent of park people conflicts after the implementation of ecodevelopment programme.

3 ED 1. Have you fell as victims of wildlife attack in last 10 years?

Yes	1	No	2	Can't tell	CT
-----	---	----	---	------------	----

3ED1.1 Year of attack	A Species of wildlife	B Victim (person/animal)	C Loss (Rs.)
3ED1.1 1995			
3ED1.2 1996			
3ED1.3 1997			
3ED1.4 1998			
3ED1.5 1999			
3ED1.6. 2000			
3ED1.7. 2001			
3ED1.8. 2002			
3ED1.9. 2003			
3ED1.10. 2004			

3 ED 2. Please tell me the details of compensation from Periyar Tiger Reserve ?

3ED2.1 How much rupees you got as compensation from PTR in last 10 years?	Rs.
3ED2.2 Are you satisfied with the compensation?	YES 1 NO 2 CT
3ED2.3 How much rupees you expected?	Rs.
3ED2.4 How much Rupees you can bear for PTR?	Rs.

3 ED 3. Have you or your family fell as victims of crop raiding in the last few years?

Yes 1 No 2 Can't tell CT

Year of attack	A Species of wildlife	B Crop damaged	C Total Loss (Rs.)
3ED3.1 1995			
3ED3.2 1996			
3ED3.3 1997			
3ED3.4 1998			
3ED3.5 1999			
3ED3.6. 2000			
3ED3.7. 2001			
3ED3.8. 2002			
3ED3.9 .2003			
3ED3.10. 2004			

3 ED 4. Please tell me the compensation from Periyar Tiger Reserve ?

3ED4.1 How much rupees you got as compensation from PTR in 2004?	Rs.
3ED4.2 Are you satisfied with the compensation?	YES 1 NO 2 CT
3ED4.3 How much you expected?	Rs.
3ED4.4 How much Rupees you can bear for PTR per year?	Rs.

3 ED 5. What you did with the crop raiding animals in the past to keep them away?

3ED5.1 Before joining EDC:	3ED5.2 After joining EDC.
3ED5.1.1 How much you spent? Rs.	3ED5.2.1 How much you spent? Rs.

3 ED 6. What EDC did for mitigating the problem of crop raiding and Wild animal attack?

3ED6.1 Solar Fence	3ED6.OT Other
3ED6.1.1 Present condition	

Yes 1 No 2 CT

3ED 7. Do you feel that the wildlife population has increased due to protection of PTR through EDC?

3ED7.1 If yes, which species increased

3ED7.2 If yes, Do you think the increase in wildlife has increased threat to agriculture?

Yes 1 No 2 CT

SECTION - 4 FUNCTION OF EDCs AND ATTITUDES OF EDC MEMBERS

Objective 5. To understand the attitudes of local communities (EDC members) towards conservation and ecodevelopment.

4 ED 1. What do you think is the main purpose of this programme?

Conservation 1	Livelihoods 2	Development 3	Others OT	Don't know DN
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4 ED 2. Whose body is the EDC?

Forest Department 1	Panchayat Body 2	NGO 3	Your 4	Others OT	Don't know DN
---------------------	------------------	-------	--------	-----------	---------------

4 ED 3. Are you really participating in EDC activities?

Yes 1	No 2
4 ED 3.1 How and Why?	4 ED 3.2. How and Why?

4 ED 4. Are you satisfied with the operation of EDC at present?

Extremely satisfied 1	Satisfied 2	Neither satisfied nor dissatisfied 3	Dissatisfied 4	Extremely dissatisfied 5	CT
4 ED 4.1 Why?			4 ED 4.2. Why?		

4 ED 5. What is micro planning?

4 ED 6. What are the problems you are facing in micro planning?

4 ED 7. How frequently your EDC meets ?

Monthly 1	Once in 2 months 2	Once in 3 months 3	Once in 6 months 4	Yearly 5	CT
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4 ED 8. Your attendance in 2004 in the EDC meetings _____ %

4 ED 9. If you are not attending the meeting frequently, then what is the reason?

You are not interested 1	Do not have time 2	Others (specify) OT	Can't tell CT
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4 ED 10. Qualitative changes;

	A. Always	B. Most of the times	C. Some times	D. Never	E. Can't tell	CT
4 ED 10.1. You were not told the time of meeting						
4 ED 10.2. The time of meeting was not suitable						
4 ED 10.3. The place of meeting was not suitable						
4 ED 10.4. Is there any benefit of meetings						

4 ED 11. What are the voluntary helps that you can render for the upkeep of Periyar Tiger Reserve?

Activity:	A How many days/year	CT
4ED11.1.		
4ED11.2.		

4 ED 12. Have you involved in any conservation activities of PTR voluntarily with out accepting wages for it?

Yes	1	No	2	CT
Which activities?	How many days in 2004 you did it?	4 ED 12.A Why?		
4 ED 12.1. Plastic waste removal				
4 ED 12.2. Fire protection				
4 ED 12.3. Patrolling				
4 ED 12.4. Pilgrimage management				
4 ED 12.5. Brush root check dams				
4 ED 12.6. Planting trees				
4 ED 12.7. Others				

4 ED 13. Apart from the above, how many times you helped PTR in conservation through the following in 2004?

4 ED 13.1 Informing about poaching	4 ED 13.2 Informing about fire	4 ED 13.3 Locating offenders	4 ED 13.4 Reporting evils	4 ED 13.OT Others

4 ED 14. In your opinion why forests & wildlife shall be conserved in PTR ?

For Social benefits	For ecological benefits	For generations to come	For tourism	For biodiversity	Others (specify)	Can't Tell
1	2	3	4	5	OT	CT

4 ED 15. Could you tell me the details of sighting of tiger in and around PTR?

4 ED 15.1 Year	4 ED 15.2 Number of times	4 ED 15.3 Location	4 ED 15.4 Inside/Outside PTR	
			Inside 1	Outside 2
			Inside 1	Outside 2

4 ED 16. How important you think the eco development could influence the potential threats to conservation of PTR ?

Threats from/through	Greatly reduced 1	Reduced 2	Greatly increased 3	Increased 4	No change 5	A. Why no change/ Increased?	DN
4 ED 16.1 1. Encroachment							
4 ED 16.2 Tourism							
4 ED 16.3 Pilgrimage							
4 ED 16.4 Fire							
4 ED 16.5 Grazing							
4 ED 16.6 Ganja cultivation							
4 ED 16.7 Fuel wood collection							
4 ED 16.8 NWFP collection including fishing							
4 ED 16.9 Poaching							
4 ED 16.10 Illicit felling including sandal							
4 ED 16.11 Plastic deposition							
4 ED 16.OT. Others (specify)							

4 ED 17. How do you rate the effect of generation of alternatives for livelihood though the present activities of eco development on long term conservation of PTR? (PLEASE TICK ONE BOX)

Significant effect 1	Moderate effect 2	Low effect 3	No effect 4	Negative effect 5	CT
4 ED 17.1 Why?			4 ED 17.2 Why?		

4 ED 18. How many days you are trained by eco development programme so far?

4 ED 18.1 Year	4 ED 18.2 No. of days	4 ED 18.3 Hours spent	4 ED 18.4 Aspect of training	4 ED 18.5 Expenditure by you for the training

4 ED 19. What do you feel about the following due to eco development activity of PTR in your EDC ?

Change in	Significantly improved 1	Improved 2	No change 3	Worsened 4	Significantly worsened 5	CT
4 ED 19.1 Awareness about conservation in family (by nature clubs) and attitude towards wildlife						
4 ED 19.2 Educational standards of children						
4 ED 19.3 Skills of local people and use of traditional knowledge						
4 ED 19.4 Life standards						
4 ED 19.5 Respect in society						
4 ED 19.6 Relations with foresters						
4 ED 19.8 Power of local people to influence decisions on PTR						
4 ED 19.9 Micro enterprises at rural level						
4 ED 19.10 Condition of Roads						

4 ED 20. What in your mind has happened good after the formation of EDCs and how?

4 ED 21. What has happened bad during this time and why you think so?

4 ED 22. How in your perception about Park has been in the last 10 years? (Historical Sense)

4 ED 23. Who is the most important for your EDC and why?

4 ED 24. Has forest protection improved due to ecodevelopment/EDCs

Yes 1	No 2
4 ED 24.1 How?	4 ED 24.2 Why?

4 ED 25. Can you tell about any area which has regenerated after functioning of EDCs?

4 ED 26. Do you think this programme can continue in future?

Yes 1	No 2
	4 ED 26.1. Why?

4 ED 27. Can this scheme be successful in other sanctuaries and National Parks?

Yes 1 4 ED 27.1 How?	No 2 4 ED 27.2. Why?
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4 ED 28. How can we improve the ecodevelopment programme?

SECTION 6- IMPACTS OF ECO DEVELOPMENT ON COMMUNITY EMPOWERMENT

Objective 6. : To examine the empowerment of the communities for the sustainability of the programme.

Objective 7. To examine the extent of social capital generated among the EDC members for sustainability of the programme.

Empowerment:

5 ED 1. Do you think your committee/ EDC has representation of everybody from the village? If not, how and why?

5 ED 2. Do you know how much money is available in the EDC account?

5 ED 3. What is your role in deciding and doing the activities of EDCs?

5 ED 4. Are there times when there are conflicts with in the members?

Yes 1	No 2	CT
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5 ED 4.1. If yes, then what kind of conflicts. How these conflicts are resolved and by whom?

5 ED 5. Who is maintaining the accounts and records for the EDC and why?

5 ED 6. Are you satisfied how programme was designed?

Yes 1	No 2	CT
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5 ED 6.1. If not how it could have been better designed?

INSITTUTIONAL SOCIAL CAPITAL

5 ED 7. Do you think EDCs have the capacity to successfully run ecodevelopment programme

Yes 1	No 2	CT
-------	------	----

5 ED 7.1. If No, What are the limitations?

5 ED 8. Do you have any suggestions for ensuring the success of the eco development programme?

5 ED 9. Will you prefer individual or group activities and why? (Unity)

5 ED 10. How do you take decision if there is a conflict over some issue? (Corporate)

5 ED 11. Did your EDC ever collaborate with other agencies for executing or planning some activities? (Collaboration)

5 ED 12. Did any other agency like panchayat or government departments came forward to entrust any responsibilities to your EDC? (Trust credibility)

5 ED 13. Does your EDC has any association with local panchayath, other departments or agencies for any activity or programme in the area? (Net working Capacity)

INDIVIDUAL SOCIAL CAPITAL

5 ED 14. Do you think that there is any need to work together? (Group feeling)

5 ED 15. How do you see the past, present and future? (Historical sense)

5 ED 16. What is that which makes you feel proud and why? (Self Pride)

5 ED 17. What makes you feel important in the society? (Self recognition)

SECTION 2- WILLINGNESS TO PAY

Objective 8. To understand the acceptability of different strategies of PTR management to EDC members starting from exclusive approach to limited participation to active participation.

Strategy 1-Let me explain some management strategies for PTR. In the first strategy, management aims at biodiversity conservation alone. Local people will not be allowed to use forests in any form. No visitors will be allowed in PTR. But people will get benefits like irrigation, electricity etc. from the dams existing at present.

6 ED 1. What do you say about this management strategy of PTR (PUT A TICK)

Strongly support	1	Support	2	Neither support nor against	3	Oppose	4	Strongly oppose	5	CT
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6 ED 1.1 Why?

Indigenous people should be permitted	1
Visitors should be permitted	2
Both Visitors and Indigenous people should be permitted	4
No income for maintenance of Periyar Tiger Reserve	5
Lack of job opportunities will lead to forest destruction	6
Threat to livelihood	8
Others (Specify)	OT
Can't tell	CT

6 ED 2 Since Government cannot provide sufficient funds always, will you be willing to pay to the Periyar Tiger Reserve for conserving the biodiversity by this strategy annually. (PUT A TICK)

Yes	1	No	2
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6 ED 2.1 Because

6 ED 2.2 Because

GO TO 6 ED4

I want to support biodiversity conservation	1
Others (specify)	OT
No justification	NJ
Can't Tell	CT

6 ED 3. (IF YES) In that case, shall I ask you how much rupees you will be willing to conservation of biodiversity of Periyar Tiger Reserve by this strategy annually (FILL IN)

Rs.

A. Nil B. Can't disclose C. Don't Know

It is a public property and Govt. has to bear cost	1
I am a tax payer and hence it is unfair	2
I have a poor financial status	3
No trust in Periyar Tiger Reserve	4
This should be compensated against the fee of activities	5
Lack of transparency and Corruption in the system	12
No Developments and Misutilization of funds	13
No Justification	NJ
Others (Please specify)	OT
Can't tell	CT

Strategy 2: Let me explain another management strategy. Here, the management aims at conservation of biodiversity providing particular identified zones as being done at present. Tourists will be allowed to visit PTR, but the activities will be highly restricted in based ecotourism and other alternatives. Indigenous people will be given chance to earn a living through community affecting detrimentally the biodiversity. In conclusion, activities like ecotourism and pilgrim management, support to agriculture and other livelihoods alternatives as done now in PTR will be supported through ecodevelopment programme.

6 ED 4. What do you say about this management Strategy of PTR?

Strongly support 1	Support 2	Neither support nor against 3	Oppose 4	Strongly oppose 5	CT
--------------------	-----------	-------------------------------	----------	-------------------	----

6 ED 5 Since you are given a chance to see animals in forests and enjoy the scenic value, will you be willing to pay to the Periyar Tiger Reserve for conserving the biodiversity of PTR by this strategy annually. (PUT A TICK)

Rampant corruption and lack of transparency	1
Inadequate facilities	2
Adverse environmental impacts	3
Others (Please specify)	OT
Can't tell	CT

Yes 1 No 2

6 ED 5.1 Because

I want to support biodiversity conservation	1
I want to support development of facilities	2
Others (specify)	OT
No justification	NJ
Can't Tell	CT

6 ED 5.2 Because

It is a public property and Govt. has to bear cost	1
I am a tax payer and hence it is unfair	2
I have a poor financial status	3
No trust on Periyar Tiger Reserve	4
This should be compensated against the fees for activities	5
Lack of transparency and Corruption in the system	12
No Developments and Misutilization of funds	13
No Justification	NJ
Others (Please specify)	OT
Can't tell	CT

(PUT A TICK)

GO TO 6 ED7

6 ED 6. (IF YES) In that case, shall I ask you how much rupees you would be willing to pay to the Periyar Tiger Reserve for the conservation of biodiversity of Periyar Tiger Reserve by this strategy annually, (FILL IN OR PUT A TICK)

Rs.

A. Nil B. Can't disclose C. Don't Know

Strategy 3: Let me explain another management strategy. This is similar to the second one I told, but involves totally decentralized system of management. Government will not provide any funds for PTR and it's role will be restricted to provide policy support only. The income generated from PTR will be retained in the sanctuary itself and will not be paid to the Government treasury. This money will be used for running the complete management of PTR. This will also be used for running ecotourism and community based ecotourism programmes to support the livelihood of indigenous people. Continuous monitoring will be done by people themselves to prevent the damages caused by external threats as well as ecotourism based activities. (SHOW CARD).

6 ED 7. What do you say about this management strategy of PTR? (PUT A TICK)

Strongly support 1	Support 2	Neither support nor against 3	Oppose 4	Strongly oppose 5	CT
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6 ED 7.1 Why?

6 ED 8 Since you are given a chance for complete independence of managing the PTR and better and diverse chances of enjoyment in Periyar Tiger Reserve, will you be willing to pay to the Periyar Tiger Reserve for conservation of biodiversity by this strategy annually. (PUT A TICK)

Rampant corruption and lack of transparency	1
Inadequate facilities	2
Adverse environmental impacts	3
Others (Please specify)	OT
Can't tell	CT

Yes 1	No 2
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6 ED 8.1 Because

I want to support biodiversity conservation	1
I want to support development of facilities	2
Others (specify)	OT
No justification	NJ
Can't Tell	CT

6 ED 8.2 Because

GO TO 6 ED10

It is a public property and Govt has to bear cost	1
I am a tax payer and hence it is unfair	2
I have a poor financial status	3
No trust in Periyar Tiger Reserve	4
This should be compensated against the fees of activities	5
Lack of transparency and Corruption in the system	12
No Developments and Misutilization of funds	13
No Justification	NJ
Others (Please specify)	OT
Can't tell	CT

6 ED 9. (IF YES) In that case, shall I ask you how much rupees you would be willing to pay to the Periyar Tiger Reserve for the conservation of biodiversity of Periyar Tiger Reserve by this strategy, annually. (FILL IN OR PUT A TICK)

Rs.

A. Nil	B. Can't disclose	C. Don't Know
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6 ED 10. If the government decides that a certain amount of the revenue accrued through Periyar Tiger Reserve should be reinvested for development of local people what % do you prefer? (FILL IN OR PUT A TICK)

%	DN. Do not know
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Format for rapid survey of staff

Annexure IV

Objective: To gather information for stratification of staff for detailed survey.

1. Name of the staff:
2. Length of service:
3. Category/ designation:

CCF/CF	DFO/ACF	ROs	DRO/FR	FG	MS	CS	Others

4. Period of working in PTR:

<1 yr.	1-2 yrs.	2-3 yrs.	>3yrs.

5. Age:

<30 yrs.	30-40 yrs.	40-50 yrs.	>50 yrs.

6. Education qualification:

<10	10-12	Degree	PG and above

7. Whether worked in Village Ecodevelopment or not: Yes No

8. How long worked in Village Ecodevelopment:

<1 yr.	1-2 yrs.	2-3 yrs.	>3yrs.

9. Trained in Ecodevelopment or not: Yes No

India Ecodevelopment Project Periyar Tiger Reserve

Annexure V

2002-2003

1. What is your designation?

Range Officer	Dy. Ranger/ Forester	Forest Guard	Ministerial staff	Contract staff	Other staff

2. Under which office you are/ were working in PTR?

Ecodevelopment Office	Periyar East Division	Periyar West Division (Previous GLAD)

3. How long you have worked in PTR?

<1 Yr.	1-3 Yrs.	3-5 Yrs.	>5 Yrs.

4. Where you are working now? In PTR Outside

5. If in PTR, where?

Tourism zone	Buffer zone	Core area	Office

6. Have you received any training in Ecodevelopment/ PRA?

Yes	No

7. How much is your understanding about Village Ecodevelopment?

Very high	Medium	Less	Nil

8. Have you been involved in village ecodevelopment programme?

India Ecodevelopment Project Periyar Tiger Reserve

Annexure V

2002-2003

1. What is your designation?

Range Officer	Dy. Ranger/ Forester	Forest Guard	Ministerial staff	Contract staff	Other staff

2. Under which office you are/ were working in PTR?

Ecodevelopment Office	Periyar East Division	Periyar West Division (Previous GLAD)

3. How long you have worked in PTR?

<1 Yr.	1-3 Yrs.	3-5 Yrs.	>5 Yrs.

4. Where you are working now? In PTR Outside

5. If in PTR, where?

Tourism zone	Buffer zone	Core area	Office

6. Have you received any training in Ecodevelopment/ PRA?

Yes	No

7. How much is your understanding about Village Ecodevelopment?

Very high	Medium	Less	Nil

8. Have you been involved in village ecodevelopment programme?

Yes	No

9. If yes, in what way? What in your opinion had been your participation in the programme?

Sl. No.	Component	Your participation				No opinion
		High	Medium	low	Nil	
1	PRA/ microplanning					
2	Programme implementation					
3	EDC Meetings					
4	EDC field visits/ Discussions					

10. What in your opinion is the objective of Ecodevelopment programme?

Park conservation	Livelihoods for local people	Development of local people	Others	Not aware

11. To what extent, in your opinion, Ecodevelopment programme has been able to benefit PTR conservation?

Sl. No.	Component	Level of benefits				No opinion
		High	Medium	Low	Nil	
1	Facilities to the staff					
2	Conservation awareness					
3	Research and monitoring					
4	Livelihoods to the Park dependent people					
5	Reduction in the dependencies of forest resources of local people on the Park					
6	Relation between park staff and local people					
7	Support of local people in Park protection through:					
	a. Providing information					
	b. Active patrolling					
	c. Apprehending offenders					
	d. Fire protection					
8	Mutual relation between the field staff, Office staff and other technical staff					

12. In your experience what has been the involvement of different levels of staff and other peoples in the programme?

Sl. No.	Staff/people	Level of involvement				No opinion
		High	Medium	low	Nil	
1	CCF					
2	FD					
3	DFOs					
4	EDO					
5	AFD					
6	Wildlife Assistant					
7	Range Officers					
8	Dy. Rangers/ Foresters					
9	Forest Guards					
10	Contract staff					
11	Office staff					
12	Panchayat					
13	Political leaders					
14	NGOs					
15	Media					
16	Staff/Officials outside PTR					
17	Other departments					

13. Do you think you need some training in Ecodevelopment?

Yes	No

14. What in your opinion has happened good due to the implementation of this new programme?

15. What in your opinion has happened bad due to the implementation of this new programme?

16. Who in your opinion should be the most important for field implementation of Ecodevelopment programme?

DFO/EDO/ACF	ROs	Dy. ROs	Foresters	Forest Guards

16. Any others remarks.

Date:

Name (Optional)

Component wise investment received by sampled EDCs

Annexure VI

Sl. No.	Name of EDC	Investment (Rupees in Lakhs)					Total	Per HH
		Income generation support	Community Infrastructure	Community Welfare	Implementation			
1	Anakallu	3.15	3.01	0.07	0.14	6.37	0.13	
2	Attathodu-1	7.96	3.9	1.14	0.28	13.28	0.18	
3	Kuttikkayam	7.53	1	0.81	0.14	9.48	0.16	
4	Kuzhimavu-1	11.08	4.24	0.41	0.19	15.92	0.13	
5	Moozhickal	10.99	1.39	0.84	0.14	13.36	0.14	
6	Mukkampatty-2	9.02	2.11	0	0.14	11.27	0.16	
7	Ceylon Colony	4.3	0.07	0.3	0.21	4.88	0.12	
8	Chottupara	12.48	2.03	1.48	0.05	16.04	0.15	
9	Gandhi Nagar	3.31	0.04	1.9	0.31	5.56	0.16	
10	Mannakudy-1	10.04	0.92	0.03	0.15	11.14	0.15	
11	Mattupetty-2	10.33	0.5	0	0.31	11.14	0.13	
12	Paliyakudy	15.93	3.15	0.95	0.24	20.27	0.17	
13	Sathram Colony	14.72	3.11	0	0.14	17.97	0.15	
14	SpringVally-1	13.65	0.15	0	0.14	13.93	0.16	
15	Vallakadavu-2	9.51	0	0.15	0.14	9.8	0.10	
16	KFDC Kochu Pamba	10.81	0.51	0	0.14	11.46	0.11	
17	SAPP Karimala (Valiyanavattam)	2.5	11.7	0	0.14	14.34	0.22	
18	Exvyna	1.91	1.55	0	0.14	3.6	0.16	
19	Thekkady PETS	13.28	8.64	0.92	0.1	22.94	0.35	
20	Tribal Trekkers I	0.36	2.17	0.02	0.24	2.79	0.14	
21	Kollampattada (W)	3.64	0.11	0	0.3	4.05	0.15	
Total Investment		176.5	50.29	9.01	3.78	239.59		
Average Investment		8.4	2.39	0.43	0.18	11.41	0.16	
Maximum Investment		15.93	11.7	1.9	0.31	22.94	0.35	
Minimum Investment		0.36	0	0	0.05	2.79	0.10	

Annexure VII

Institutional strength of EDCs on different parameters

Name of EDC	CDF	CDF mgmt.	Capacity	Participation	Women empowerment	Conflict resolution	Overall strength
Anakkallu	2	1	1	1.33	1.33	1	1.28
Attathodu 1	2	1	1	1.57	1.33	2	1.48
Ceylon Colony	1	1	1	2.08	0.00	3	1.35
Chottupara	1	1	1	1.22	1.67	3	1.48
Gandhi Nagar	1	1	2	2.00	1.33	3	1.72
Kuttikayam	3	1	2	2.29	2.33	2	2.10
Kuzhimavu 1	1	3	3	2.70	3.00	3	2.62
Mannakudi 1	3	2	2	1.43	1.33	2	1.96
Mattupetty 2	1	1	1	1.69	1.33	1	1.17
Mookampetty 2	1	2	2	1.79	3.00	2	1.97
Moozhikal	3	3	3	2.44	1.67	2	2.52
Paliyakudi	3	2	2	2.25	1.67	2	2.15
Sathram Colony	1	1	2	1.55	1.00	2	1.43
Springvalley	3	2	1	1.63	1.67	2	1.88
Vallakkadavu 2	3	1	1	2.00	1.33	2	1.72
<i>Neighbourhood total</i>	<i>1.9</i>	<i>1.5</i>	<i>1.7</i>	<i>1.86</i>	<i>1.60</i>	<i>2.13</i>	<i>1.87</i>
Ex-Vayana	2	2	3	3.00	0.00	3	2.17
KFDC-Kochupamba	3	2	1	0.28	0.00	3	1.55
PETS Thekkady	3	3	3	3.00	0.00	2	2.33
Tribal Trackers	3	3	3	3.00	0.00	3	2.50
<i>Ecotourism total</i>	<i>2.8</i>	<i>2.5</i>	<i>2.5</i>	<i>2.32</i>	<i>0.00</i>	<i>2.75</i>	<i>1.69</i>
SAPP Valiyanavattam	1	1	2	2.21	0.00	2	1.37
<i>Pilgrimage total</i>	<i>1</i>	<i>1</i>	<i>2</i>	<i>2.21</i>	<i>0</i>	<i>2</i>	<i>1.40</i>
Kollampattada (W)	1	2	3	2.90	1	3	2.15
<i>User group total</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>2.90</i>	<i>1.00</i>	<i>3.00</i>	<i>2.30</i>
<i>Total</i>	<i>1.7</i>	<i>1.5</i>	<i>2.1</i>	<i>2.32</i>	<i>0.65</i>	<i>2.47</i>	<i>1.81</i>