INTEGRATING CULTURAL & BIOLOGICAL DIVERSITY INTO THE CONSERVATION OF AGASTHYAMALAI BIOSPHERE RESERVE

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FOREWORD

At the World Summit on Sustainable Development, Johannesburg, UNESCO jointly with UNEP convened a high level Round Table in 2002 on "Cultural Diversity and Biodiversity for Sustainable Development" based on the assumption that biological and cultural diversities are mutually reinforcing and interdependent, and that cultural diversity and biological diversity together hold the key to ensuring resilience in both social and ecological systems. During this Round-Table the interrelationship of cultural diversity and biological diversity was explored, and it was agreed that there was a need to further understand and promote action on this topic.

As a follow-up to this recommendation, UNESCO decided to launch an interdisciplinary and intersectoral undertaking in the area of biodiversity and cultural diversity which builds upon the work of UNESCO on culture and development, linkages between sacred sites, cultural landscapes and nature conservation and local knowledge, values and world views as bases for understanding the interaction between biodiversity and cultural diversity. These are issues that have been explored since the early 1980s. Unique expressions of biological and cultural diversity coincide in UNESCO's Biosphere Reserves, World Heritage sites and island systems.

It is in the above context that a rapid analysis was undertaken by the Applied Environmental Research Foundation, Pune, and the Kerala Forest Research Institute, Peechi, which has resulted in this publication entitled "Integrating Cultural and Biological Diversity into the Conservation of Agasthyamalai Biosphere Reserve". This publication has a wealth of information and reveals that there is a definite linkage between cultural diversity and biodiversity in the Agasthyamalai Biosphere Reserve. The traditional societies like Kanis of the ABR perceive the biodiversity based on their indigenous knowledge and they respect the nature and the elements around them though they use the same for their well being and livelihood. Whereas the non-traditional societies perceive the nature and the forest resources only as useful and useless commodities. The forests being replaced by rubber plantations is a common sight throughout the

Peppara and Neyyar areas. In this process, the synergy of people and nature has been disturbed within the Agasthyamalai Biosphere Reserve area.

Given the above findings, it would seem important to understand the indigenous knowledge systems and possibilities to make best use of them in conservation and development. Such an approach will help to maintain the cultural identity of the Kanis. Also, there is a need for detailed studies, documentation and in-depth research work before implementing any special biodiversity conservation and management programme.

We would like to record our sincere thanks and gratitude to Dr. J.K. Sharma, Director, Kerala Forest Research Institute, Peechi, for all his support which made this research possible. We would, particularly, like to thank Dr. Archana Godbole, Director, Applied Environmental Research Foundation, Pune, for taking on and coordinating this short-term research programme jointly with Dr. V. Anitha and Dr. U.M. Chandrashekhara from the Kerala Forest Research Institute, Peechi, and for her enthusiasm, diligence and perseverance in seeing the present publication into print.

We hope that this publication will be of interest to a wide variety of audience scientific community at large, policy planners and administrators and governmental and non-governmental agencies concerned with management of natural resources linked with sustainable development.

Minja Yang
Director, New Delhi Office
31 October 2005

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Abbreviations

ABP	:	Agasthyavanam Biological Park
ABR	:	Agasthyamalai Biosphere Reserve
AERF	:	Applied Environmental Research Foundation
DTPC	:	District Tourism Promotion Council
GBH	:	Girth at Breast Height
ICDP	:	Integrated Conservation & Development
IVI	:	Important Value Index
KFD	:	Kerala Forest Department
KFRI	:	Kerala Forest Research Institute
KMTR	:	Kallakkad Mandanthurai Tiger Reserve
KTDC	:	Kerala Tourism Development Corporation
MAB	:	Man & the Biosphere Programme
PRA	:	Participatory Rural Appraisal
PA	:	Protected Area
SNS	:	Sacred Natural Site
TBGRI	:	Tropical Botanical Garden & Research Institute
UNESCO	:	United Nation's Educational, Scientific & Cultural Organization
WLS	:	Wild Life Sanctuary

Within last two decades there has been an increasing understanding that indigenous cultures can provide solutions to the challenges of achieving participatory biodiversity conservation. Off late it has been realized by planners and policy makers that there is a concrete relationship between these ancient cultures and their epistemologies that are responsible for biodiversity conservation. Such traditions are in many forms like legends, indigenous knowledge systems, stories, songs, rituals, cultural perspective of use and protection of forests and biodiversity, sacred forests, sacred groves and sacred landscapes. The concept of sacred has provided the utmost superior protection to the biodiversity and norms for collective protection for the community are often in the form of oral history or expressed in the traditions like sacred groves or sacred landscape. The intimate relationship with the land and resources through respect for all "elements" is the key to survival of indigenous communities in difficult landscapes. The indigenous cultures share a concept of reciprocal relationship with the natural forces that are responsible for the being of these people. This relationship with nature is not static but dynamic and over the period of time it builds into a more complex bondage with nature.

However, the story is not that simple. It is difficult to understand the complicated relationship of cultures and biodiversity, which had been contributing to protection of resources through the ages and was responsible for developing respect about the nature and natural forces among the communities. The western world has started realizing this complex linkage of people, their relationships with nature maintained through the culture. However it is extremely difficult for them to understand the fact that acculturation is at its peak and is disintegrating the cultures through modern lifestyle as well as progressive development models. The situation is far more difficult for designing conservation frameworks involving these indigenous people safeguarding the resources since generations. It is still a quest to understand the traditions and cultures of such societies living in harmony with the nature and to seek answers to the complicated conservation challenge.

Ultimate protection has been provided to the biodiversity all over the world through protected area networks and highest protection is given to the biosphere reserves. As a matter of fact most of the forest tracts and biodiversity concentration areas around the globe have traditional societies in the surrounding area. In the initial planning most of the protected areas were evacuated and indigenous people using the resources of the reserves and living in harmony with their landscapes were driven away. The degradation of the forests and loss of biodiversity was continued and custodians of the

forests were forced to fall prey to the modernization processes thereby contributing to further deterioration of the resources within and outside the protected areas.

Therefore it is all the more difficult to continue the course of development and bring these societies into the "mainstream" without breaking their bondage with nature.

It is also theorized through many studies that there is a definite relationship between cultural and biological diversity in any given area or land. The relationship always existed; though in a deviated manner and change has been in most of the cases brought in by external non natural forces especially by non indigenous cultures and people through encroachments. Such encroachments are not restricted to sharing the resources but become exploitative and ultimately responsible for further deterioration of indigenous cultures and therefore the biodiversity and natural resources.

The concept of cultural landscape

Natural landscapes, have often viewed as biophysical units divorced from the humans, as though these are 'pristine', untouched by human civilization. The shift in ecological paradigm occurred when perturbation was more and more recognized as an integral component of ecosystem (eg., human impacted ecosystems in pre-Columbian South America, spanning over 12,000 yrs). On the other hand, the term cultural landscape is often viewed as one physically transformed by human action, these impacts being measured by the stage of human evolution on the landscape, ranging from hunter-gatherers through shifting agriculturists leading to intensively managed land use systems of the industrial societies (Kumar and Ramakrishnan 1990; and Ramakrishnan et. al. 2005, 2006).

There is wide recognition worldwide and across the disciplines that regions of ecological caution exhibit a symbiotic relationship between physical ecosystems and social systems with strong cultural interconnections between the two. This demonstrates that culture and environment are complementary and in various stages of evolution (Ramakrishnan 2001). However, these traditional societies are no longer immune to changes occurring everywhere and continually. The predominant culture of the over consumption of natural resources is making an impression on these societies , resulting in the erosion of their time tested and value based institutions.

Social institutions in connection with biological resource management are often linked to religious myths and socio cultural belief systems. Such a concept of the sacred often has special dimensions and specificities. Ramakrishnan (1996) has conceptualized broad hierarchy of social institutions and sacred entities. These include a) spatially diffused sacred landscape b) spatially defined sacred landscape c) sacred groves and d) sacred species.

The concept of sacred grove and sacred species has been studied over last three decades in details but the sacred landscapes are being discussed only for last decade. Sacred landscapes have a particular significance in terms of biodiversity conservation. It is in this context the Agasthyamalai sacred landscape becomes significant. Being a huge area it can be considered as a spatially diffused sacred landscape.

The World Heritage convention, 1972 is a unique international instrument for conserving cultural and natural heritage of outstanding universal value. This provides an opportunity for protecting natural sites and archaeological sites of outstanding universal value, from a historical, ethnobiological

or aesthetic perspective. With the World Heritage Convention recognizing three categories of cultural landscapes, namely, (i) clearly defined landscapes designed and created intentionally by humans, such as garden and parklands; (ii) organically evolved landscapes, that may still be organically evolving or relicts; and (iii) associative landscapes, by virtue of religious, artistic or cultural associations that are intangible, the cross-cutting dimensions of ecology, economics and ethics, spread across a variety of disciplinary realms is becoming more and more relevant for natural resource management. In the contemporary context, these cultural entities provide not only intangible benefits that enable humans to arrive at a harmonious relationship with nature, which includes leisure, as well as providing tangible benefits through the biodiversity that is conserved and managed through human actions.

In the contemporary context of 'global change' in an ecological sense, and 'globalization' in an economic context, which is rapidly overtaking traditional approaches to ecological inquiries, there is an urgent need for interaction between the ecological, social and cultural dimensions of a given environmental problem; there is a need to look into the wider context of how societal perceptions differ and how the same environmental issue, oftentimes, is perceived differently by different cultural groups, which may form the basis for coping with greater environmental uncertainties arising from 'global change' and 'globalization' (Ramakrishnan 2004). Mountain societies in the developing world still consider themselves as part of a cultural landscape in which they are placed, and this forms the basis for the more recently evolved 'Biosphere Reserve' concept, which aims at linking conservation with sustainable development of societies. It is in this context that the 'Globally Important Indigenous Agricultural Heritage Systems' (GIAHS) of FAO becomes significant.

In this context, it is important to look at ecosystems and their cultural history to know the possibilities of integrating culture and conservation for long term protection to biodiversity maintained through such systems.

Cultural landscape and ecosystem services

Human cultures, knowledge systems (traditional and formal), religions, social interactions, and amenity services have always been influenced and shaped by the nature of the ecosystem. While we can think of specific cultural 'services' that ecosystems provide (e.g. aesthetic enjoyment, recreation, spiritual fulfillment and intellectual development) it is quite artificial to separate these services or to separate their combined influence on the quality of human life and well-being (Ramakrishnan 2004).

Recognising the different types of spiritual, intellectual, and physical links between human cultures and ecosystems that are inseparable, it is necessary to explore these different dimensions of the human-ecosystem relationship in the context of main types of cultural and amenity services provided by natural ecosystems and landscapes.

These types are

i) Cultural diversity and identity,
ii) Spiritual services,
iii) Knowledge systems,
iv) Cultural landscapes and heritage values,
v) Inspiration (e.g. for arts and folklore),
vi) Aesthetics, and
vii) Recreation and tourism.

The Major concern is sustainable management of natural resources, with sustainable livelihood and improved quality of life to local communities.

The key question for this rapid analysis was therefore how these ecosystem services affect biodiversity and human well-being? While assessing it for ABR it is critical to address three main issues viz
(a) Current status and dependence on ecosystem/landscape condition,
(b) Observed changes and future trends, and
(c) Effects of changes on human well-being.

The Agasthyamalai Biosphere Reserve (ABR) is a natural unit of mountain system at the southern end of Indian peninsula. It has the largest tract of wet evergreen forests of Western Ghats. This region also represents a pristine paleotropic region with very high floral endemism and rich biodiversity. The ABR is an important biosphere reserve in the world where the indigenous culture, religion and spirituality are associated with the biological diversity.

This report is an attempt to look at Kani tribals from Agasthyamalai Biosphere Reserve (ABR) from Kerala; India and their culture to demonstrate the interdependence of biological and cultural diversity and need to jointly conceptualize their sustainability. It has been also tried to recognize the cultural diversity[1] responsible for human- environment relationships, how to promote cultural perspective in development strategies and how to develop a pilot action plan for sustaining both cultural as well as biological diversity.

In this rapid study following aspects were analyzed to understand the present linkage of culture and conservation.

- Traditional Knowledge of Kanis and their association with ABR forests
- Recent development of PA management systems and plantation forestry
- Cultural perspective of forests and its association with Kanis
- Ecosystem services through the ABR landscape
- Understanding ABR as sacred and cultural landscape of Kanis
- Ecological status of ABR forests
- Socio economic status of Kanis

[1]Cultural diversity implies the range of practices followed by Kanis for developing the synergy to live in ABR landscape rather than different cultural or indigenous groups.

The rapid study and analysis of situation within ABR demonstrated the fact that how and why both the diversities are at high risks as well as how the new status of biosphere reserve may help them to survive hand in hand. In today's context many other stakeholders are involved in the use and management of ABR resources. Their impact and influence on the traditions and culture of Kanis is important to understand the complicated resource use patterns and forced sharing of resources.

Before going into details of our rapid study, let us look at the perceptions of various stakeholders that are operating, associated, dependent and exploiting the ABR resources in various ways and means. Though ABR has been a sacred landscape of Kanis, in post independence development era, various other stakeholders were associated with ABR resources and were responsible for changes in the landscape.

Ummanikani, an old man from Neyyar WLS area ....

"Forest and the land is ultimate for us. Agasthyamuni is our Supreme God. Though we also have other sacred places within the forests, we worship Agasthyamuni and we know these forests as His abode. Our lesser gods Karathambura and Bhudaga help us survive in the forests. Forest means everything to us. As per our forefather's knowledge and teachings; we know that forests are also changing. As we throw the old cloths we also need to clear some forests that are deteriorating. But how forests are deteriorating naturally ; that I can't tell you. It is my knowledge acquired from my ancestors and by experience of being one with forest. However due to cutting and selective burning of the forest new grass and plants appear which provide fresh food to herbivores like deer . I can not tell you the total number of species in our Agasthyamalai forests and I don't have any right to count them either. So far due to various developmental programmes and conservation activities both forests and life have been affected badly. With so much of the development we are still there; without any direct or indirect benefits of the development. Earlier we use to grow 108 different varieties of crops in our shifting agriculture. Now we are displaced and settled at one place, our agriculture pattern has changed and we lost most of those valuable varieties.

Our rituals are for our well being, for our resources in the forests and for our ancestors. We worship and perform rituals also for betterment of our young generation. Thetumalay lengam is our ancient sacred forest for Bhudaga. Rock shelter Ayyaviluyam is very near the village. By keeping a small lamp on the leaf we worship these places and are blessed by our ancestors. We were protecting our forests by blessings of gods and ancestors. But everything has changed since the Forest Department took over the protection and management of the forests without involving us.

Till such time when there was no Forest Department and outsiders, we were living in perfect harmony with our forests. There was an understanding between Kanis and animals about each others being in the forests. Protected areas and dams changed all that. Later alcohol damaged our lives. Due to changed land use and occupations Kanis become more and more lazy. Illegal hunters and poachers came with their Mafia. While working as trackers for them, we were held responsible for poaching.

Roads, schools and eco development everything has come but we are still as poor or poorer than before. Wherever the outsider reaches; the forest changes slowly and dies slowly with its original people."

Temporary field staff of forest department.....

"Long time ago there used to be thick rosewood forest in some pats of the Kottur division of Neyyar sanctuary . Due to illegal cutting and poaching the populations were devastated to such an extent that there is no scope for natural regeneration anymore. In Neyyar area the main issue however is not illegal cutting but illegal brewing of liquor. Debarking of huge trees to kill them is another hazardous practice.

Now eco development programme funding has been stopped. Kanis are becoming lazy. Who made ' them lazy? There are many cases of crop damage by wild animals. But not everyone is compensated. If they undertake a ritualistic community hunt, we permit them. Now a days Kanis are getting organized and have started fighting for their rights. Their battle is with the government and government representatives.

Actually only 2% of the Kanis are part of the anti-social elements and support Mafia. But they disgrace all the Kanis. These poor Kanis somehow live in a 'hands to mouth' situation and do not get any livelihood support. It is of utmost importance to involve them in the task of forest protection, but before that there has to be an effort to understand them seriously. This is a long process. Do we have time to follow it? We must take Kanis into confidence while designing any programme in their traditional area. There is a tussle between other development and poverty reduction programmes like promoting rubber plantations deep inside the forests.

What will happen when the ABR conservation programme will come into force? How will we provide the utmost protected status to already degraded ABR forests and where to search the valuable biodiversity? Many more such questions , for which we need to search for solutions. However Forest Department. alone cannot resolve the issues. There has to be changes at policy level , there has to be interdepartmental cooperation. But is it is like belling a cat . Who will do it ?"

Common tourist at Neyyar dam gardens.....

"It is a great pleasure to visit Neyyar dam area and the landscape garden surrounding the dam. Now there are lot of facilities developed for tourists. Boat rides are cheap. We can easily spend a day on a family outing. The lion safari is main attraction for children. We do not know much about the wildlife and sanctuary. We do not know about Agasthyamalai Biosphere Reserve. We only know that due to some legal restrictions of KFD, common tourists like us cannot go inside the forest areas. Neyyar area is developed much better and we are fortunate that we have such a place very near to a growing city like Trivandrum."

All these perceptions and worries expressed for forests and biodiversity are worthy enquiries. These narrations provide a challenge to develop all-inclusive frameworks to achieve conservation of biodiversity through the biosphere reserves guidelines and the highest protection provided through that status. This report is one such effort to contribute to the understanding of relationship of people, forests and cultures in order to develop a contemporary understanding of the cultures and traditions that have maintained the forests through ages. The comments of laymen and the business sector clearly indicate the need for awareness generation for various stakeholders. Through our rapid assessment we tried to seek answers to some of their questions and tried to look at the conservation and cultural issues in a more holistic manner.

Introduction

Biological diversity & cultural identity

Sacred landscapes and sacred sites are facing enormous challenges in today's context. Community managed institutions helped to maintain them in often-pristine conditions. The natural protection to such high biodiversity areas or sacred landscape components received due to cultural beliefs has resulted in conservation of precious natural resources like water, timber, flora and fauna for the generations to come. To ensure the long-term success; the beliefs and practices of the indigenous communities need to be linked to the new approach of natural resource conservation. For example sacred sites and the cultural beliefs surrounding them can serve as inspirational communication tools for new conservation efforts. Through such communications communities can develop their own locally appropriate conservation plans and activities so that the cultural beliefs and practices that have conserved the environment in a sustainable manner can be honored , maintained and revived. However it is easier said than done as the linkage between cultural and biological diversity has almost disappeared. The processes responsible for such result are vaguely known. It is therefore necessary to look at the surviving traditions and cultures, their relationship with indigenous institutions responsible for nature conservation with new vision. Rather than providing answers to symptoms like tourism and infrastructure development that have changed the landscapes along with acculturation, it is important to look at the relationship between the culture & biodiversity, their interdependence and root causes of declining status of the traditional institutions responsible for conservation in the past.

The synergy of people and nature has been disturbed in the process of development. The new materialistic culture approaching human life and its speed is degrading the indigenous cultures. It is important to understand these indigenous knowledge systems and possibilities to make best use of them in conservation and development. Such an approach will help to maintain the cultural identity.

People & biosphere reserves

In many cultures of the world, sacred natural sites are important areas for environmental conservation. Traditional respect for the environment and access restrictions to sacred sites have often lead to well conserved areas with high biological diversity within otherwise degraded environments (Schaaf 2003). Biosphere reserves are often considered as appropriate tools to

reconcile environmental conservation, sustainable economic development and research on human environment interactions. UNECSO has two global instruments that protect many of the world's most important environmental sites. These programmes are Man & the Biosphere (MAB) programme with its world network of Biosphere Reserves and second the World Heritage Convention.

In 1995 UNESCO formulated the statutory framework of the World Network of Biosphere Reserves which provides definition of biosphere reserves as well as their functions. UNESCO's Seville Strategy for Biosphere Reserves recommends using biosphere reserves as "models of land management and of approaches to sustainable development". In particular at the national level the Strategy suggests establishing, strengthening or extending biosphere reserves " to include areas where traditional lifestyles and indigenous uses of biodiversity are practiced and including sacred sites"(UNESCO 1996). Therefore UNESCO's MAB biosphere reserve concept clearly recognizes the importance of sacred sites and places them into the context of sustainable development.

With this understanding UNESCO MAB programme implemented a project in Ghana focusing on research, conservation and management of sacred groves, which promoted sustainable development in the areas surrounding the sacred groves. This three year project has resulted into a number of lessons and conclusions about the conservation and management of natural sacred sites . These include

- A sacred natural site is an important element linking nature and culture.
- A sacred natural site is often an anchor of cultural identity.
- It can constitute effective means of environmental conservation as it is embedded in local and traditional belief system.
- Sacred Natural Sites have great value for conservation eg
  1. as areas of high biodiversity.
  2. as sanctuary of rare and or threatened species.
  3. as sites that protect fresh water sources.

It is important in this context, to look at the recently formed Agasthyamalai Biosphere Reserve in the species rich southern India covering wet tropical forests of western ghats and is considered as a sacred mountain by Kanis the indigenous people inhabiting the reserve.

Agasthyamalai Biosphere Reserve in India

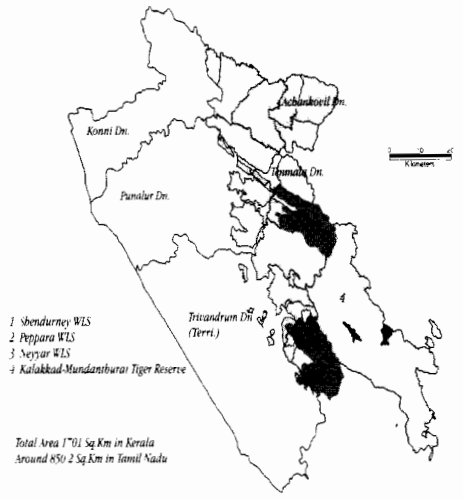
The Agasthyamalai Biosphere Reserve (ABR) is a natural unit of mountain system at the southern end of Indian peninsula in Kerala. It has the largest tract of wet evergreen forests of Western Ghats. This region also represents a pristine paleotropic region with very high floral endemism and rich biodiversity. The ABR is an important biosphere reserve in the world where the indigenous culture, region and spirituality are associated with the biological diversity. Therefore a study was proposed to look at the linkage between cultural and biological diversity at ABR and its integration for designing a conservation programme.

Map I

KERALA IN INDIA

Map II

AGASTHYAMALAI BIOSPHERE RESERVE



Its location at the tip of the peninsula, peculiar topography, physical isolation, well distributed rainfall, suitable temperature regimes, evolutionary history and absence of human interference till recently enabled it to support and retain extremely rich tropical ecosystems with proportionately a higher number of endemics and rare elements than any other part of the Western Ghats mountain system (Nayar, 1996; Varghese and Menon, 1999).

According to mythology, Lord Agasthya resided at the peak of this mountain (Agasthyakodam) and taught his followers the Siddha system of medicine. In the past the Siddha physicians and the traditional medicinal plant collectors, mainly the tribes from Kerala and Tamil Nadu states of the Indian union, made an annual pilgrimage to this site where they would collect medicinal plants. Some local tribes would also collect edible fruits and nuts. The forest around this region is considered to be sacred and is forbidden to enter for any people other than Siddha physicians and local tribes. An average of about 5,000 people used to visit this site annually. But off late, there is a rapid increase of the number of pilgrims visiting this sacred site causing great pressures on the forest resources and responsible for depletion of many rare and endemic plant species.

As per the official document of Kerala State Forest Department (KFD); Agasthyamalai Biosphere Reserve (ABR) was notified as the 13th Biosphere Reserve of India; by Govt. of India in Nov. 2001 under UNESCO's MAB programme (Map I). The document illustrates that the ABR falls exclusively in Kerala and covers an area of 1701 sq. km. The ABR is located within the Southwestern section of the Western Ghats between 8°25' - 13°0' N latitude and 76° 52'- 77°34' E longitude. Agasthyamalai, popularly called Agasthyakodam, is a landmark on the eastern side of Thiruvananthapuram in the southern state of Kerala, India. It is known world over for its diverse and rich forests.

The ABR falls in three revenue districts of Thiruvananthapuram, Kollam & Pathanmthitta. ABR is contiguous with parts of Kalakkad- Mundanthurai Tiger Reserve in Tamilnadu. Recently this part of the Tamilnadu forests has also been included in the ABR. In Kerala the three Wild Life Sanctuaries (WLS) i.e. Neyyar, Peppara and Shendurney WLS are also incorporated into the ABR. The biosphere reserve has an adequate area to serve the major functions of conservation, development and logistic support with a core zone (225 sq. km), a buffer Zone (754 sq. km) and a transition zone (722 sq. km). ABR also includes additional areas from the forest divisions, which are non-protected areas but are designated reserve forests.

In both the states diverse eco development activities are currently in progress, especially within the fringe areas of the forest tracts where people depend on the forest resources for livelihoods.

Indigenous community of ABR

Kani is a tribal group occupying the ABR area traditionally for more than 100 years . The Kani or Kanikkar are also known as Kanikkaran. However, their neighbours refer to them as Kani. Kani, a shortened form, is used as a synonym as well as their title. They are a homogenous community without sub tribal groupings. The ethnographic account of Kanis by Iyer (1937) gives their past history as recalled in their Chatu Pattu songs. They were formerly settled in Kalakad and Kallidakurchi in Tirunelveli district of Tamil Nadu.

The natural resources of the Kanikkar are land and forests. The lands under their possession are called Kani lands, which are under government ownership. The small plots owned by them are surrounded by forestland, which are also under government control. Their landholdings are of two types; those held by individual proprietorship and those held under the chieftain's proprietorship which he allots for cultivation to the members.

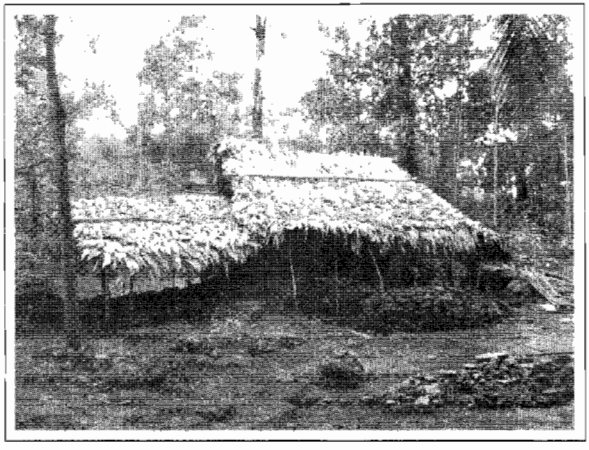


Photo by Archana Godbole

Traditional Kani Hut in the Neyyar Wild Life Sanctuary

One of the traditional occupations of the Kanikkar was shifting cultivation of paddy and ragi. This has been discontinued. Hunting, gathering of minor forest produce, fishing and trapping of small animals and birds, are some of the traditional occupations, which are still continued despite the laws prohibiting the practice. Settled cultivation of plantation crops like coconut, rubber, cardamom and tubercrops have been adopted in a small way and now forms the primary occupation. The Kanikkar are also employed as forest laborers.

Kanis have been using the ABR forests for generations and are dependent on the resources in many ways. However within the last three decades various non-tribal groups invaded the forest areas. The

sharing of resources is affecting Kani's traditional livelihood pattern. Due to formation of WLS in Neyyar & Peppara area, the Kani resource areas shrunk considerably and they were driven out of the forests in the name of conservation. Later they were further pushed away due to dams and development. The detailed account of their displacement and its relationship with resource degradation is provided in the later part of the report. Due to changing livelihood patterns, land use changes and acculturation, the age old sacred relationship of the Kanis with the ABR and the respect for the Agasthyamalai mountain has changed over a period of time. This transition was rapid and has taken place just within two decades. The transition has degraded local culture and the ABR landscape in such a manner that there is an urgent need to seek answers for the ABR conservation programme through an understanding of the linkages between cultural and biological diversity.

Need of the assessment

In the present day context of ecosystem degradation in some parts of the ABR, attempts need to be made to appreciate the strong socio-cultural dimensions of Kani , which are responsible for biodiversity conservation. Such an attempt will ultimately help in designing strategies for sustainable management of natural resources, building bridges between scientists and policy planners, ensuring community participation in their sustainable development while promoting conservation of biological resources. This approach of biodiversity conservation is at par with the UNESCO's concept of natural resource management by linking ecological and social processes. UNESCO is interested in exploring ways to promote conservation, while at the same time trying to satisfy the economic and spiritual needs of people who live in or near protected areas. How can environmental conservation be rendered sustainable without violating perceived and real requirements of people inhabiting an area since time immemorial? Can cultural values and traditional belief systems which respect the environment, be more powerful or at least an equally powerful means to conserve nature than legally protected areas? The present study in ABR has tried to answer some of these questions and tried to develop an understanding of the current situation in the light of conservation needs and linkage with traditional belief systems of Kanis.

With these assumptions a brief research activity in the Agasthyamalai Biosphere Reserve (ABR) was planned to seek answers to following questions.

1.How and why the Agasthyamalai hills have been preserved?

2.How this ecosystem or landscape and its present status is linked with the cultural identity ?

3.What are the alterations in the ecosystem over the period of time and its effect on culture?

4.How developmental processes affecting/changing the cultural Identity ?

5. How changing socio-cultural activities are affecting the conservation and management of ABR?

6. How traditional holistic wisdom (both ecological and social) has the relevance both for the natural resource management and sustainable livelihood/development of the biophysical/human systems under consideration?

It is important to resolve the issues and involve the local communities and other stakeholder groups in the conservation and management of the reserve effectively for the preservation of biological as well as cultural diversity. However there are many gaps in understanding in terms of designing and implementing a conservation action plan for participatory conservation of ABR. The most important aspect is that very limited baseline data about the biodiversity and the people of ABR are available. It is also important to appreciate the strong socio cultural dimensions that have contributed to biodiversity conservation in ABR.

Assumptions

- There is an interdependent relationship of cultural & biological diversity in this region and Kani tribals consider the ABR ranges as sacred landscape
- Kani tribals have been part of the process of alterations of the landscape within some parts of ABR but they were instrumental and not the responsible group.
- There is a range of options available to involve Kanis and other stakeholder groups in conservation and management of ABR.

Therefore a rapid assessment has been carried out to understand the interdependence of culture & biological diversity in the ABR area. The study also focused on collection of data related to sacred beliefs, legends, myths, and their association with ABR to understand the need of converging indigenous knowledge & biological diversity for better preservation of the ecosystem whilst embedding the rich cultural identity of the region.

Critical issues identified by KFD

- Local people operating within the fringe areas of the reserve.
- Presence of private settlements along the tribal communities within the ABR area with varying degree of dependence.
- Pressures of grazing, firewood collection and NTFP collection.
- Forest fires , poaching, fishing etc.
- Tourism & Pilgrimage.

The objectives of the rapid analysis

- To collect baseline information on dependencies on the Reserve considering socio-economic and ecological aspects as well as indigenous knowledge and use in natural resource management and conservation.
- To understand the natural resource use patterns by the communities and issues associated with the same in present-day context.
- To evolve and propose suitable site-specific future strategies for biodiversity conservation and sustainable management of Agasthyamalai Biosphere Reserve.

The rapid analysis of Agasthyamalai has brought about an understanding of the cultural processes responsible for fragmentation of the interwoven fabric of cultural and biological diversity over the period of time. It has also offered an understanding of the cultural processes that need to be revived to generate the enthusiasm and respect among the communities for their ancient belief system of considering nature and human beings as part of the same universe.

Such challenges could be dealt with through integrated conservation and development approach with community participation, awareness generation, by establishing a mechanism to relate the core conservation values and aspirations of the communities managing the resources. An approach to increase the appreciation of cultural identity of the region and its reflection in the conservation of biodiversity has been looked at by studying ongoing participatory conservation and development initiatives. Finally an attempt has been made to design the strategy for implementation of community based conservation action plan that broadly follows cultural norms.

It is also important to emphasize that cultural values are dynamic and can change over time. Traditional belief systems can also change resulting in the abandonment of sacred natural sites and relinquishment of their associated protection by local communities particularly the younger generation. One overriding question is whether environmental conservation can be based effectively on cultural values and traditional belief systems. One would also needs to look into the question of whether such an approach is sustainable in today's world , especially in the light of changing societies and cultures as well as globalization processes.

Present Status of ABR

As stated earlier, the ABR area in Kerala mainly covers three sanctuaries viz. Neyyar WLS , Peppara WLS and Shendurney WLS. Details of these sanctuaries, current conservation and development status are discussed here.

Neyyar Wild Life Sanctuary

Neyyar wild life sanctuary is located on the western slopes of southern Western Ghats along the southeast corner of Kerala in Neyyattinkara taluk of Thiruvananthapuram district (Map II). The forest area is more or less continuous with a vast stretch of reserved forests in Kerala and Tamil Nadu, and lies between 8°17' and 8°53' N latitude and 76°40' and 77°17' E longitude. Agasthiavanam Biological Park and Peppara Wildlife Sanctuary surround this sanctuary towards the north, private land on the south and west, and Tamil Nadu Forests i.e. Kalakkad-Mundanthurai Tiger Reserve (KMTR) area on the east.

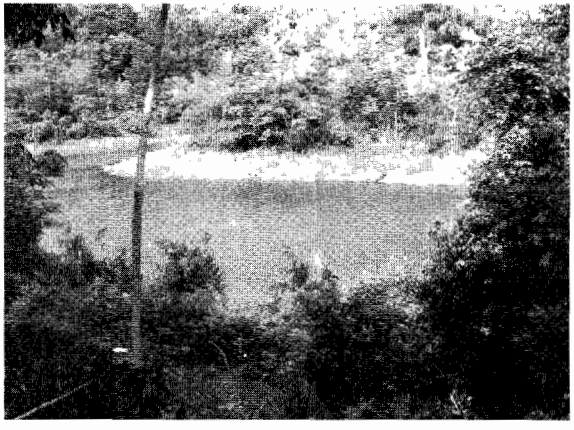


Photo by Archana Godbole

Neyyar reservoir & forests

The sanctuary lies within the catchment area of Neyyar river, which originates from the slopes of Agashtyarkodam the highest peak of the sanctuary. The terrain is undulating with elevation ranging from 100m to 1898m (Agashtyarkodam). Other important peaks of the sanctuary are Athirumala and Varayattumudi. The other geomorphologic units include low rolling zone and the reservoir formed by the construction of a dam at Neyyar. Steep slopes, cliffs and rocky outcrops characterize the eastern region of the sanctuary. ABR including all three sanctuaries and adjoining area in Tamilnadu enjoys two well-marked rainy seasons ; southwest and northeast monsoons.

The forests in Neyyar sanctuary exhibit considerable variation in floristic composition & structure. These are due to variations in climatic, altitudinal and geographical aspects. The vegetation ranges from southern secondary moist deciduous forests to southern subtropical hill forest.

Varayattumudi is a place near the state border lying continuous to Kallakkad Mundanthurai Tiger Reserve. As the area is located quite far away, protection is very difficult and the incidences of poaching are more. Much attention needs to be given to protect the animals in the area. The Athirumal region of Neyyar Wildlife Sanctuary is a plateau of high ecological importance, especially, being the habitat of lion tailed macaque.

Peppara Wild Life Sanctuary

Peppara Wildlife Sanctuary is nestled in the western slope of southern region of the Western Ghats, in Nedumangadu taluk of Thiruvananthapuram district. It is located about 50 km east of Thiruvananthapuram city, the capital of Kerala.

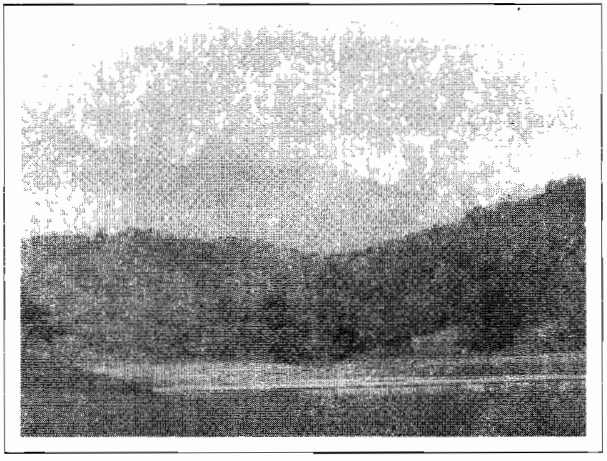


Photo by Archana Gorhole

Peppara reservoir forests with Agasthyamalai range in the background

This sanctuary is surrounded by Neyyar Wildlife Sanctuary in the southeast, Agasthiavanam Biological Park in the west and Paruthippally Range of Palode Reserved Forests in the northwest. In the north, the boundary runs along the periphery of Bonacaud Tea Estate and Palode Range of Palode Reserved Forests. In the east, it coincides the boundary of Katakkad-Mundanthurai Tiger Reserve of Tamil Nadu (state boundary) and meets the boundary of Neyyar Wildlife Sanctuary near **(Refer Map I)** Athirumala. It also includes Peppara reservoir. As adjoining Neyyar WLS, Peppara also exhibits high biodiversity through 13 different forest types (Champion & Seth 1968) . The details of vegetation types and area covered by each type of Neyyar WLS and Peppara WLS are provided in **Annex I .** The area lies between 8° 34' to 8° 41' N latitude and 77° 6' to 77° 14' E longitude.

Peppara sanctuary lies within the catchment area of Karamana river , which originates from the slope of Chemmunjimottai, the highest peak of the sanctuary. The terrain is undulating with elevation ranging from 100m to 1717m (Chemmunjiimottai). The important peaks of the sanctuary are Kovil therimalai (1313m.), Athirumala (1594m:), Nachiyadikunnu (957m), Arumukhamkunnu (1457m) and Kadirumudimalai. The other geomorphologic units include low rolling zones and the reservoir, formed by the construction of a dam at Peppara.

One of the challenges of biodiversity conservation in protected area management is to locate high

concentration areas of endemic species so that critical endemic plant sites can get priority for conservation. The following areas with their communities are most important and vulnerable areas within the sanctuary with respect to endemic species concentration (Mohanan, 2002). In Peppara there are many such areas identified and attempts are being made to provide protection . Such areas include

- **Chemmunji** (900- 1300m) : Subtropical hill forests and hilltop evergreen forests of Chemmunji is one of the richest areas in terms of rare and endemic species. ***Cinamomum chemungianum, C. travancoricum, Garcinia imberti, G, trvancorica, Helicia robusta, Humboldtia unijuga var trijuga, Symplocos oligandra,*** etc are some among the endemic species found here. This is a very vulnerable area due to the existence of a short route from Bonacaud to Mundanthurai Wildlife Sanctuary.

- **Attayar** (900 - 1300m) :The evergreen forests and riparian fringing forest of Attayar is a rich area of many local endemic species like ***Amorphophallus bonaccordensis, A. smithsonianus, Ixora agasthyamalayana, Pavatta bourdillonii, Poeciloneuron pauciflourm, Syzygium bourdillonii,*** etc. Excessive seasonal pilgrimage to Agasthymalai is causing severe damage to this locality.

- **Kurisumala** (800-900m) : Kurisumala area of Peppara Wildlife Sanctuary is very important area of conservational value due to the existence of locally endemic species like ***Janakio arayalpothra*** and ***Memecylon sivadasanii.***

Shendurney Wildlife Sanctuary

The Shendurney wildlife Sanctuary is situated in the southern part of Western Ghats (8° 50' and 8° 55' N; 77° 5' and 77° 15' E) in the Pathanapuram taluk of Kollam district. The sanctuary covers a total area of 1000.32 sq . kms. However, the border with Tamil Nadu has not been fully surveyed.

Shendurney Wildlife Sanctuary, part of Agasthyamalai Biosphere Reserve, owes its name to the endemic species, ***Gluta travancorica,*** locally known, as Chenkurinji .The Sanctuary is a valley of green splendor acclaimed for its rich biodiversity laying on either side of the Shendurney river.

This is the only wildlife sanctuary in Kollam District. The reservoir of the Parappara dam, constructed across Kallada river in 1986, occupies the heart of the sanctuary. The construction of the Parappara dam across the confluence of the Shenduruny and Kulathupuzha rivers has resulted in the creation of an artificial lake covering an area of 18.69 sq.km. This reservoir forms a major source of irrigation for Kollam, Pathanamthitta and Alappuzha districts. The construction of the dam has also caused submerge of about 23 sq.kms of rich forest cover.

Before the formation of Shendurney wildlife sanctuary, the area was under the Thenmala Forest Division. Both clear felling and selection felling were once practiced in this area to a larger extent. Large tracts of forests were clear felled and such areas were converted to plantations. Besides, the widening of the Trivandrum Shencottah road (T.S.Road) during the 40's also enhanced the deterioration of the Shendurney forests. Despite all these disturbances the faunal status of Shendurney valley was found to be somewhat well, especially in the eastern mountainous zone.

Kani : Indigenous People of ABR

Over the millennia, indigenous peoples have developed a close and unique connection with the lands and environments in which they live. They have established distinct systems of knowledge, innovation and practices relating to the uses and management of biological diversity on these lands and environments.

Much of this knowledge forms an important contribution to research and development, particularly in areas such as pharmaceuticals, agricultural and cosmetic products. A brief overview of Kani tribals is provided here to form the basis of understanding their knowledge , culture and relationship with ABR.

Kanis & their relationship with forests

Kani tribals came into limelight recently ; due to the famous case of use of ***Trichopus zylanicus*** in their traditional system for energy restoration and the framework of benefit sharing mechanism that has been developed by Tropical Botanical Gardens and Research Institute (TBGRI) . In the ABR area Kanis are the only group of indigenous people settled within the protected areas and also on the fringes. It is therefore important to look at historical account of Kanis to understand their relationship with forests and biodiversity.

Kani is a tribal group occupying the ABR area traditionally for more than 100 years . They are distributed in the Neyyattinkara and Nedumangad taluks of Thiruvananthapuram District. Kanis are also found in Kollam District and spread over adjoining districts of Kanyakumari and Tirunelveli of Tamil Nadu. They are known as Kanikkar, Kaniyan, and Kanikkaran, Kani, Kannikkar, Velanmar, Malai Arayan and Malavedan in Tamil Nadu. They had three important chieftains, Virappan Arayan of Viranellikotta, Sithangen Arayan of Chennallurkotta and Adichan Arayan of Alantharakotta, who ruled over 72 hamlets. The Ponnum Perumal of Attingal held rights over these territories and it was customary for the tribal chieftains to offer tribute to him periodically. On an occasion when the chieftains made presents after a break of three years, King was much pleased and conferred on Virappan Arayan the title of Vira Marthandan Arayan and also the rights to collect taxes from the 72 hamlets in this area (Nair 1986).

The Kanis are found in the southern-most part of the Western Ghats ; the Agasthyamalai range of hills. They live along the lower valleys and the forested foothills up to about 700 m. elevation along the slopes. Although originally inhabiting only forested areas, the receding boundaries of the forests have left many Kani settlements stranded far outside the current perimeter of the forests.

The Kanis consider themselves as 'Mala Arayas' a title given to them by the Travancore Maharaja whom they used to visit every year with gifts ('Kanikka') of a number of forest produce. Even now the elders do not like to consider themselves as 'Adivasis' or Scheduled Tribe. They believe that the 'Kadal Arayas' are their cousins who had migrated long ago to the coast to live as fisher folk, and they are the 'Mala Arayas' rulers of the hills. The details of Kani resources use and their historical account provided here is based on S. Santhi 2004.

Traditional lifestyle and landuse of Kanis

The Kanis, essentially cultivators, used to occupy the valleys of the rivers in the Agasthyamalai ranges. Extensive river valleys are lacking in this area now. The Kanis preferred the tract along the foothills where the torrential hill streams join together to form the main channel. In the north-west extremity of the Kani range in the Kulathupuzha valley, there are extensive swampy flat stretches in the Yerur and Kulathupuzha Reserved Forests where the Kanis practiced wet paddy cultivation. Further south, such suitable lands were not plentiful and here they occupied the narrow steeper valleys and the gentler outer hill slopes where dry paddy and other cereals and pulses were cultivated under the 'jhum' (shifting cultivation) system.

The slash and burn or jhum cultivation of the Kanis was evolved probably in the drier, ecologically less sensitive eastern slopes of the Western Ghats. It used to have till recently a three-year fallow period after two croppings of dryland paddy sown in March-April and harvested during August-September. Besides paddy they used to have a large number of cultivars of foxtail millet *(Setaria italia),* common millet *(Panicum miliare),* green gram *(Phaseolus mungo),* sorghum *(Andropogon sorghum),* maize *(Zea mays),* sweet potato *(Ipomea batatus),* squash *(Cucurbita moschata),* turmeric *(Curcuma longa),* several varieties of plantains, ginger etc. for food and marketing. Occasional hunting with bows and arrows, catapult, traps and muzzle loading guns provided them with meat. They also practiced fishing. Apart from dogs and poultry they never used to keep domesticated animals. Kanis often used to keep wild animals as pets.

In 1892, Bourdillan estimated the Kani population to be about 2000 with the largest concentration in the Kothayar and Neyyar basins. In 1931, their number was estimated to be 6,659 excluding the small population in Papanasam hills. By 1971, their numbers had increased to 11,879 (Census of India, 1971). By 1981, in the Thiruvananthapuram district alone they numbered 14,145. According to the 1991 census, there are 16,181 Kanis residing in the Thiruvananthapuram district (Census of India, 1981, 1991).

Forest exploitation and deforestation in the Kani Area

After 1880, the Reservation of the hill forests started and excepting a few coffee and tea estates and leased Zamindari forests on the Kalakkad hills, practically the entire Agasthyamalai range including all the foothills and many extensive valley forests close to the plains became Government Reserved Forests. During this period there was no control over jhuming by the Kanis, and no systematic timber extraction by the government.

From 1900, till the beginning of the Second World War, there was little change in the overall scenario. But the slow and steady extension of paddy cultivation along these valleys had set in motion the process of isolation of the outer hillocks from the main block of forests. This later on adversely affected the Kani settlements in those hillocks. Unable to compete with the plains-people, the Kanis were forced to leave or alienate their land, and move back deeper into the Western Ghats forests. Such vacated lands inevitably soon came to be occupied by the plains' people.

The construction of the Thiruvananthapuram Shenkotta road and later the construction of number of spur roads from it towards east along each of the parallel east-west river valleys set in motion severe forest fragmentation. Forest plantations started taking up more and more of lower elevation forests in the fertile locations. Land was released from the reserved forest along the main Thiruvananthapuram Shenkotta road under various schemes such as Colonization Programme, Grow More Food Campaign etc. which also led to considerable encroachment of the best accessible forest tracts. Extensive forests to the west of the Kani territory were lost due to the expansion of cultivation by the plains' people. As human interference and forest working by the Forest Department increased, the forests started getting degraded rapidly. This not only affected the agricultural practices of the Kanis but also reduced their natural resource base. Competition from outsiders for the various forest produce also increased.

Dams in the Kani lands

While forest management and land settlements were putting great strains on the Kani society, yet another development of far reaching implications for the Kanis also took place. The southern parts of the Thiruvananthapuram district and adjoining Kanya Kumari district have very high-density population along the coastal tracts. There are vast reaches of low-lying paddy lands on the southwestern coast the Nanjinad area. The Princely State of Travancore had always been importing rice and hence great stress was placed on enhancing food production. Irrigation potential was sought to be enhanced to increase paddy production. The southern parts of Travancore receiving less rainfall compared with the rest of the west coast and with smaller rivers were chosen for irrigation development. After independence, during the first two Five Year Plan periods, irrigation dams were constructed in Neyyar and Kothayar. During the late 1960s in the northernmost river in the Kani territory, the Kallada dam construction started. During the 1980s, the Karamana River was dammed at Peppara upstream of Aruvikkara to provide drinking water to the Thiruvananthapuram city. Each of these dams, except Kallada, submerged on an average 500 ha. of valley forests while the Kallada dam submerged about 4,800 ha. In addition to the loss of the valley, the surrounding forests were also heavily disturbed during the dam construction and subsequently due to the increased accessibility.

All the reservoirs of the above mentioned dams were in the base of the Ghats in forested valleys, the best and only habitat of the Kanis. Being illiterate and disorganized tribal people, they never received any compensation or rehabilitation assistance. They simply moved into the nearest forest tract available. Invariably this shifting was to far less suitable (S. Santhi 2004.).

The construction of the dams opened up the previously inaccessible interior valleys. Large influx of population took place temporarily and even after the construction phase was over, townships developed in the dam sites and remained. This was apart from the illegal encroachments in the opened up areas which went unchecked. Besides the degradation pressures on the rapidly shrinking forests, the social conflicts such as exposures engendered contributed to the destruction of the Kani society. They had always considered themselves to be the masters of the forests and then suddenly they were relegated to nonentities, to be pushed around.

Kani settlements in KMTR in Tamilnadu

There are eight Kani settlements inside the KMTR forests of Tamilnadu ABR side. These Kanis are similar in many ways to Kanis from Neyyar and Peppara WLS forests. In KMTR there are eleven dams part of medium or major irrigation projects and Kanis have faced the same problems. However KMTR has developed many participatory initiatives for Kani development and involving them in the resources conservation through the implementation of India Eco Development Project. It is important to look at the effectiveness of such efforts and process documentation has to be done. Such understanding then could easily be used for the similar situations to develop solutions to participatory conservation and highest protection of biodiversity through achieving the synergy between the indigenous people and their surrounding environment.

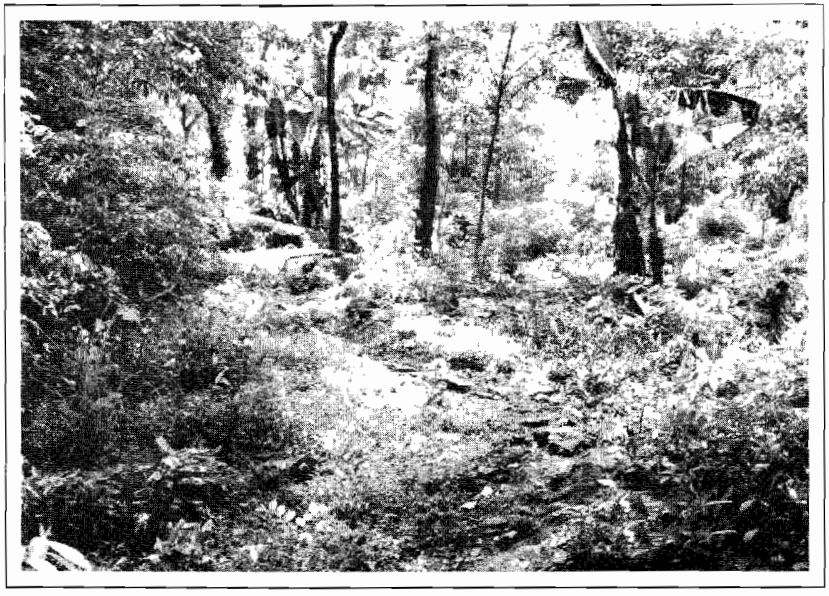


Photo by Archana Godbole

Forest near Kani hamlet

ABR : Sacred Landscape of Kani

There is a wide recognition throughout the globe and across the disciplines that regions of ecological prudence exhibit a symbiotic relationship between habitat and cultures (Arizpe 1996). Traditionally some of the indigenous societies have many natural resource management institutions in the form of sacred groves, sacred mountains etc. It was the ultimate expression of these societies to respect the natural forces by considering them sacred and attaching religious importance to it. The rapid development and resultant materialistic culture had considerable impact on the traditional societies and indigenous people to a large extent. Such impacts; rapidly modified the indigenous knowledge based resource management patterns and altered the practices of respecting the natural forces expressed in the form of biodiversity. Urbanization and modernization bent the value system and traditional institutions maintaining these systems vanished rapidly.

Within last three decades the value and need of better environment encompassing all the components of nature and natural forces have been understood in the new context of development. At many places like in the developed world it was too late and solutions to correct the scenario did not exist. However in developing world traditional societies are still struggling to maintain their culture and identity in the era of modernization facing threats of development at every step of survival. These traditional belief systems of sustainable resource use patterns and culture of respecting nature provided some answers to the quest of conservation of valuable biodiversity. However; it remained a question that how a balance could be achieved between culture, conservation needs and development. Later it was also realized that it is possible to seek answers to complicated conservation questions through the traditions of indigenous societies and their way of perceiving nature and environment.

Kanis perception of forests & landscape

Kanis of ABR have their own traditional system of perceiving nature, forests and minor elements of their environment. As stated earlier; Kanis have established in ABR forest areas since last 100 years. They originally belong to Tamilnadu. Their original language was Tamil. Later they developed a mixed complicated dialect composed of both Tamil & Malayalam. Only very old Kanis can communicate in this Kani dialect whereas the younger generation has adopted Malayalam as their language. In Kani dialect there are words for different forest types. This dialect can differentiate between ecosystems types by specific terminology providing the details of the ecosystem structure or function with a lot

of precision. ***Adawi*** for example means closed canopy evergreen forests or ***Vennaü*** meaning buttresses, ***Tolavi*** are waterfalls in high mountains and ***Karikam*** means marshy swamps are self-explanatory.

There is a plenty of material available in ancient Tamil anthologies providing knowledge about the landscapes and ecosystems of Tamilakam (Gurukkal & Variyer 1999). It could be suggested here that Kanis have been instrumental to some extent to maintain that ancient ecosystem understanding due to their habitations in the thick-forested areas and due to their remoteness. However detailed ethno linguistic studies of Kanis from ABR in Kerala as well as Tamilnadu are required to prove the point. Along with the Kani language studies it is important to look at how today's Tamil as well as Malayalam are treating the natural elements and understanding of environment.

The distinct knowledge & realization of the environment by Kanis can therefore be traced back to their Tamil linkage. However a detailed ethno biological research has not been done for Kani people. In the context of this study it is important to look at the Kani culture & indigenous knowledge with respect to their language, terminologies, and understanding of nature through their dialect.

Sacred mountains & biodiversity conservation

Biodiversity rich mountain areas have always been homes to the Gods for many of the world's traditional societies. Considering mountains as sacred entities is common all over the developing world especially in the areas dominated by indigenous people. This sacredness is recognized in the sacred landscapes identified by a variety of mountain societies (Bernbaum 1997) . The Himalayas as a mountain system represent the ultimate spirituality for many religious groups in the Asian region. In a more specific sense Mount Fiji represents beauty and harmony for the Japanese and Koyasan, the meditation centre of Shingon Buddhism, is worshipped as the world of ancestral spirits and has an impressive graveyard. In short, people worship the intangible values that they perceive in a given natural landscape. They see the intangible values through more tangible representations as temples, stupas or other human made places of worship (Ramakrishnan 2003). All traditional beliefs and identities of the people are seen in the light of shared territory, common rights, and similar lifestyles. The social institutions linked to biological resources management are often linked to religious myths and social-cultural belief system.

Such a concept of the sacred often has spatial dimensions and specificities (Ramakrishnan 2003). It is important to understand these specificities if such sacred areas or larger sacred landscapes are to be brought under the legal framework of protected areas. The sacredness and essence of communities' perception of protecting it is dependent on the sense of ownership traditional communities have about such areas or the spiritual and mythical identity of the region. Legal protection in the realm of State law has suddenly changed the traditional institutional systems maintaining such areas. To formulate the strategy for declaring such sacred landscapes into biosphere reserves; it is important and urgent to understand the embedded roots of conservation practices into the cultural diversity of the region. Acceptance of the concept of sacredness in principle is followed even in today 's context.

However, implementing that conceptual understanding in day-to-day life has been a difficult task. To use the conceptual understanding of the sacred our wise ancestors have developed certain practices to keep the sanctity of nature and laid down some principles and rules for the protection and conservation of nature. These rules became general practice and became the integral part of the culture of various traditional societies. The interdependence of culture and conservation of biodiversity however is not very simple and cannot be used directly to develop the approach for biodiversity conservation in the context of present day. Complexities of cultural operative environment and current conservation needs are to be dealt with together rather than in isolation.

Photo by Archana Gorbole

Old Muttakani from Thenmala hamlet Neyyar WLS

Kanis have been considering Agasthyamalai as their sacred mountain and abode of their supreme god Agasthyamuni. The forests on the higher hill surrounding the higher peaks in the Agasthyamalai range like Kovilthérimalai (1313m.), Athirumala (1594m:), Nachiyadikunnu (957m.), Arumukhamkunnu (1457m.) and Kadirumudimalai are part of Kani sacred landscape. Kanis visit the main peak of Agasthyakodam , the highest in the range once in year in the Month of Feb March to light a lamp as part of religious ritual. Earlier there was no shrine or temple but recently a small temple was built which is the result of growing pilgrimage to Agasthyakodam and can be considered as acculturation. Within ABR there are many special areas which are worshipped by Kanis at different occasions and are associated with local deities and clans or ancestors.

Kani sacred sites in ABR

Kanis consider Agasthyakodam mountain peak as abode of Agasthyamuni their supreme god but also have many smaller local gods and separate spaces are allocated to these gods and protected by all. Specific areas like grasslands, rock shelters, marshy swamps and trees with huge buttresses are considered as abodes of these gods and are fully protected by Kanis.

In Puravimala settlement of Kanis, they have a small sacred grove up to 1 ha in size ; mainly reed dominated area and is known as **Kottamkatiiyakavu.** Kavu means sacred grove in Malayalam. It appears that Kanis have forgotten the term for such sacred forest areas in their dialect over the period of time and adopted a Malayalam term. These areas have some huge trees of ***Ficus*** sps. Generally the whole area is sanctum sanct and people avoid going inside except during festivals. In such smaller groves near the hamlets women are not allowed to enter. In Neyyar WLS Kanis have maintained some ***Myristica*** swamps as their sacred areas. Cutting trees within the swamp as well as from immediate surroundings is a taboo. Women can go inside and worship as well as offer flowers or

coconuts to the Gods. Some Kanis consider the open grasslands as their sacred places, which are considered abodes of ancestors rather than gods. Such spaces are well known for various Kani clan (Illyams) ancestors.

In Chonamapra Kani area there is a huge ***Bombax malabarica*** tree with a girth of up to 5 meters and height of about 60 feet. This tree is considered as sacred.

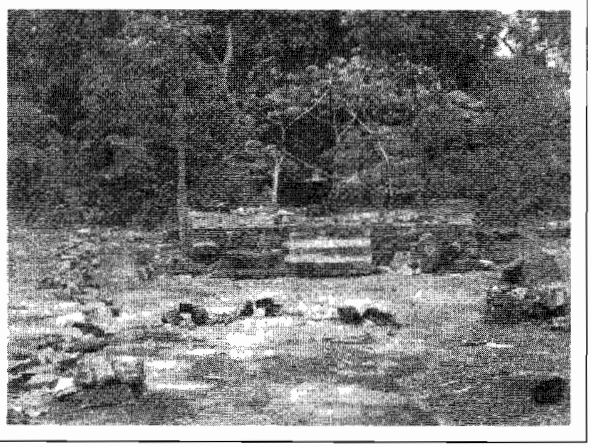


Photo by Archana Godbole

Open Rock Shelter within Peppara WLS
Sacred place of Kani

Kanis from the settlement believe that this tree can help fulfill one genuine wish and they offer coins, bells and coconuts. There is no priest. It is believed that all the offerings disappear within the huge buttresses and it is not allowed to take offerings and coins. This huge tree is surrounded by a thick reed and bamboo grove and it is very difficult to reach the sacred tree. Kanis are aware of the majestic nature of the tree and believe that they had many such trees earlier in their forests. It is interesting to note that this tree is not a useful species for the Kanis.

Sacred trees, sacred groves, rock shelters and sacred grasslands are common in Kani surroundings in the ABR forests. It is quite clear that the Kani had deep understanding of the nature and elements of their environment. The change of Kani's original Tamil culture through their migrations to ABR area over 100 years ago and its their blending with Kerala culture and adopting Malayalam as a channel for communication; is an important cultural transformation which requires detailed study. This cultural transformation has been associated with the dense forest ecosystems of the past to the degraded short cycled shifting cultivation systems of Kanis to finally today's protected area regime with rubber plantations.

Photo by Archana Godbole

Sacred *Bombax malabarica* tree
Majestic specimen with buttresses

Some linkages and parallels between the cultural changes and ecosystem alterations could be easily drawn if we carefully look at Kanis perception of their plants, forests, lands and landscape today. Kanis sacred areas in the form of lakes on the high hills of Agasthyamalai, open rock shelters and some particular huge long-lived trees explain the linkage.

It is quite natural to have open rock shelters as sacred areas for the people residing in the thick forests with close canopy structures. According to Kanis these spaces are pathways to the world outside forests and obviously considered as abodes of gods and ancestral spirits showing the way. Considering small lakes and water bodies sacred is comparatively easy to understand. Water though not a scare commodity, it needs to be respected as essence of life. Kanis have many such sacred lakes along the high hills of ABR.

Origin of Kani sacred areas

The legend takes us back into the past hundreds and thousands of years ago.....

According to a legend, when Kanis were cultivating large tracts of ABR forests, a group of Kanis came across a rock shelter perhaps like a cave and saw two children playing in the opening. The group wanted to interact but often they use to disappear. Everyone in the nearby Kani forest hamlet saw them, but none could find out where they disappear every time. One brave man from the group finally stayed there in a hideout through out the night and saw the children actually going to a cave like shelter. He came with a group and caught them finally by his trick of hiding. The young boy and girl tried their best to escape but could not succeed. Probably these might have been lost kids of some forest tribe present then. Kanis were scared and thought that they have kidnapped god's children as they started experiencing all sorrows and bad things for their group. They immediately left the hamlet, but decided to sacrifice 100 men every year to the God of Rocks that guarded the children. However these children remain with the Kanis and mixed with the group and became part of Kanis.

Kanis continued to offer 100 men for couple of years. Later they took the concession of offering 100 goats instead of men, later offering came down to 100 chickens and today it is coconuts.

Since then Kanis worship the open rock shelters and offer coconuts. Later the number of coconut reduced to one or two. Kanis have Plathi or traditional healer cum magician to establish link with gods through spirits.

The Kanis were not known to perform the elaborate rituals at their sacred sites. To light a lamp and gather once or twice a year for worshipping was a simple routine. However with the contact to the outside world, the Malayalis form Kerala started taking interest in such sacred places of the Kanis. These non-Kanis started their worshipping pattern and imposing the practices like building small stone temples and placing stone idols of their gods. Offering Pongal[2] is gaining importance over maintaining the tranquility and sanctity of the place. Agasthyakodam peak and the small shrine established by such modern intervention at the peak is also a similar happening. Earlier, the Kanis used to visit Agasthyakodam once in a year and only a selected few used to take pilgrimage to the sacred peak. Now this has become a famous pilgrimage and trekking route. Tourists and pilgrims crowd this area every year from January to April. Due to such an influx of people, the Kanis now take their pilgrimage to Agasthyakodam prior to the tourist season i.e. in November - December.

[2]Pongal : Cooked rice offered to the god

Sacred Animals and Kani Hunt

In the ABR forests Nilgiri thars were once common. These goat like antelopes are very agile and occupy the higher grasslands and shola forests. They are very agile and difficult to catch. Kanis worship Nilgiri thar. Kanis offer the silver effigies of Nilgiri thar in a rock shelter before going for Nilgiri thar hunt. Kanis believe that if they worship and go to the forest; there are better chances of finding them. Charkarmotta in the Poonmudi forests is one such place. Kanis from Kottur side used to offer the silver images of Nilgiri thars in the rock shelters. Mappi, Tindi & Petukalla are areas of Nilgiri Thar in Peppara area where as Bangalam is thar area in Neyyar WLS.

According to the old Kanis residing in the immediate surroundings of Agasthyakodam peak area, the increasing tourism and such activities are destroying the divinity of the area and Kani culture. Kanis today are loosing their harmony with the ABR forests and natural resources. There are many reasons and processes responsible for such fast irreversible change.

It is apparent that the Agasthyamalai mountain and surrounding forests have been conserved by local communities and were worshipped for many generations. Traditional understanding and cultural perception are significant in terms of livelihood support and day to day customs of the Kani community. Since the area has been considered sacred since time immemorial, the biodiversity unique to ABR has been preserved.

Now such systems are under enormous pressure as many other non-indigenous people use them. The later inhabitants do not have knowledge of the culture that has preserved the landscape. The development of a drug based on Kani's indigenous knowledge and further development of benefit sharing mechanism with intervention of a research institution TBGRI is one way of dealing with this challenge. However; awareness generation among Kanis and among all other stakeholders of the process of conservation and development is utmost important.

Growing tourism, pilgrimage, rubber plantations and some forest development activities are helping Kanis to earn better livelihood. However this enhanced livelihood is at the cost of their deep routed traditions, culture and age old relationship with their plants, forests and environment.

Kanis Perception of Climate Change

Raman Kani (an old Muttukani) 90 years of age ; on changing climate of ABR

- According to his forefather's knowledge the reason for climate change is Earth is moving towards Sun though very slowly.
- This area used to be comparatively cool in April till last two decades. Now it is very hot.
- It is getting hot in general. It is evident that harvested paddy used to take 7 days for complete drying . Now it dries only within an hour.
- Due to increasing heat in the forest we can not cultivate some of our rice varieties.

It is a critical challenge to maintain rich indigenous knowledge of Kanis while achieving biodiversity conservation and development for betterment of Kanis. Before the advent of development the sacred landscapes and ecosystems within them were managed by one or more traditional societies. The Kanis though formally not managing the ABR resources definitely had better understanding of the forests and ecosystems. They have been living in harmony with nature till the recent past.

The issues like cause and effect of changing socio economic conditions of Kanis, how it is linked with changing ecological conditions of ABR are discussed later. Our brief study and rapid analysis has tried to deal with these critical questions and discussions in the later chapters will provide an insight into proposing a strategy for participatory conservation and management of biodiversity of ABR.

Socio- Economic Aspects of Kani

It is evident and clear from earlier studies as well as from field visits for this assignment, that the ABR is one of the very few high biodiversity areas of the country. It was also noticed that the Kani are only tribal inhabitants of the area and are dependent on the forest resources for their livelihoods. Their way of shifting cultivation has been responsible to some extent for localized forest destruction. However, vast stretches were available for agriculture to limited Kani groups. Shifting cultivation was not solely responsible for forest destruction. Later due to the onset of development many other non-tribal groups started sharing ABR resources with the Kanis. Today these settlers and Kanis are dependent on the ABR forests for their daily needs of resources in particular and for livelihood activities in general. It is interesting to look at the interactions of these groups with forests and changed socio economic conditions. During this rapid assessment socio economic data has been collected from some Kani settlements from Peppara WLS hamlets, Neyyar WLS area and some settlements from Agasthyavanam Biological Park range. The settlements were selected randomly.

Kerala Forest Department has prepared the detailed sanctuary management plans for Neyyar & Peppara WLS for the period 2005 to 2012. While preparing these management plans KFD has conducted PRA exercises in many settlements. The baseline information collected from such interventions has been used to know the demographic profile and occupational pattern of the settlements studied for this rapid assessment. Details of Kani settlements from these two sanctuaries are provided in **Annex II.**

Socio economic studies revealed the degree of dependency on the forests; of both tribal and non tribal populations residing within the ABR or in the fringe areas. These people collect thatching grass, NTFPs, firewood, bamboo poles, reeds, honey and large timber occasionally for own use. However all the commodities available form the forest are becoming scares day by day and forest destruction for many reasons is continued. General scenario of the Kani's socio economic aspects is provided below. Specific observations and data for this particular assessment are given later.

Settlement pattern

The Kani settlements of ABR are concentrated in Neyyar and Peppara WLS. Shendurney WLS do not have any Kani settlement. The Kanis live in small-scattered settlements called 'Kanikkudy', each consisting of about 10-15 families. In each settlement the houses are spread out leaving sufficient space for cultivation. As per the management plans of KFD there are 13 settlements inside the sanctuary limits in Peppara WLS whereas there are 18 tribal settlements in Neyyar WLS. Among these Chakkapara , Puravimala and Vlavettey from Neyyar WLS are thickly populated. In Neyyar there is a substantial population of non-tribals living in the fringe areas, these 3600 people compete for the resources with the Kanis. All these people are directly or indirectly dependent on the forest resources for their subsistence. In Peppara , Bonacaud tea estate has major non tribals population of 1209 people.

Education

In most of the Kani settlements primary schools are present. However, a couple of very small hamlets; situated deep in the forest do not have schools. Such hamlets use the school of nearby settlement. The average literacy rate is higher in Neyyar area than in the Peppara area due to its remoteness and non-availability of communication facilities in the later. Rarely few graduates are seen. School dropouts are mostly after 4th standard as there is no facility of higher education in these remote forest areas. There is a trend among Kanis to send the children to tribal residential schools. The children definitely get better education than in the hamlet, but their connection with the forest and villages is weakened and most of such children do not come back to their forest village. They try to search for some semiskilled job or work as laborers in the nearby cities.

Land use pattern

Majority of households have about 2 to 3 acres of land. Very few tribal families posses bigger land area. This land is used for cultivation of food crops as well as cash crops. Most of the households also have a small homestead. Women cultivate household vegetables and similar items in these systems. Since the last two decades the Kanis are being settled; these small home gardens are gaining importance in the household food security and nutritional aspect.

Kani houses used to be thatched with a large open space along side a main hut. This traditional pattern is changing very fast due to Grampanchyat aided housing scheme. However Kanis still build an open thatched area outside the brick house and use it for most of their activities. The land used for houses is just about 500 to 1000 sq. feet. It is observed that Kanis still clear some forest area near their dwellings and use it for rubber plantation.

Agriculture

As stated earlier; Kanis were traditionally involved in the short cycled slash and burn cultivation. In the past the forests were not under the control of KFD and large tracts were available to Kanis for cultivation. Similarly due to favourable environmental conditions like high rainfall distributed over long period of time, natural regeneration was very fast. Kanis have acquired these agricultural lands by clearing forests in the past (Kani Pattu lands).

However since the protected area notification and irrigation projects in the Kani forest area the efforts began to settle them. Agricultures pattern of Kanis is therefore changing very fast. Rubber plantations have initiated in the area long time back in Kerala and spread over to Kani area as well. Today most of the Kanis have abandoned the traditional cultivation practice and are practicing a mixed cultivation or in a transitional stage. In traditional type of cultivation Kanis use to grow tapioca, dry land paddy, cereals like common millet , Italian millet , corn and plantains. At present Kanis cultivate the land only adjacent to their settlement mainly due to fear of crop damage by wild animals. Due to lack of manpower Kanis do not use all the land under their possession for cultivation every year.

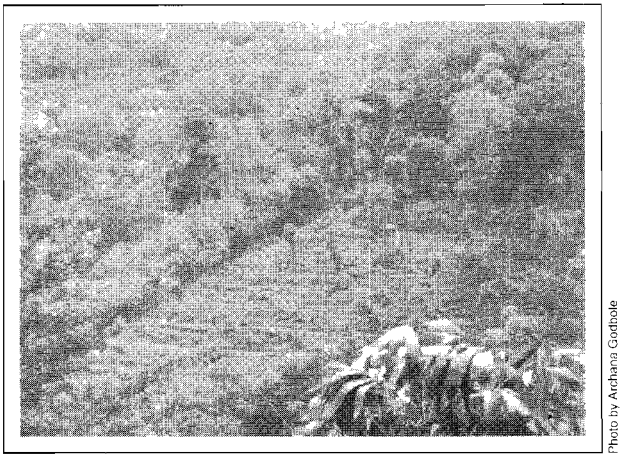


Photo by Archana Godbole

Kani farming deep inside the protected area

Livelihoods

It is already stated that Kanis in ABR area are dependent on the subsistence agriculture and recently initiated the cash crops cultivation mainly rubber. These people also have other range of livelihood supporting activities. Kanis are engaged in the major self employment of cultivation of tubers and other cash crops in and around their homesteads and performance of their own domestic works. Primary occupation of men is generally cultivation whereas women are engaged in both homestead cultivation and all other household work. In earlier days Kani women also used to weave household articles using reed. Such articles had good demand outside. Now due to the low availability of reeds and completion from non tribals in making these articles such craft is rarely seen among Kanis from ABR area.

Kanis also work as paid workers or on daily wages. They work as permanent long term laborers with government departments like Forests, Irrigation and Public Works department. Such jobs include boat drivers, forest watchers, road building, employment at irrigation construction and maintenance, voluntary teachers, tourist guides, trekkers etc. Most of such employment is seasonal. Tree cutting and loading trucks is another subsidiary activity for the Kani settlements near the plantations of territorial Forest Divisions. However now a days there is very heavy competition for the coup cutting work with the non tribals who are more skilled and experience than the tribals.

NTFP collection and sell is another supporting livelihood activity of many Kanis. Kanis are engaged in collection of various NTFPs like seasonal wild fruits, honey, wild tubers, medicinal plants , reed and bamboo. Kanis are rarely engaged in collection of fodder for cattle. They also gather wild green leafy vegetables and mushrooms .The nuts and seeds of ***Entada scandense*** , ***Cycus circinalis*** and ***Artocarpus hirsuta*** are preferred items. (Christopher & Jayson 1998).

It appears from the NTFP collection for use and sale that Kanis have lot of indigenous knowledge of use of plant resources. However comprehensive documentation of Kani's ethnobiological knowledge has not been done so far. Such documentation will reveal many other uses of plants available in ABR and the relationship of plants and Kani people. Kanis sell commodities collected from the forest to Kottur market. Kanis do not have any facilities for value addition and processing of these NTFPs and they get a meager price for these items.

Hunting of wild animals has been an important supplementary livelihood. However due to strict enforcement of protected area rules and regulation this has reduced to a large extent. KFD does officially permit traditional village hunt once or twice a year . Now Kanis hunt animals mainly to control crop damage. Many of the Kanis have country guns. They also employ pellet bow for hunting small animals. Hunting is done either personally, in a group or as a community or village hunt. Fishing is important activity. Due to formation of many reservoirs in ABR fishing is gaining importance though Kanis were not traditionally involved in fishing. Kanis hunt animals like mouse deer, barking deer, sambar, porcupine , wild boar and balck naped hares. Kanis do not prefer hunting large animals and snakes. The meat is used for own consumption. Kanis are fond of keeping forest birds like hill myna, parakeet, hornbill and owls as pets. Kanis traditionally are not known for cattle rearing . Recently through government intervention some of them initiated cattle rearing with settled agriculture.

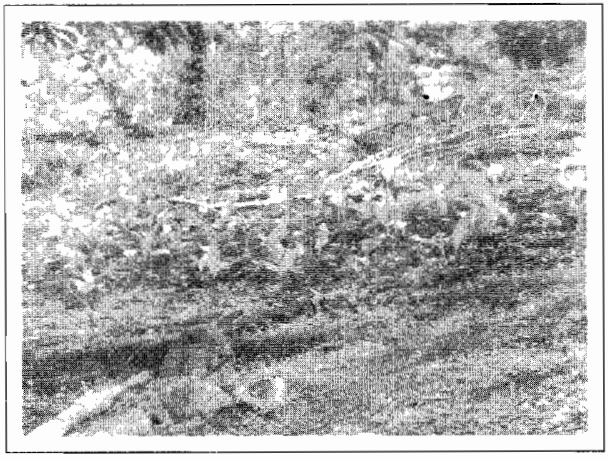


Photo by Archana Godbole

Turmeric cultivation on the Kani farm

Field observations and survey findings

In order to identify the social and economic status of the forest depending communities especially the Kani people a reconnaissance and a detailed questionnaire survey was conducted among a sample of 44 families with a population of 177 people. The survey findings revealed that approximately 71 % of the sample population comes under the laborers group; The sex ratio shows the preponderance of males over females which is contrary with the State situation. The health of the Kani tribals residing inside the forests is very poor. They rely on allopathic medicine and rarely use the tribal medicines given by their priest or Plathi. The health status of women is poor compared to men in the interior settlements like Kombudi, Podiyam, Kaithodu etc.

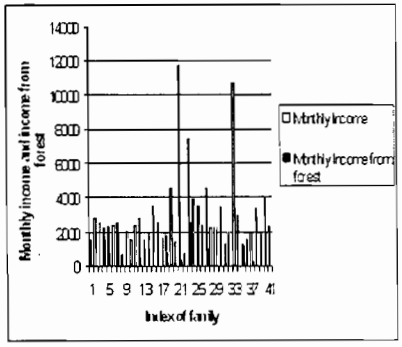
Bigger hamlets have Primary Health Centers whereas others visit public or private hospitals in the nearby city. The level of education does not project satisfactory figures among Kanis. Only 4.5 per cent of the sample population has availed high school education while 30.5% doesn't have any education background. The reasons for this poor education status include lack of motivation, poor

education facility , illiterate parents , lack of awareness etc .

NTFP collection is the main source of income for most of the Kani tribals living within the sanctuary area, whereas those residing in the peripheral areas have almost completely shifted to agriculture with rubber being the dominant crop now.

The occupational structure indicates a dominance of the primary sector, indicative of a basically agrarian economy. Shift from traditional crops (subsistence crops) to cash or commercial crops is indicative of their advanced socioeconomic outlook.

Income distribution is highly unequal in the local economy. 92.7% of the sample population enjoys less than Rs 5000 per month while 2.4 % having income in the range of Rs 5000 to Rs 10000 and the rest 4.9 % having monthly income in between Rs 10000 to Rs15000.



More socio economic data are provided in **Annex III**.

Forest dependency index of ABR

Forest dependence can be broadly classified into two categories, one is social and cultural dependence and another is economic dependence. The dependency index is arrived at on the basis of use of the natural resource. The social and cultural dependence cannot be estimated easily in numerical terms because such dependence is subjective. The survey highlighted the economic dependence of the Kanis on ABR mainly for income, food, housing, grazing and for fuel wood.

Table 1: FDI of families

FDI	No.of families	%
0 - 10	0	0
10 - 20	15	36.6
20 – 30	6	14.6
30 – 40	7	17.1
40 – 50	8	19.5
50 – 60	3	7.3
60 - 70	2	4.9
70 - 80	0	0
80 - 90	0	0
90 -100	0	0
Total	41	100

Primary data estimates

In the reconnaissance survey it is observed that people build their home by using forest products like thatch grass, bamboo and small timber. Another main economic need that is being fulfilled by ABR forests is that of firewood. The over all forest dependence of the sample is 31.1 based on the target group (Table 1).The dependency index for fuel is very high when compared to other factors. The government priority (Table 2) when assessed indicated first priority for fuel itself.

In other words, it indicates that keeping conservation and sustainable management in mind alternate solutions must be worked out priority wise in order to reduce the pressure/dependency on forest.

Table 2: FDI and Government priority

Dependency	Index	Govt Priority
Income	0.24	3rd
Food	0	
Housing	0.37	2nd
Grazing	0.11	4th
Fuel	0.51	1st

Facts revealed through rapid socio economic assessment

- Kanis dependence on the forests for livelihood is still high.
- Use of forest resources mainly for firewood is very high
- Earlier trend of clearing forests for ownership of land for cultivation is reduced.
- Wildlife attacks are common concerns to all Kanis and other people in the fringe areas.
- There is a need of awareness generation about the conservation of forests and biodiversity for their well being.
- Younger generation is unaware of the traditions and culture.
- There is a need for continuous dialogue between KFD and Kanis to understand the roles and responsibilities in managing forests and practicing conservation.
- Alcohol production and consumption are social problems among Kanis and have deep roots in the changed resource use pattern.
- Consentization and training is required for Kanis to enable them to respond to emerging new market scenarios.
- There are many non tribal settlements along the fringe areas of ABR and these groups compete with Kanis for use of forest resources. Such competitive interactions result into conflicts and acculturation.
- There is a pressure of various practices like illicit liquor brewing, farming by outsiders within the forests, grazing, firewood collection, forest fires, poaching and illegal fishing in the reservoirs.
- There is a growing pressure from tourists of various categories on the forests of ABR.
- Rubber plantations do help in increasing income and standard of living but it is diluting the traditional knowledge regarding resource use.

Ecological Aspects of ABR

India has been identified as one of the 12 mega biodiversity countries of the world. Among the 18 hotspots recognized in the world two are in India i.e. Eastern Himalayas and Western Ghats. The Western Ghats which is one of the nine bio geographic regions of India possesses various types of tropical forests, ranging from wet evergreen to dry deciduous. Nearly 63% of tree species of the low and medium elevations evergreen forests of Western Ghats are endemic. This high level of diversity and endemism has conferred the hotspot status (Nayar 1996). Nayar has identified three endemic centers of Kerala viz. Agasthyamalai, Anamalai high ranges and silent valley. IUCN has identified Agasthyamalai and its environs as one of the three centers of plant diversity in India .

Various ecological studies have been carried out in ABR forests. These studies were restricted to very small areas and related to research on a particular issue . eg Parthasarathy (2001) looked at changes in forest composition and structure in tropical evergreen forests around Sengaltheri which is very small area from KMTR in Tamilnadu. Mohanan & Shivadasan (2002) compiled flora of Agasthyamalai but his collections were restricted to some areas in Peppara and Neyyar WLS. Varghese & Menon (1999) studied rare and endangered species from Peppara WLS. All the available liturature has been scanned to know the floristic composition. Considering the vast area and types of forests in ABR it is urgent to conduct the study of vegetation ecology and endemism to define the conservation strategy for this area.

It is also essential to look at the use of forest resources by local people and how this interference has affected the forest structure and diversity. As a part of this rapid assessment to understand the dependence of local people on the forest brief ecological studies were carried out. The details of the studies and data analysis are provided later in this chapter. It was not possible to conduct detailed long term ecological studies and quantitative assignment but lot of qualitative information has been collected which will help to develop the strategy for participatory conservation and balanced development in the resource rich ABR area.

Flora

As stated earlier ABR has a range of forest types from wet evergreen to dry deciduous and also has some specialized habitats like ***Myristica*** swamps. On way to Agasthyamalai from Boncaud one can see

many of these forest types as we ascend towards the peak. The vegetation show a good

representation of specialized groups of flowering plants such as epiphytes, parasites, insectivorous plants and saprophytes along with herbs, shrubs, climbers, lianas and trees.

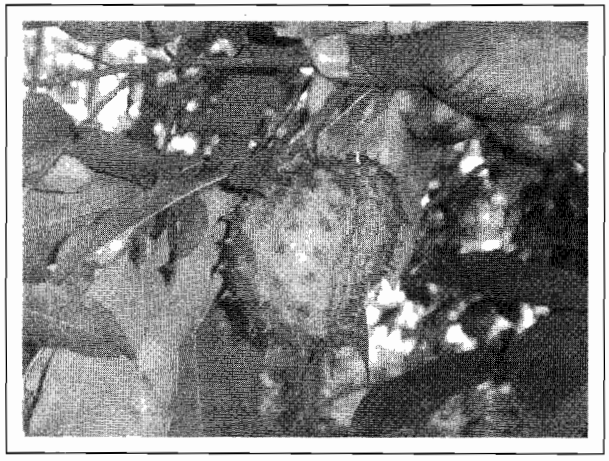


Photo by Archana Godbole

Annona muricata **an endemic species**

There are 132 plant families of Angiosperms recorded from ABR area. Family Rubiaceae is represented by more than 80 species. This is unique due to the fact that it is represented by many endemic species of the family in ABR and those species are available only in ABR. In other parts of the Western Ghats hotspot area the highest species representation is seen in case of Fabaceae and Poaceae. Out of 85 species of Rubiaceae recorded from ABR ; 35 are endemic (Kunni & Sankar 2002) . Detailed accounts of endemic and rare plants from small areas of ABR have been given in many studies conducted so far.

It is interesting to note that there are many wild relatives of crop plants seen in ABR forests. Among these are close relatives of cereals and millets like ***Elusine, Oryza,*** pulses like ***Atylosia*** and ***Vigna.*** Total 88 species are recorded as relatives of crop plants.. Some of these plants are endemic and becoming very rare. If the human interference and depletion of forests continued in this area these important crop relatives will extinct soon.

Photo by Archana Godbole

Trichopus zeylanicus

ABR forests also harbor many medicinal plants used in Ayurveda, Siddha and modern medicine. Similarly Kani tribals use many plants in their traditional system for curing certain ailments. Most of these plants are becoming rare due to over exploitation. Many of the medicinal plants collected from these forests are tree species and are cut for desired part. While designing the conservation strategy special attention should be given to such medicinal plants in high demand. Mohanan et al (1997) have recoded five new species from ABR forests.

There are 25 species of exotic plants recoded in ABR ; most of which belong to tropical Americas.

Invasion of such plant as weeds is indication of degraded habitat.

Fauna

All three WLS forming ABR are rich in wildlife. Each of these sanctuaries support good populations of wildlife. So far 43 species of mammals, 245 species of birds, 46 species of reptiles and 13 species of amphibians and 42 species of fishes have been recorded from ABR.

Vertebrates: abundance & distribution

Mammals include elephant, Indian bison, Nilgiri tahr, barking deer, sambar deer, wild boar, pangolin, slender loris, lion tailed macaque, bonnet macaque, Nilgiri langur, Nilgiri marten, smooth coated otter, toddy cat, small Indian civet, jungle cat, leopard cat, Malabar giant squirrel, flying squirrel, mongoose, porcupine, sloth bear, hare, etc. Among the 43 species of reptiles recorded, 23 species were snakes like python, king cobra, common cobra, common krait, Russell's viper, rat snake, pit vipers, green whip snake, Bibran's coral snake, common keel back, etc. Beside snakes, terrapins like Indian flap shell turtle, Travancore tortoise; geckos like house gecko, bark gecko, rock gecko; etc were also recorded, Indian monitor lizard, which breeds during October- January, is highly sought after by the tribals for meat and eggs. Some species of skinks and ichthyophis are used as fish bait by the tribals. Among other mammals fruit bats are also hunted for meat by the Kani tribes. Of the 217 bird species recorded from Neyyar WLS and 233 species from Peppara WLS, important sightings include painted bush quail, Indian great backed wood pecker, three-toed king fisher, blue-eared king fisher, blue bearded bee eater, red-winged crested cuckoo, forest eagle owl, brown wood owl, grey- headed fishing eagle, great-eared nightjar, Japanese buzzard, tiger bittern, hair crested drongo, Nilgiri wood pigeon, orange-breasted green pigeon, Nilgiri thrush, white-bellied short wing, black and orange flycatcher, Malabar shama, Indian cliff swallow, black-crested baza, eastern grasshopper warbler, white-bellied blue flycatcher, Kerala laughing thrush, South Travancore laughing thrush, etc. 13 species of amphibians were reported from the ABR . Species like common Indian toad, Indian bullfrog, green pond frog, Jerdon's bullfrog, Beddome's leaping frog, Indian tree frog, Malabar tree frog, Ichthyophis sp, etc were the common ones (Table I).

Invertebrates: abundance & distribution

Altogether 233 species of insects were collected from ABR. This included 53 species of butterflies, 90 species of moths, 22 species of beetles, 20 species of bugs, 17 species of bees and wasps, 6 species of dragonflies, 26 unidentified species of flies and 2 species of grass hoppers. The butterflies recorded in this study included 3 species having protected status and 2 Western Ghat endemics. Some of the butterflies recorded in this study viz., Papiliio paris tamilana, P. budha, Cyrestis thyodamus, Kaniska canace, Tirumala septentrionis dravidarum and Pantoporia ranga are rather rare(Pradeep Kumar 2001). However, Mathuw et al (1998) reported 109 species of butterflies, of which 8 species are endemic to Western Ghats. Majority of the rare and endemic butterflies were confined to the evergreen forests and high attitude grasslands.

Table I
Vertebrates of Neyyar & Peppara Wildlife Sanctuary

No	Class	Total species in Neyyar WLS	Total species in Peppara WLS	Source
1	Mammals	43	43	Christopher, 2001
2	Reptiles	46	46	Christopher, 2001
3	Birds	217	233	Warblers & Waders
4	Amphibians	13	13	Christopher, 2001
5	Fishes	27	27	KFRI

(From : Management Plans 2002-2012 for Neyyar WLS & Peppara WLS)

Ecological significance of the landscape

Varghese and Menon (1999) studied forest degradation analysis for Peppara WLS. As per their findings the forest ecosystem of Peppara WLS vegetation shows fragmentation due to natural and manmade reasons. At low altitude original pristine forest is highly fragmented into small patches of secondary forests. The climax forests become secondary moist deciduous forests. West coast tropical semi evergreen forest exhibits high rate of natural fragmentation in this sanctuary followed by southern secondary moist mixed deciduous forest. Artificial fragmentation of the forests of this sanctuary is mainly due to the construction of dam and planting of ***Eucalyptus*** in the adjoining areas in the northwest boundary. Artificial fragmentation has major impacts on species distribution. The study also shown that the primary forests of the sanctuary at present are 29.42 km2 (43.35%), among the rest, secondary forests occupy 38.39 km2 (56.57%), and cultural habitat, 0.05 km2 (0.07%). Encroachments (0.069 km2) from the tea estate into the west coast evergreen forest of the sanctuary were also reported in the study.

It is very clear from the study that forests of ABR are changing very fast and areas with high biodiversity are shrinking. These ecologically important areas of all three WLS should be prioritized with appropriate participatory conservation and management plans. It is also urgent to conduct more specific studies to understand the ecology of this delicate ecosystem of ABR.

Rapid ecological assessment of forests near the settlements

To understand the linkage of indigenous culture and biodiversity in ABR rapid ecological assessment has been carried out in selected areas. These areas were adjacent to the hamlets selected for socio economic data collection. This assessment revealed the fact that most of the forest areas surrounding the settlements are degrading due to high degree human intervention and developmental activities.

Forest patches, representing both primary and secondary forests adjacent to eight settlements were selected to analyze the tree structure, composition and regeneration. A plantation of ***Albizia lebbeck*** which is now left for natural regeneration of native species was also selected. In each selected patch, three quadrats each of 20m x 20m were laid. All the trees (GBH more than 10.cm) were marked, identified and the GBH was measured. Density, basal area and IVI of each species was calculated following standard methods. Species diversity index for each forest patch was also calculated. Girth class distribution of trees was calculated in order to know whether recruitment to different girth class is satisfactory.

Table II
Type of vegetation near the settlements in Peppara WLS

Type of Vegetation No. of	Houses
Moist deciduous	131
Semi evergreen	02
Evergreen	16
Riverine	06
Moist deciduous & Riverine	07
Moist deciduous & Mixed	01
Semi evergreen Riverine	01
Others	04

Source Jayson 1998

Tree density, basal area and species diversity index calculated for natural forests and abandoned plantations are given in Table III. In fact, the dominant natural vegetation of this area is evergreen forest. However, due to human interventions most of them have converted in semi-evergreen and moist deciduous forests interspersed with secondary grasslands. At present about 80-90% contribution to total IVI of tree community in each forest patch is from deciduous species. This indicated that irrespective of declaration of the area into protected area in the name of sanctuaries and bio-reserves the forests are degrading. This is also clear from the girth class distribution of trees where although trees of small girth class are more in number their recruitment to higher girth classes are being curtailed (Table IV) to collection of poles and wood by the local residents.

Table III
Density, basal area and SDI of trees in forest patches in ABR

Location	Tree density (individuals ha^{-1})	Tree basal area ($m2\ ha^{-1}$)	Species diversity index (H)
Kathakkode	1383	39.5	4.089
Chonnanmpara-1	958	39.1	3.475
Chonnanmpara-2	2942	53.47	3.978
Mulamoodu	2025	17.51	2.780
Valippara(Albizia plantation)	3141	53.6	3.383
Valiakunnadi	2225	19.19	3.035

Table IV
Girth class distribution of trees in forest patches adjacent to selected settlements in ABR

Settlements	Girth classes (GBH in cm)		
	10.1- 30.0	30.1-60.0	>60.1
Kaithode	834	237	312
Chonnampara-1	537	58	363
Chonnampara-2	2259	383	300
Mulamoodu	1267	675	83
Valippara	1825	825	493
Valiyakunnadi	1783	254	188

Table V
Settlements viz resources degradation

Settlement	Pole & Firewood Collection	Medplants/NTFP collection	Encroachments for farming	Canopy Opening
Kaithode	+++	++	+++	+++
Chonnampara	++	NA	NA	++
Mulamoodu	+++	++	NA	+++
Valippara	NA	+	NA	++
Valiyakunnadi	++	NA	NA	NA

+++ : major impact ++ : moderate impact NA : Not affecting

Facts revealed through ecological studies

- Biodiversity studies in ABR are restricted to popular communicable areas. Large tracts of forests remained without any scientific investigations.
- No baseline data is available for most of the areas of ABR.
- Floristic literature survey revealed that biodiversity is protected better in KMTR area of Tamilnadu as it has many untouched and undisturbed patches of forests.
- Kanis are dependent on forests in many ways but due to strict protected area regulations they are more in collection of various NTFPs and small timber requirements rather than encroaching more forest land for farming of food crops.
- Among three WLS biodiversity is better preserved in Shendurney WLS.
- Most of the tea gardens in ABR area are closed. Such areas could be used for tourism purposes. But there has to be open policy for involving companies for such development.
- Forests of Agasthya peak area are degraded severely and are converted to grasslands due to repeated burnings and growing tourist influx.
- People in the fringe areas are competing with Kanis for forest resources and are contributing to degradation of forest ecosystems.
- Drying up of some of the perennial streams is indicator of degradation of forests.
- Forest cover in some parts of ABR especially in the pilgrimage area has reduced to 13.30 % .
- Forest fires are major threats to the remaining biodiversity of rich forest ecosystems of ABR.

Development Interventions & Conservation

Demarcation of certain areas as protected areas with varied status of protection has found useful to some extent for conservation of biodiversity. It also gave rise to conflicting situations as it has disturbed the harmonious man-nature relationship displacing people from their natural surroundings. Such propositions also created new threats resulting into acculturation by activities like tourism. Traditional societies maintaining the biodiversity were excluded in the process and their role has changed from guardians /custodians to those exploiting nature. It is therefore all the more important to document and analyze the need for developing an understanding of interdependent role of cultural and biological diversity to establish better conservation initiatives. Such understanding then would provide a solid base to involve the traditional communities in the conservation and respecting their contributions of protecting the high value biodiversity areas, through generations. In protected areas many livelihood support activities are implemented by various developmental agencies to bring traditional communities into mainstream. In this chapter each of these activities and issues related to conservation and development are discussed in ABR context. Attempt has been made here to look at the challenges and solutions to the quest of conservation and development.

Developmental interventions

Kanis from ABR area were isolated and faced difficulties in continuing their life in ABR forests due to dams and protected area development in the recent past. These developments have affected Kanis as well as ABR ecosystems in many ways both in a negative as well as positive manner. It is important to look at developmental interventions in ABR area, their impact on Kanis as well as its relationship with conservation of biodiversity. This understanding will be useful to see a better picture and status of Kanis traditions today. It will also provide the knowledge about using Kani traditions for better participatory conservation planning and implementation.

Tourism

Tourism is considered as most important development intervention which can serve various other purposes like awareness generation among the tourists and city dwellers, source of earning foreign exchange, source of employment to local people and conservation to some extent. Tourism if managed as ecotourism could certainly be considered as major intervention for Integrated Conservation and Development .

ABR has a lot of potential to be developed as important tourist destination. It can offer wild life tourism, water sports, recreation, and trekking as main attractions. ABR has three reservoirs and each one is a good location for day's family picnic. However such ideas are not taking off and not really useful for the involvement of local people into the tourists and resources management. It is interesting to discuss one such case here.

Ponmudi is the nearest hill station to Thiruvananthapuram (65km). It is situated at 915 meters above sea level. It is an ideal hill resort with narrow, winding pathways and cool, green wooded environs. The natural scenery, salubrious climate and the scope of hiking in high trails make the visit an exhilarating experience. However on the contrary Ponmudi and surroundings is the best example of adverse impacts of forest and tourism development efforts. Ponmudi surroundings have best untouched wet evergreen forests distributed in about 200 sq. km area and are stretched up to Shendurney WLS and Kallad Irrigation Project catchment. Unfortunately all these forests are not included in ABR.

At Ponmudi hill station area there are some very old tea gardens owned by a company from Calcutta. In this area old plantations of tropical pine are observed. For these plantations large tract of wet evergreen forest has been clear felled in the past. Similarly for beautification of the area ***Acacia auriculiformis*** has been planted as an avenue tree. Ponmudi hill station has an acute drinking water problem from March to June. Therefore the only resort operated by Kerala Tourism Development Corporation is closed from March to June. It is clear from the situation that the lush green catchments of the streams originating from Ponmudi have been destroyed for tourist development and other initiatives like commercial plantations of tropical pines.

Photo by Archana Godbole

Wet evergreen forest at Ponmudi

KFD had developed a deer park in an enclosure and put about 35 sambar deer. However it was not possible for them to provide fodder and water and this experiment was completely unsuccessful. Now this enclosure is open area devoid of any vegetation.

KFD also tried to establish an orchidarium especially to display and conserve the rare and endemic epiphytic orchids of ABR forests. For this purpose many of the orchids were collected from the forests and tried to be grown on other trees near the deer park enclosure. These orchids were collected from the forest during summer and evidently they could not survive on new trunks.

Such efforts by KFD have posed many basic questions regarding the ideas of tourism development and use of protected areas for the tourism and its impacts on biodiversity of the area.

On the way to Ponmudi there are Meenmutty water falls which is becoming famous tourist attraction. These water falls are situated deep inside the evergreen forests. Recently developed local Golden Valley Ecotourism Committee of the Kallar village is managing the tourists visiting the falls. This development is a positive example of collaborative effort of KFD and local people. This committee has trained guides, members patrolling the area to check fires as well as people managing the entry point. Local people have got employment as well as monetary benefits through this committee. These falls are flowing from monsoon till March end. Old people from the committee informed that these falls use to flow through out the year. Now the forest in the catchment has been destroyed. In the year 1992 due to floods and landslides in the area and changed course of the river badly affected the waterfall's

In Kallar village there is a village ecotourism complex with four exotic huts developed by a private company. However due to lack of publicity and maintenance this place is abandoned.

It is clear from these examples that there is a lot of opportunity to local people for ecotourism, through which they will certainly contribute positively to the biodiversity conservation and earn decent livelihood.

Thenmala Eco tourism Initiative

In Shendurney WLS Thenmala ecotourism facilities are developed by KTDC. Thenmala ecotourism facility is first of its kind in Kerala and it is a successful initiative.

At Thenmala (Shendurney WLS) Kerala Tourism Development Corporation has developed ecotourism facilities that are functioning properly benefiting the local people. Such facilities include a well developed ecotourism information centre with trained staff (mostly local people) and a permanent exhibition with posters and boards in local language as well as in english for tourists. Within same complex conventional small shops are allotted on lease to local people or self help groups to display and sell their products. These products include spices and condiments cultivated by local people, NTFPs like damer, barks of trees , home made products like grape wine and ginger wine (medicinal decoctions).Some shops also provide communication facilities like telephone booth, some souvenirs and a snacks stall. These shops have provided additional livelihood opportunity to poor farming community and basic livelihood

Photo by Archana Godbole

Thenmala Ecotourism

Additional livelihood opportunity to poor farming community and basic livelihood options to many landless. All the individuals running the shops are well trained and can express the process of this development and its benefits. KTDC in collaboration with Kallad Irrigation Project Division has developed many areas near the reservoir as ecotourism areas with specific facilities like adventure sports including rock climbing, mountain biking and river crossing. KTDC has also developed a leisure area with swinging bridge and canopy walk for tourists. At each of these facilities trained local guides are available and National Adventure Foundation staff is available for safety. Boat ride is another attraction at the reservoir. Tourists are carried in battery operated non polluting buses to the boating area from the Ecotourism office. Each of these areas has separate entry tickets giving choice to various classes of tourists.

Such development is not only restricted to the immediate surroundings of the dam area but also could be observed at other nearby tourist places like Pallaruvi waterfalls. At Pallaruvi waterfalls about 17 km from Thenmala a village Ecotourism Committee is functioning and managing the tourists at waterfalls. There are well trained guides who perfectly understand the need of eco friendly behavior within such forest areas. They have also developed a strategy of patrolling the area for locating fires and preventing illegal felling. The committee made the turn over of Rs. 25, 00,000/ in the year 2004 through various activities like entry tickets to people and vehicles visiting the waterfalls, sell of NTFP and other products developed through committee and SHGs. Women are represented in the committee and participate in the working positively.

District Tourism Promotion Council

DTPC is looking after the tourism facilities and promotion of tourism at the irrigation reservoirs within ABR. It is operative at Neyyar and Thenmala (Kallad Reservoir in Shendurney WLS). DTPC is mainly involved in providing boating facilities in the reservoirs, beautification and landscaping of the areas around the dam provision of drinking water, sanitation and similar tourist amenities. Such development has impacted the ABR in many ways. It has helped in attracting more tourists due to publicity efforts of DTPC and facilities. However there is no awareness generation among tourists or strict regulations while they enjoy. Littering and spoiling the area is very common. Similarly due to lack of adequate trained manpower with DTPC; it is not possible to control the situation. There is also no restriction on number of tourists per day and carrying capacity of such small areas has not been worked out. During holidays and week ends these areas are crowded and there is a tremendous pressure on the facilities developed. Littering with plastic and non biodegradable items is causing problems. However DTPC activities definitely helped to provide seasonal employment to local people including Kanis. There is lot of scope to improve the tourism management of such areas. It is possible to make best use of the visiting tourists as captive audience for awareness generation through film shows, slide shows and environmental education activities. KFD has also developed wildlife and nature tourism facilities but there is again no synergy and collaborative approach.

Development by KFD

1.1 Nature tourism

KFD has also developed the tourist information centre and other facilities at Neyyar and Peppara . Neyyar dam is visited by tourists frequently mainly for boating and trekking in the forests. Local people from Trivandrum visit here and this is a most popular picnic spot. KFD's tourist information centre facility provide basic information about the WLS . However there is no interpretation centre or any information available in English. Most of the foreigner's groups bring translator from Trivandrum or the tour operators provide such help. KFD has kept row boats for boating in the reservoir and provided employment to the local youth. Some local people also work with KFD as guides for the trekking. Most of them are wage laborers. There is no information about specific species, nearby landscape, and about importance of Agasthyakodam peak available or provided in the information centre. This information centre is managed by Chief Wildlife Warden. Irrigation Department has also set up an interpretation centre but is non operational. Tourist influx is restricted to the recreational area around the dam.

Kerala has a tradition of many successful experiences. In the Periyyar Tiger Reserve KFD has developed and executed Eco Development Plan successfully with real participation of local people and.developed country's most successful and sustainable ecotourism initiative. Lessons of Periyyar could be used in ABR with certain local modifications.

1.2 Agasthyakodam pilgrimage

Agasthyamalai attracts thousands of pilgrims annually to visit the sacred shrine at Agasthyakodam peak. The season of pilgrimage is from January to April every year. The peak of the season is in Feb March coinciding with Shivaratri festival. The pilgrimage was recognized for last 50 years but was made official by KFD in the year 1999. Since then each pilgrim requires the permission and groups are allowed with guides provided by KFD. The actual pilgrimage starts at Bonacaud and takes two days to reach the peak and back. Kunni & Sankar (2002) in their detailed Environmental Impact Analysis of this pilgrimage clearly mentioned the need of strict rules and regulations and awareness generation among all the stakeholders. Pilgrims and tourists influx is increasing every year and posing problems like forest fires, non degradable solid waste generation and destruction of valuable forests. Visits to the Kani sacred area by outsiders is also causing acculturation.

KFD tried to develop a management set up with the help of Kani Eco development Committee. This pilgrimage management is seasonal activity and the committee requires lot of training and facilitation before they shoulder complete responsibility of the tourism management. KFD has also organized some training and awareness generation programmes in the past. KFRI an institution conducted the EIA suggested to involve EDCs of Bonacaud, Podiyam and Chathankode in the pilgrimage management. A detailed planning for management needs and implementation approach is urgently required. It is necessary to generate awareness among Kani EDCs to inform them that such systematic management will enhance their income.

It is also suggested here that to generate awareness about the biodiversity and its value an information centre could be developed at Bonacaud ; the entry point for the pilgrimage. The local guides should be trained to identify plants on the way to the peak. Small booklets about do and don'ts during the pilgrimage and information about the various forest types will also be useful for the different kinds of tourists groups.

Rubber plantations

Dutch colonialists who cultivated rubber in their plantations in Indonesia introduced the rubber plant to Kerala in India, because of its similar tropical climate. Kerala was the best possible locality for the introduction of the plant. During last 30 years Rubber Board is promoting plantations in far and remote corners of Kerala. It penetrated in ABR fringe areas also. Kanis clear some forests around their settlements and plant rubber trees. The Rubber Board is proving subsidies and assuring the buy back to Kanis. Similarly rubber plantations once establish can produce till 20 years. The tapping operations are comparatively easier and sell of rubber sheets can provide cash to Kanis every week. It is making an adverse impact on Kanis as well as forests.

Nothing can be done now for well established rubber plantations in ABR. But policy decision for not allowing the new plantations within the ABR limits or on the fringes is an urgent need . To achieve this interdepartmental cooperation and synergy in approach is essential.

NTFP sale facilitation

Kanis from both Neyyar and Peppara WLS collect various NTFP items. These commodities include food, medicine, thatch grass, cane, reed, honey etc. Kottur is a nearest small town where they sell their commodities. These materials are sold in the Kottur tribal market which is unique experiment initiated and supervised by Kerala Forest Department.

Kottur tribal market is situated 8 Kms south of Peppara dam. History reveals that Kanis used to bring the NTFPs and exchange them with non tribals for salt, tobacco or cloths. Local vendors and villagers were participating in this barter trade. Later due to some conflicts between the vendors and Kanis the market was closed for sometime . It started functioning again with intervention of KFD after adopting a new system of open auction. Due to such system the interactions of non tribals and middlemen with Kanis has minimized. All the NTFPs and agricultural produce were used to be

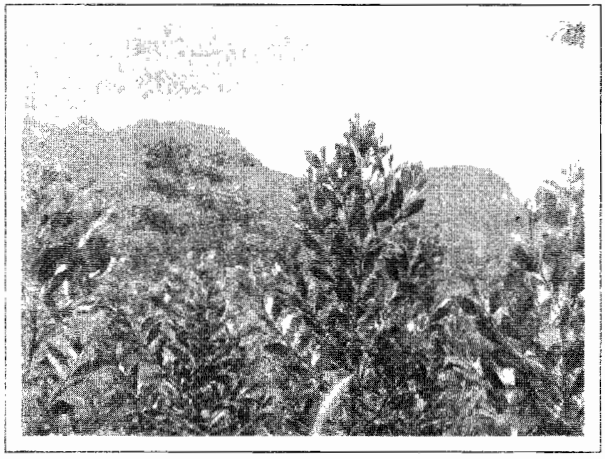
Photo by Archana Godbole

Kottur weekly market facilitated by KFD

brought to the markets by the Kanis exclusively. The market still function twice a week but the amount of NTFPs sold through this system is reduced. Only agro based products are sold by Kanis under the supervision of FD personnel. Kanis now sell the NTFPS through the tribal cooperative formed at Kottur. This system is beneficial to the tribals and there are better chances of fair trade. In the new strategies for developing NTFP sector such initiatives must be encouraged.

KFDC tree plantations

Kerala Forest Development Corporation (KFDC) has taken up many plantation activities in the fringe areas of ABR. Before the inclusion of vast reserve forests into WLS or now in Biosphere Reserve, sections as per the forest working plans have been clear felled and these lands were replanted with species like *Albizia, Acacia mangium, Eucalyptus* and such like fast growing social forestry species. These activities provided employment to Kanis but today there is no such employment available and there is lot of competition by non tribals for such jobs. Such kind of plantation related work is seen in Peppara area. In future due to strict regulations of biosphere reserve such employment may not be possible and all the people should be provided some alternative seasonal employment.



KFDC *Acacia mangium* plantation

Women's cooperative for handicrafts

In some interior settlements of Agasthyavanam Biological Park range an attempt is being made to run the Kani women's cooperative making and selling the artifacts made from reed and bamboo. The literate and enthusiastic women from the settlement were trained. Women's SHG was formed and receive some seed capital to start the enterprise. The trained women passed on the skills to other interested women in the village. However the major problem is that of market. It is not possible for these women to visit nearby city market for sell. Access to market with fair price is an important issue and now these women make items only with prior advance and orders. This situation is putting a hurdle in business development and benefits to these Kani women. The SHG needs the facilitation support to develop the strong links with markets and would like to bring the traders at their door step.

Institutional set up and benefit sharing with Kani

It is a challenge to protect the rights of Indigenous peoples over their knowledge, while conserving biological diversity. The Convention on Biological Diversity is one international instrument that has the potential to achieve both these objectives. Its primary objective is the conservation and

management of biological diversity. Such an effort has been initiated in ABR pertaining to Kani indigenous knowledge and it has been linked to markets in a manner to provide benefits to knowledge holders.

Kani tribals of Agasthyamalai , knew the anti-fatigue properties of the Arogyapacha plant ***(Trichopus zeylanicus),*** which they ate during long treks in the hilly Western Ghats region. Kani healers, known as Plathis, have knowledge of the medicinal properties of the flora and fauna of the region, and each generation passes this knowledge on to the next generation orally.

Tropical Botanic Garden and Research Institute (TBGRI), scientists studied the plant for its chemical properties and effectiveness . The study revealed that the plant contained certain substances with anti-stress and anti-fatigue properties, and which protect the liver and restore the immune system. After seven years, Dr Pushpangadan, Director TBGRI had isolated 12 active compounds and produced a scientifically verified and standardized herbal formulation, called **Jeevani.**

There is a huge world market for herbal medicines worth billions of dollars and there was significant financial gain to be reaped from the commercialization of Jeevani. Arya Vaidya Pharmacy (AVP), a private limited company, was given a license to manufacture Jeevani for an initial period of seven years at a cost of US$50,000 for the license plus 2 per cent royalty. TBGRI decided that the Kani tribals would receive 50 per cent of the license fee, as well as 50 per cent of the royalty obtained by TBGRI on sale of the drug (Pushpangadan 2001).

There were complications in transferring the financial benefits to the Kanis. There are a number of Kani groups living around Thiruvananthapuram and ABR. The knowledge about the plant's medicinal properties was one that was known to, and belonged to, the entire community. The TBGRI benefit-sharing arrangement was however made with only one Kani tribal group , the one to which the two guides belonged who had given the information about the plant. Other Kani groups protested against this. As a result, disbursement of money could not take place for some years.

To solve this problem and involve the wider community, they formed a body known as the 'Kerala Kani Samudaya Kshema Trust', which comprised of a general body with adult tribals chosen from 30 Kani settlements, an executive committee representing all the tribal colonies and a 14 member governing council. The benefits would be shared with all the Kani groups through this trust.

The trust decided to keep the capital amount in a fixed bank deposit and to utilize the accrued interest from the capital for various community development programmes. The welfare programmes planned and being implemented by the Kani trust include an insurance scheme for pregnant women and to cover accidental deaths, and providing financial support to poorer Kanis for education and marriage purposes. The model now benefits over 16,000 Kani people comprising over seven hundred families.

Once the license was granted to Arya Vaidya Pharmacy, a regular supply of the leaves of the plant was required. Scientific studies had revealed that the medicinal properties of the plant are best manifested in plants growing in the natural habitat. The Kani required the permission of the KED to harvest the plant. KFD was reluctant to grant permission because of fears that commercial harvesting would

threaten conservation of the plant. Unfortunately, some of the plants were smuggled out and, during harvest of leaves, some people uprooted the whole plant from the gardens and others took the wild herb from the forest.

To resolve this issue, TBGRI suggested that as only leaves of the plant are needed, several harvests could be made from the perennial plant without actually destroying it. Therefore, in October 1997, in a proposal to the Forest Department and Tribal Welfare Department, it is stated that it was willing to pay Kanis seed money for cultivation of the plant, and would subsequently buy leaves harvested from these plants. This was not only a sustainable use of the natural resource, but through such cultivation it gave the Kanis an extra source of income. TBGRI also assured the KFD that no private parties would be involved in cultivation of the plant.

To facilitate this arrangement a pilot scheme for cultivation of the plant was carried out with support from the Integrated Tribal Development Programme (ITDP) in areas surrounding the reserved forests from 1994 to 1996. Under this programme fifty families were given around Rs. 2000 ($40) each for cultivating the plant. TBGRI was to buy five tones of these leaves per month from the families and supply them to AVP for production of Jeevani. Through this scheme, roughly half the Kanis secured employment and were trained by TBGRI on various aspects of cultivation and harvesting of Arogyapacha to ensure that the plants were not over-harvested.

This experience has provided insight at multiple levels and is recognized as a world's first experiment on how to commercialize use of natural resources in a sustainable manner; developing a valuable product and sharing benefits in a way that rewards the knowledge of indigenous people. It has been observed through the exercise that:

- The increase in demand could have led to excessive extraction of the biological resources, if the following measures were not taken:
- Raising awareness among all stakeholders
  - Supporting and creating local institutions for sustainable extraction
  - Legitimizing the property rights of communities over the use of biological resources and associated knowledge negotiated and defined at the local level.
- The effective protection of intellectual property is a necessary condition for generating benefits, but it is not a sufficient condition for benefit sharing.
- Several additional measures are needed to supplement the role of intellectual property rights in benefit sharing over biological resources and traditional knowledge.

Ultimately, the initiative has empowered the Kanis to protect, preserve and maintain their knowledge. The sustainable use of biological resources had resulted in benefiting the local and global community.

This interesting story of *Trichopus zelanicus* and Kanis from Agasthyamalai was an eye opener in many ways. It showed the way of respecting local people's Intellectual Property Rights over their resources as well as knowledge. It also developed a benefit sharing mechanism. However after withdrawal of the scientific institution TBGRI, the system developed is not working and Kanis

involved in the process then expressed , that they need facilitation of committed individuals for a long time. Similarly there is need of awareness generation. According to Mallan Kani the former president of Kani Samudaya Kshema Trust;

"Trichopus is not all ; we have many more such effective medicinal plants and through the continuous collaboration and facilitation we can have range of products to offer to pharmaceutical companies . Such range will provide us benefits on sustainable basis. Now we are helpless, illiteracy among Kanis is also a major problem."

As a part of ABR participatory conservation strategy such good experiences and lessons learnt through them must be considered and any efforts to improve the sustainability of such initiatives should be given high priority.

Issues & Challenges for ABR Management

- Lack of awareness
- Disintegration of traditional Institutions governing conservation
- Need of continuous facilitation
- Growing populations
- Lack of appropriate policy support
- Various conflicts
- Lack of collaborative management framework

Conflicts & Kanis in ABR

Development in such a sensitive area also brings conflicts. Conflicts due to protected area rules and regulations are quite common . Kani have been using ABR resources for years. It is well understood that some of their activities like short cycled shifting cultivation were destructive. Now due to the PA regulations most of the Kanis are settled .However there is a constant increase in number of outsiders (non Kanis) using the ABR resources. Depletion of forests, outsiders encroachment , penetration of plantation crops deep inside the forests and changed livelihoods of Kanis have contributed to various conflicting situations that are ultimately hampering conservation and resulting into further deterioration of the ABR landscape.

Due to the displacement by various irrigation projects in Kani areas the land resources available to them reduced drastically and they had to change their livelihood activities forcefully. Again with the protected area regulations they were pushed away. Such developmental work has created conflicts and Kanis were not interested in any cooperation with planners and policy makers. They used to consider KFD as their first enemy .

Availability of land and cheap labor were favorable conditions for rubber plantations. Through such activities the political dominance and control over the resources increased giving rise to the conflicting situations.

Kanis were forced to take up liquor brewing as their livelihood and they get meager remuneration. However KFD as well as State Administration hold them responsible for the illegal activities like brewing though the real players are different. At times it has been observed during this rapid assessment that Kanis are getting organized to fight against such issues and antisocial elements are taking advantage of the situation. Resource use competition is a well known factor due to increasing number of outsiders in the ABR area.

Animals damage the crops of Kanis. Though Kanis were used to such damage the amount of land cultivated earlier was more. Now due to settled way of life they cultivate very limited land around the hamlet. Recently cattle lifting and attack on people by leopard or tiger is also becoming frequent and it is a great challenge to keep both people and animals in such delicate protected areas. Compensation for losses due to animals is available but the procedures and paper work required for the same is still tedious for Kanis.

Conflicts hampering effective and sustainable management of ABR

- Land ownership conflicts.
- Conflicts from rapid socioeconomic changes due to shift from subsistence to market economy.
- Growing pressures to find alternate income or subsistence where resource has dwindled.
- Friction between tribes and settlers over the use of natural resources.
- Dominance of commercial interests.
- Growing frictions with the authorities over various wage and employment related issues.
- Conflicts between communities unaware of forestry practices and downstream stakeholders.
- Contradictory natural resource management objectives of the wildlife managers and the basic livelihood issues.

Future Strategies for Conservation & Development

The sacredness and essence of communities' perception of protecting sacred landscape is dependent on their sense of ownership. It is also dependent on the spiritual and mythical identity of the region. Legal protection in the realm of state law suddenly changes the traditional institutional systems maintaining such areas. While implementing the strategy for managing such sacred landscapes into biosphere reserves; it is important and urgent to understand the embedded roots of conservation practices into the cultural identity of the region. Acceptance of the concept of sacred in principle is followed even in today's context. However; implementing that conceptual understanding in day-to-day life has been a difficult task. To use the conceptual understanding of the sacred our wise ancestors have developed certain practices to keep the sanctity of the nature and laid down some principles and rules for the protection and conservation of the nature. These rules became general practice and became the integral part of the culture of various traditional societies. The interdependence of culture and conservation of biodiversity however is not very simple and cannot be used directly to develop the approach for biodiversity conservation in today's context. Complexities of cultural operative environment and today's conservation needs are to be dealt with simultaneously rather than in isolation.

Management & conservation : challenges & opportunities

Those managing Sacred Natural Sites (SNS) face a variety of challenges though each site is unique and has its own combination of challenges and opportunities (UNESCO 2001; UNESCO 2003). Various SNS also have opportunities for participatory conservation as well as development. Again such opportunities are dependent on the uniqueness of each SNS and approach adopted by the managers. Some of the most common challenges and opportunities in the ABR context are discussed below.

(a) Multiple stakeholders

ABR originally has been a sacred site of Kanis but later on other non tribal communities also started worshiping the site. Being a forest area with abundant wild life the ABR also caught attraction of many other groups of people . These groups were using ABR resources in many ways and activities of some of these groups are exploitative. Such different stakeholders with different objectives of use

and management of sacred site obviously disturb the balance and affect the quality of sacred site. Therefore while designing management strategy it is important to take all the stakeholders into confidence and should provide enough time and resources for building consensus and capacities.

(b) Tourism activities

ABR is both a cultural heritage and natural heritage of indigenous Kani people occupying the forest areas within ABR. This biosphere reserve is also important nature tourism site for non tribals from the surrounding areas as well as from all over the country. Therefore all the three wildlife sanctuaries within ABR and adjacent non protected area divisions could be developed into ecotourism areas.

Success of Thenmala Initiative at Shendurney WLS

- Planned with local people's involvement
- Beneficiaries are literate non Kanis
- Long term planning
- Capacity Building among local people
- Training of mangers
- Small area developed for ecotourism

Ecotourism is a key word in any conservation and management strategy today. However with a few exceptions like Thenmala the correct meaning of eco tourism hardly has been understood and considered while designing the conservation strategies. Fragile areas like ABR which are under threat as well as have a lot of potential as seen by development planners pose real challenge while designing and implementing ecotourism programmes. It requires lot of awareness, and training to all the stakeholders of the process. It also requires assurance of long term support for such people centered initiatives for their sustainability. As a part of conservation strategy for ABR it is important to study the possibilities of such development within various potential areas. Thenmala initiative may not be replicable as it is elsewhere in ABR and may need some locale specific modifications. Two other protected areas within ABR also have potential to develop some eco tourism areas.

(c) Development pressure

Encroachments, agriculture, pastoralism, hunting, tourism and infrastructure development can put tremendous pressure on already degrading forests and ecosystems of the ABR. Due to the status of Protected Area to three sanctuaries within ABR the new encroachments are limited but pressures of hunting, poaching and expansion of rubber plantations deep inside the forest areas is very high. Rubber plantations do help in increasing the income and standard of living, but it is diluting the traditional knowledge regarding resources use. Rubber plantations deep inside the forests are a cause of concern for biodiversity conservation. Similarly the road and communication network through forests is also a cause of concern. How much more such development to be allowed at the cost of forests must be an important consideration in ABR management plan.

(d) Ownership patterns

The exclusivity of Protected Areas (PAs), as envisaged in conventional forest conservation is not always possible in the Indian context. The population of humans in and around these Protected Areas is largely rural or tribal and directly dependent on the natural resources for sustenance. Most of the PAs in India experience human interference, and about 72 per cent of Wildlife Sanctuaries and 56 per cent of National Parks have human settlements within their boundaries. 73 per cent of Wildlife Sanctuaries and 39 per cent of National Parks experience grazing by domestic animals. About 8 per cent of National Parks and 26 per cent of Wildlife Sanctuaries have reported incidence of illegal occupation or illegal use or both (Kothari et. al., 1989).

ABR is a huge area covering an area of 1701 sq. kms. Kani traditional community has been spread within the area and their settlements are scattered all over except in some remaining untouched forests within the core area. Before any development the area was available to Kanis and they were custodians of the ABR forests. Later with development and awareness most of these forests were brought under the legal framework of protected areas and the state forest department became the official owner of the forests. This has posed serious challenges in terms of use of the resources and access regimes.

(e) Economic activities within SNS

To establish a balance between the material and non material values of an area is always difficult especially in case of sacred landscapes like ABR. It is very difficult to know the situation of indigenous people as they protect the landscape as sacred site and at the same time have been using the resources in a sustainable manner. It is a challenge to understand the processes and cultural practices responsible for maintaining such a balance and understanding the pressures disturbing this balance. Kanis in the ABR were using forests for their economic needs through practicing typical shifting agriculture, plantation forestry, hunting and NTFP collection. These activities continued and it is difficult to stop them unless the new management regime provides viable alternatives.

(f) Political will and access

ABR is an interstate project covering areas of three sanctuaries from Kerala and parts of KMTR from Tamilnadu. Till recently Tamilnadu was not accepting the inclusion of the Tiger Reserve into the ABR. Now finally the state has accepted the same and started working to design the special strategy for conservation as Biosphere Reserve. It is an important challenge to deal with the issue of collective management of all the protected areas within ABR together and to resolve the interstate management issues. A strong political will is desirable to manage all the protected areas within ABR using similar approaches and principles.

(g) Conservation value

Many SNS have a high degree of biodiversity and are important areas for water resources conservation. ABR with its strategic location within the Sahyadris and high endemism is no exception. ABR still has some untouched areas and these can serve as indicator sites for the restoration and rehabilitation of degraded systems within and outside ABR. Based on species inventories of ABR strategies can be formulated for the reintroduction of rare and endemic species in a wider spatial context of the ABR.

(h) Model sites for integrated management

The objectives of the management of the PAs in India till recently focused on plant and animal conservation and people were totally excluded. After the promulgation of the Wildlife Protection Act in 1972, the network of PAs was strengthened all over the country and restrictive access rules were strictly enforced by the State Forest Departments. Over the next three decades the Wildlife Management approach towards local communities was often confrontational. Local communities were forced to become 'illegal encroachers', 'poachers' and 'smugglers' in their own ancestral lands. However it has been widely realized that natural resources cannot be protected without the participation of the local people whose survival is intimately linked with the forests. The latest National Forest Policy also aims at participatory forest protection and management measures. To this end, Eco Development Committees (EDCs) will be formed in the Protected Areas and 'Vana Samrakshana Samithies' (VSS) in the other Forest Divisions. The Eco Development Programme aims at "conserving the biodiversity by addressing both the impact of the local people on the PAs and impact of PAs on the local people". The EDCs emerged around many PAs in Kerala in recent years through village level planning of reciprocal commitments. The reciprocity resides in (i) specific measurable actions by local people to improve conservation and (ii) project investments that foster alternative and sustainable resource use and livelihood.

The Peppara WLS has 17 Kani tribal settlements inside the forests and a large population of people living around the Protected Area. Seven EDCs were formed in the Peppara Wildlife Sanctuary. They are Podiyakkala, Anakkallu, Kunnathery, Chathancode, Podiyam, Cherumankal and Bonaccord. Of these, Anakkallu and Kunnathery do not function any more.

The proper functioning and designing of the EDCs within some parts of ABR in Kerala could be considered as model sites for integrated management as EDCs have formulated considering most of the demands and dependence of the local communities. This framework has been successful in Kerala already in case of Periyar Tiger Reserve.

(i) Model sites for participatory conservation

The case of development of Arogypacha based on the traditional knowledge of Kanis has already been discussed in detail. It is quite clear from the example that it is definitely possible to develop some model sites for participatory conservation where communities showed interest and responded positively. At the same time there is a need to look at social issues while designing effective participatory conservation framework because

- **Social acceptance is crucial for sustainability of conservation initiative.**
- **There is a possibility of realization of benefit sharing approaches through collaborative work.**
- **Philosophies and practices change with limited investment, new partners and new ideas.**
- **Effective processes and tools are available.**
- **Effective strategy involves a clear political and moral responsibility.**

Challenges for all inclusive ICDP

- Can conservation find roots in indigenous knowledge and local institutions?
- Who are legitimate stakeholders for ABR resources management?
- Can all stakeholders be involved and become partners of the collaborative process?
- How to provide long term facilitation for communication, negotiation and conflict resolution among the stakeholders management?
- Can conservation process provide effective Alternative livelihood options?

While designing any Iintegrated Conservation and Development Programme there is a need to look at the challenges in a holistic manner rather than various issues in isolation.

Guidelines for conservation & management of ABR

To deal with the issues and challenges as well as to make best use of opportunities it is necessary to evolve general guidelines for achieving better conservation management and participation in maintaining the ABR as sacred natural site . These guidelines are based on the principles evolved by UNESCO through various workshops and meetings on sacred natural sites since 1998. These guidelines refer both to the respect of environment as well as to the respect of traditional and spiritual belief system.

1. Recognition

Sacred Natural site should be officially recognized. If sacred natural site occur within established and legally protected areas their recognition by government authorities will help increase the overall protection of the entire area through added cultural value. In case of ABR though it is legally recognized protected area only part of it is recognized as sacred pilgrimage site . Such understanding for the whole ABR as a sacred landscape should be developed. It could be possible through awareness generation among policy makers and mangers responsible for management and conservation of the ABR landscape.

2. Inclusion

The management of Sacred Natural Sites must involve all relevant stakeholders. The entire community of different groups that have specific value to the sacred landscape should be involved in the planning and management of any action plan for better conservation. Only the widest possible participation of all stakeholders can ensure the safeguarding of a sacred natural site. In case of ABR such a process of informing and including all the stakeholders is initiated with recent programmes

like development and management through Eco Development Committees. However there is need to have more dialogue between various stakeholders like forest officials, tourism managers, irrigation officials , Kani and non Kani.

3. Voluntary participation

The effective protection of any sacred natural site could be achieved only through the voluntary participation of local people. People's participation is the basis of integrity and very existence of the site. It is therefore essential that local people be consulted on their willingness to accept outside help to strengthen the conservation efforts. In case of ABR many steps have already been taken for the conservation without consulting the Kanis which has resulted into serious conflicts as discussed earlier in this report. However the new understanding and participatory forest management practices the voluntary participation could be increased in future.

4. Conservation approach and integrated management

An extended concept of conservation is needed in conservation and management of sacred landscapes. The conservation strategy for the sacred landscape like ABR should aim at

- Diversification of local employment to reduce pressures on threatened species and or ecosystems .
- Control of conservation management activities effectively by local communities.
- Involving communities in planning and implementation as partners and not as employees implementing the conservation and development programmes.
- Not looking at Kanis in isolation but to consider other settlers of forest area to avoid future conflicts.

5. Modern science and traditional knowledge

The classical western approach to conservation is based on scientific knowledge while the traditional approach is based on value system. In the management plan of SNS modern scientific approach and indigenous knowledge should be utilized fully for conservation. As regards the traditional ecological knowledge the indigenous people have a wealth of knowledge on the biophysical environment. They have capacity to base their decisions of resource use and healing powers on the understating of the nature around them and the sacred within the landscape. Such a deep understanding of the cultural perspective of Kanis and ABR is still being understood and the process of blending both the knowledge system is yet to begin in ABR.

6. Research & Consultation

There is need to know more about the linkages between sacred mountains or sacred landscapes , cultural conservation and environmental protection. There is also a need to understand the priority issues of the local communities that are dependent on the SNS for their livelihoods. It is equally important to look at ongoing developmental processes and to find out impacts of such processes on the very existence of the sacred site. For doing a detailed analysis continuous research efforts are

required as the first step. Before designing the long term action plan for better conservation and management of ABR for benefits of Kanis it is necessary to fulfill the research needs .

These include

- A prioritized research agenda is very important for ABR. Research must be participatory, action & implementation orientated and must be complementary to the conservation and development needs of ABR area.

- Detailed ethnobiological studies of Kanis from ABR are utmost important. Arogypacha experience is one example but Kanis have vast knowledge of plants and use of biodiversity which has not been documented. Similarly Kani's indigenous knowledge used for sustainable natural resources management in a rich resource area like ABR has not been documented and analyzed. It should be done on urgent basis. As very few knowledgeable Kanis are surviving now.

- Applicability of available academic research should be looked at . Such reports should be easily available to planners and policy makers .

- Inter institutional cooperation is important. Such institutions should not repeat the research projects rather, should collaborate using each other's expertise.

- Codes of culturally appropriate conduct should be established for researchers investigating such fragile and traditionally important sacred landscapes. Such codes should focus on long term sustainability of intellectual property rights of indigenous communities.

- Documentation of sacred ABR mountain landscape to capture as many aspects of local tradition as possible like oral, musical, crafts, dance etc.

Frequent and regular consultations should be held with local communities, site managers and government officials on the conservation of sacred site. Such consultations would be helpful to bring an understanding about the value of the sacred among younger generation that is not closely associated with the sacred site. Also within a community different views may exist on the continued need of protection of the sacred site regardless of age or gender. Such consultations would be useful to establish the linkage between the status of conservation and the prevailing traditional belief system.

7. Training & capacity building

The work on conservation and management of sacred natural site like ABR must be embedded in long term training and capacity building programmes. The complexity of sacred natural sites in terms of socio cultural structure and environmental repercussions necessitates special training and capacity building for protected area managers . In ABR such process has been initiated through participatory forest management programmes .

Policy recommendations

For achieving better and long term participatory conservation of sacred landscape of ABR ; at policy level there is a need for

- Interactive dialogue among various institutions especially government line departments (Forest, Irrigation , Tourism etc.) is essential. Such sessions should be organized at least twice a year.
- Creating mechanisms to provide appropriate and correct information about such sacred landscapes to all .
- Clear policy for stopping further expansion of rubber plantations within the PA and fringe areas.
- Institutional collaboration and transparency is utmost important for generating a common understanding of ABR forests and indigenous people of ABR.
- Support to local Kanis to integrate conservation of ABR resources and cultural practices of Kanis.

Future strategies

- Development of community based integrated conservation and development plans. Ecotourism, Watershed management, Eco restoration of degraded areas, JFM , NTFP based local enterprise are some such appropriate programmes.
- Involvement of the community right from the planning is essential for successful implementation.
- Conservation framework should be based on the cultural perspective of communities to specific areas within the larger ABR ecosystem; e. g. there could be separate strategy for protection of Kani sacred areas in the form of rock shelters, sacred groves and sacred water bodies.
- There has to be a regional and precise conservation action plan based on understanding of Kani traditions and their needs to cope up with changing conditions.
- Participatory protected area management framework should be used for implementing various conservation and development programmes.
- While planning and executing conservation action plan all the private, government and other development agencies involved in the programme should recognize and respect, the traditional knowledge of Kani.
- Inter institutional cooperation is the key of success of any participatory programme.
- Comprehensive collaborative tourism management plan for various tourist areas of ABR should be prepared .
- There is a need to develop the alternate energy sources to reduce the pressure for firewood .
- There is a need to develop water harvesting structures in some scarcity areas like Ponmudi .

Summary of Findings

There is a definite linkage between cultural identity and biodiversity. It is evident that the traditional societies like Kanis of ABR perceive the biodiversity based on their indigenous knowledge and they respect the nature and elements of environment around them though they use the same for their well being and livelihood. Whereas the non traditional societies perceive the nature and forest resources only as useful and useless commodities. Due to such non respecting perception they are responsible for destruction of forest tracts in exploitative manner. The forest being replaced by rubber plantations is a common sight throughout the Peppara and Neyyar areas. Therefore it can be said comfortably that non tribal cultures do not provide space for the natural processes responsible for maintaining diversity nor they have certain traditions like sacred groves or sacred landscapes that are contributing to biodiversity conservation . The main findings are

- Kanis perception of the forests and ABR has been based on the principle of sacredness.
- The knowledge of biodiversity and cultural practices associated with age old conservation practices are vanishing very fast in ABR as in case of all other protected area management and forest / tribal development scenarios.
- There is need of detailed studies, documentation and in depth research work before implementing any special biodiversity conservation and management programme.
- Awareness generation among various people's group including Kanis should be mandatory before implementation of any new participatory conservation approach.
- There is need of an integrated approach for establishing balance between environmental protection and development needs to mange and protect the delicate landscapes like ABR.

Conclusion

The Biosphere reserve and natural world heritage site concepts of UNESCO are indeed a rediscovery of the sacred landscape belief system of traditional societies and is an attempt towards an integrated management strategy to conserve natural resources for sustainable use with intergenerational equity concerns (Ramakrishnan 2003). Natural and human managed systems are often embedded within all these human endeavors. While designing any plan of action to achieve better conservation or providing any special status to a specific area or landscape it is important to understand the linkage of and interdependence of the cultural and biological diversity.

Biodiversity rich areas are fast shrinking and are a cause for concern globally. The conservation of these fragile ecosystems has multifaceted challenges. The establishment of Protected Areas has been found useful to some extent for conservation of biodiversity, but on the other hand it has created new threats resulting in acculturation of indigenous communities by different development activities such as ecotourism, cultural tourism, dams etc. Such propositions have created a series of repercussions, which generate new kinds of management issues. Forest ecosystem is an evolving mosaic of ecosystems that are susceptible to change rapidly by the interaction of man and technology. The human interface is a critical part of the landscape and the social dynamics needs to be considered in any resource management programme.

Biosphere Reserves have highest conservation status in terms of its biological diversity and complex ecosystem structure and functions. India has already established biosphere reserves in diverse forest zones and ecosystems from Himalayas, Western Ghats to northeastern region of the country. There are 13 biosphere reserves in the country now, aimed at protecting representative ecosystems and safeguarding the genetic diversity of species. It is important to consider the biodiversity for utmost conservation priority through status of biosphere reserves, but it is equally important to understand the synergy of cultural diversity of the region responsible for maintaining these ecosystems till today. Traditional societies maintaining the biodiversity were excluded in the process and their role has reduced from that of a guardian or custodian to those exploiting the nature. It is therefore important to understand, document and analyze the linkages between cultural identity, and biological diversity to establish better conservation initiatives. Such understanding then would provide a solid base to involve the traditional communities in conservation and respecting their contribution through generations for protecting the high value biodiversity areas. It is thus necessary to adopt a sustainable landscape-livelihood approach to natural resource management initiatives while designing plans to achieve the synergy between cultural and biological diversity.

In ABR there is only one indigenous people's group that is Kani. However many other non tribal groups have been using and exploiting resources of ABR for last three decades. There has been an impact of these people's culture on the Kani way of life. The impact of Kanis; on non tribals is negligible. Similarly all other groups never had any traditional relationship with the forests of ABR. Through this rapid study a linkage of cultural knowledge and biodiversity in this ancient ecosystem of ABR has been revealed partly. However such glimpses are certainly indicative to design the long term participatory conservation strategy safeguarding the biodiversity and cultural identity of Kanis.

The synergy of people and nature has been disturbed in the process of development. The new materialistic culture approaching human life and its speed is degrading the indigenous cultures. It is important to understand these indigenous knowledge systems and possibilities to make best use of them in conservation and development. Such an approach will help to maintain the cultural identity of Kanis of ABR.

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Annex I

Table I : Forest types of Neyyar Wildlife Sanctuary

No	Code*	Forest type	Status
1.	1A/C3	Southern hilltop tropical evergreen forest	Climax
2.	1A/C4	West coast tropical evergreen forest	Climax
3.	2A/C2	West coast semi-evergreen forest	Climax
4.	1/2S1	Pioneer euphorbiaceous scrub	Seral
5.	2/E3	Moist bamboo brake	Edaphic
6.	3B/2S1	Southern secondary moist mixed deciduous forest	Seral
7.	4C/FS1	Myristica swamp forest	Edaphic
8.	4C/FS2	Sub- montane hill valley swamp forest	Edaphic
9.	4E/RS1	Riparian fringing forest	Edaphic
10.	8AC1	Southern subtropical hill forest	Climax
11.	8A/C1/E1	Ochalandra reed breaks	Edaphic

Table II : Forest Types and Area within Peppara WLS

No	Code*	Forest type	Status*Area** (km²)
1	1A/C3	Southern hilltop tropical evergreen forest	Climax0.457(0.60%)
2	1A/C4	West coast tropical evergreen forest	Climax10.442(13.81%)
3	2A/C2	West coast semi-evergreen forest	Climax15.234(20.15%)
4	1/2S1	Pioneer euphorbiaceous scrub	Seral0.555(0.73%)
5	2/E3(2/2S1)	Moist bamboo brake	Edaphic0.448(0.59%)
6	3B/2S1	Southern secondary moist mixed deciduous forest	Seral29.256(20.15%)
7	4C/FS1	Myristica swamp forest	EdaphicNot estimated
8	4C/FS2	Sub- montane hill valley swamp forest	EdaphicNot estimated
9	4E/RS1	Riparian fringing forest	Edaphic2.537(3.35)
10	8AC1	Southern subtropical hill forest	Climax1.075(1.42%)
11	8A/C1/E1	Ochalandra reed breaks	Edaphic2.218(2.93%)

*Code as per Champions and Seth 1968

Annex II

Table I Settlements within Peppara WLS

No.	Peppara Tribal Settlement	Number of Families
1	Chemmankala	12
2	Podiyakala	44
3	Podium	26
4	Kamalakam	24
5	Kombidi	08
6	Cherumangal	18
7	Aamoodu	09
8	Viavila	09
9	Parandodu	08
10	Kunnatheri	07
11	Pattampara	05
12	Pothodu	09
13	Erumbiyadu	13
	Total	**192**

Annex II

Table II Settlements within Neyyar WLS

No.	Peppara Tribal Settlement	Number of Families
1	Ayyavilakam	12
2	Chakkappara	50
3	Kaippamplavila	18
4	Kallukadu	14
5	Kunnathumala	31
6	Sankikonam	10
7	Karikuzhi	40
8	Puravimala	55
9	Kannammamoodu	12
10	Thenmala	29
11	Vlavetty	85
12	Komba	04
13	Ayirmkal	04
14	Pathayamvachappu	02
15	Mele Amala	06
16	Thazhe Amala	04
17	Plathu	04
18	Anakal	12
	Total	**392**

Annex III
SOCIO ECONOMIC DATA

Population dynamics	
Indicators	Sample Population
Total Population	177 (44hh)
Male	90 (50.85)
Female	87 (49.15)
Avg. family size	4.02
Sex ratio	967

Figure in parenthesis represent percentages

Occupation Structure		
Occupation	Sample	%
NTFP collection	49	27.7
Agri culture	28	15.8
Coolie	15	8.47
Student	43	24.3
No occupation	40	22.6
Service and Technical	2	1.13
Total	**177**	**100**

Primary data estimates

Age wise classification		
Age	Number	%
0-15	47	26.6
15-65	126	71.2
65-Above	4	02.2
Total	**177**	**100**

Primary data estimates

Monthly Income Distribution of Families		
Family Income	Number	%
0 -1000	2	4.9
1000 - 2000	11	26.8
2000 - 3000	17	41.5
3000 - 4000	6	14.6
4000 - 5000	2	4.9
5000 - 10000	1	2.4
10000 -15000	2	4.9
41	100	
Average Monthly Income	2987.8	
SD	6.04	

Primary data estimates

Level of Education		
Status	Number	%
Nil	54	30.5
Lower Primary	33	18.7
Upper Primary	23	13.0
High School	59	33.3
Above High School	8	4.5
	177	**100**

Primary data estimates