

**Sacred Groves of North  
Malabar**

**M. Jayarajan**

**Discussion Paper No. 92**

**Kerala Research Programme on Local Level Development  
Centre for Development Studies  
Thiruvananthapuram**

## **Sacred Groves of North Malabar**

M. Jayarajan

English  
Discussion Paper

Rights reserved

First published 2004

Editorial Board: Prof. S. Neelakandan, Prof. P. R. Gopinathan Nair, H. Shaji

Printed at:

Kerala Research Programme on Local Level Development

Published by:

Dr K. N. Nair, Programme Co-ordinator,

Kerala Research Programme on Local Level Development,

Centre for Development Studies,

Prasanth Nagar, Ulloor,

Thiruvananthapuram

Cover Design: Defacto Creations

**ISBN No: 81-87621-95-8**

**Price:       Rs 40**  
**US\$ 5**

---

KRPLLD

2004

0500

ENG

## Contents

1. Sacred Groves of North Malabar	5
2. Sacred Groves: Diverse perspectives	9
3. Exploring the Study Area	13
4. Sacred Groves in the Study Area: Social History, Administration, and Practices	19
5. Ecological Significance of Sacred Groves in the Study Area and Need for their Conservation	27
6. Decline of Sacred Groves	38
7. Continued Conservation of Sacred Groves	46
8. References	50
Appendix 1. Comparative List of Plants in Selected Sites	
Appendix 2. List of Animals	
Appendix 3. Statistical Tables	

# Sacred Groves of North Malabar

M. Jayarajan

## 1. Sacred Groves of North Malabar

### Context of the study

Sacred groves are patches of natural vegetation surviving in the man-modified landscapes. They owe their preservation to their perceived importance to some form of divinity. Hughes and Subhash Chandran (1997) define 'sacred groves' as segments of landscape containing trees and other forms of life and geographical features, that are delimited and protected by human societies believing that preserving such a patch of vegetation in a relatively undisturbed state is necessary for expressing one's relation to the divine or to nature. So these remain as isolated patches of forests in the midst of agricultural landscapes. Sacred groves are often the only lingering samples of natural vegetation in the man-modified landscapes of Kerala. In most localities, sacred groves are being increasingly exposed to various kinds of threats leading to either qualitative degradation or total disappearance.

The project aims to throw light on the urgent need for conservation of sacred groves by generating a crucial baseline data on these neglected repositories of biodiversity in North Malabar. It highlights the ecological importance of sacred groves. It analyses the social conditions essential for ensuring long-term conservation of sacred groves i.e., the social sustainability factor. The previous studies provide information projecting some aspects of the richness of the sacred groves in this area. They do not, however, highlight all the aspects which would necessitate social preservation of the groves. Structured information is lacking. Hence this study is an attempt to build a database on social preservation, to stress on the importance of groves as refugia and as biodiversity inocula, to describe the ecological and cultural services provided by the groves, and to explain the socio-economic aspects of degradation of groves.

---

*ACKNOWLEDGEMENTS: Financial support and timely interventions from the KRPLLD secretariat made implementation of the research project possible. Our sincere thanks are due to Dr K.N. Nair and all staff numbers and friends at KRPLLD secretariat. We are indebted to Dr Satheesh Chandran Nair, Thiruvananthapuram, Prof. T.P. Sreedharan, Payyanur College, Mr E. Unnikrishnan, Payyanur and Mr Dinesan, Payyanur for valuable suggestions. Tedious task of collecting direct information from remote localities was carried out by Mr K.V.N. Bhaskaran and Dr Jaffer Palot, ZSI, Kozhikode. Dr K. P. Rajesh, Department of Botany, University of Calicut has been extremely helpful in identification of fauna and flora. We are thankful to Mr C. Sasikumar, ornithologist, Mr T. P. Padmanabhan, friends from KSSP and all others who helped us on various stages of the study. We are grateful to the Panchayat, Municipal, Local authorities and owners and users of the sacred groves for providing us with necessary information. We have benefited considerably from the discussions with various stakeholders of the sacred groves at various levels. We thank all of them.*

M. Jayarajan is President, Society for Environment Education in Kerala (SEEK), Payyannur

The present day Kannur district and the southern part of Kasargod district form the area of the study.

The hitherto available archaeological evidences from the study area stretch the human presence here to the period of megalithic culture.

Till recently, the highlands of Kannur-Kasargod districts were sparsely inhabited. The human inhabitation became widespread here only by the migration of people from central Kerala in 1930s. Then, for a period lasting till the 1960s, over seventy thousand small-scale farmers and planters belonging mainly to the Syrian Christian Community from Travancore streamed into the highlands of Malabar and settled there by purchasing and clearing tracts of private forest lands. Kodom-Belur, Panathady, and Balal *panchayats* in the present day Kasargod district are the last areas subjected to such occupation. Apart from the increasing pressure of population, the main reasons identified for migration to Malabar are: (1) the poverty resulting from the worsening economic conditions due to Second World War, and (2) the availability of uncultivated private land in abundance in highlands of Malabar. The scholars have identified these two factors respectively as the push and pull factors which led to the migration.

Before the recent migration, the original landlords in Malabar were least interested in expanding their cultivation further deep into the highland and were less inclined to disturb its ecological balance. At that time the inhabitants of Malabar did not encroach into the forest, since they had enough land for cultivation as well as for collecting timber, firewood, and fodder required to meet the demands of everyday life. A kind of harmony between the lifestyles of the local people and their natural milieu existed, which left the geographical division under discussion intact.

The Malabar landlords liberally gave away the forestland under their possession to the migrants at very low price or even free of cost. And it is even reported that a few migrants obtained land by begging. Alakkod Raja, one of the main landlords in Kannur district then, sold vast extent of forestland for negligible amounts. Many of the settlers encroached more forestland than what they had actually purchased. When the migrants became the land owners, they were least aware of the consequences of upsetting the ecological balance of the region. As Freeman (1999) states, the transformation of land use pattern initiated by a single generation of settlers cleared nearly all the natural forest cover of the region and converted the former jungle land into cultivated field of rubber, pepper, areca, tapioca, coconut, and cashew. Consequence of all these is the snuffing out of the ecologically attuned way of life of the early habitants of this region and the destruction of ecological balance. This is yet to be studied properly.

Unnikrishnan (1990, 1995) conducted a preliminary survey of the sacred groves. He has documented more than 32 species of plants that are endemic to the Western Ghats. Wild relatives of a number of cultivars were also reported from the sacred groves. The figures are more astounding when it comes to the faunal diversity. Among the 90 species of birds documented, 10 were endemic to the Western Ghats; 34 species of birds were found breeding in the sacred groves. More interesting is the fact that 40 species of birds, which are typical

forest species, had found the sacred groves to be equally habitable. More than 20 species of birds are reportedly migrants.

Unnikrishnan (1990) has not dealt with in detail the threats faced by sacred groves of Kerala including the changing socio-economic scenario that leads to their degradation. “To say how exactly it happens, a detailed examination of certain historical and social development is necessary. As it will be beyond the scope of this paper I do not wish to elaborate the subject” (Unnikrishnan, 1990). Since the area under study is blessed with a number of sacred groves, many of which are still well flourishing in spite of severe threats, we find it necessary that a follow-up work must be started from where Unnikrishnan concluded.

### **Objectives**

The following are the specific objectives of the study.

1. To conduct a survey of the sacred groves in North Malabar between Mahe River and Chandragiri River in Kannur-Kasargod districts.
2. To list the external influences leading to the degradation of sacred groves. Data on clearing of the groves, selection felling, hunting, poaching, gathering, grazing, cultivation etc., will be collected. Details of encroachment will be recorded. Reasons for the change in attitude if any of the individual/community towards sacred groves will be pinpointed.
3. To suggest an integrated scheme for conservation of the sacred groves as an asset of the community i.e. by ensuring social preservation in the long run.

### **Main research questions**

1. What is the overall extent of each sacred grove?
2. Have the groves shrunk within a specific period?
3. What are the major causative factors of sacred grove degradation?
4. Would it be possible to conserve them through state intervention or could local people be motivated to preserve them?
5. Can local bodies be involved in conserving sacred groves?
6. Do land tenure and ownership pattern influence the status of the sacred groves?
7. How far sacred groves affect life around it?
8. How far religious reasons have influenced preservation of sacred groves?

### **Methodology**

1. Preliminary survey for collecting data on various aspects through questionnaires was attempted.
2. Survey of flora and fauna was made in selected groves by total inventory method. The selection was based on the specific location and nature of vegetation of each grove.
3. Oral history from elder generation was collected to document the change that has taken place within a specific period.

4. To involve local people in the inventory survey, two workshops, two meetings, and a series of group discussions were held. Two one-day training programmes were conducted for college students.
5. Feasible policy level interventions for the conservation of sacred groves within the context of the decentralised planning were examined. Opinion of local community was examined for this.
6. A participatory research strategy for collecting baseline information on biodiversity and ecological status of sacred groves by means of focus group discussions was attempted. Service of voluntary organisations was utilised.
7. Data from stakeholders of various statuses were collected by means of interviews and informal conversations.
8. Guidance of experts from CDS, Thiruvananthapuram and SEEK, Payyannur were utilised to assess the societal attitude on the value and relevance of the sacred groves. For identifying the flora and fauna, guidance and services of SEEK, Payyannur College and University Departments were utilised.

## **2. Sacred Groves: Diverse perspectives**

The concept of sacred groves in India has its roots in antiquity. Ramakrishnan traces its antiquity to the pre-Vedic period. He argues that, “Vedic people assimilated new environmental values and the concept of ‘sacred groves’ from the value system of the original inhabitants of the Indian subcontinent” and that it became a widespread practice. In the post-Vedic period, in addition to considering a landscape as such valuable and sacred, individual species and micro units also began to be treated as sacred.

It may be assumed that traditional Hindu society recognised individual species as objects of worship, based on accumulated ancient knowledge and their identified value for specific use. Some species are employed in religious ceremonies as part of socio-cultural traditions.

### **Sacred landscape**

Instead of a patch of virgin vegetation, people sometimes used to consider an entire landscape as sacred and used to worship it. The reason may be the belief that such a conception of the landscape will make certain the persistence of their cultural practices and also ensure the sustainability of the landscape. The course of the sacred river Ganga is cited as an example of sacred landscape. The Sabarimala enclave and the hill of Kunnathurpadi where Muthappan is worshiped once in a year are illustrations of sacred landscapes from Kerala. The local communities in the study area consider many mid-land hills there as sacred landscapes. But present researchers are of the opinion that any attempt to link the concept of sacred landscape with the notion of sustainability requires further exploration both conceptually and empirically, especially if one wants to develop it as a conservation tool.

### **The idea of sacred groves**

Sacred lands are found everywhere around the world. In all parts of Africa, various tribes consider different types of groves as sacred. In West Asia, Babylonians and Assyrians had planted sacred groves. Palm forest with altar has been reported from Arabia. Sacred Oak grove was present in Asia Minor. Sacred mountains and lakes are present in Madagascar. Many Siberian people honoured sacred groves. Village groves are present in Korea. In Japan, Shinto shrines, as a rule, are surrounded by trees. Buddhist temples in Japan and China have tree-gardens. Traditional Chinese honour sacred mountains with trees. Buddhist monasteries and temples of Thailand have sacred groves. Indonesia has monkey-forests. Sacred groves were also present in Greece, Italy, France, Scandinavia, Sweden, Finland, British Islands, Arctic Russia, New Zealand, and Polynesia. Sacred groves are present in Nepal and Sri Lanka. In America, both pre-Columbian people and the settlers maintained sacred groves. In San Francisco AIDS National Memorial Grove (1996) was started in memory of those who died by AIDS and of other AIDS patients.

In India sacred groves are found in a wide range of ecological situations from estuaries to mountain localities. Gadgil and Vartak (1976) record that the important regions with sacred groves in India are the North Eastern Himalayas (Khasi-Garo hills), Western Ghats, Aravalli

Hills of Rajasthan and Sarguja, Chandes and Bastar area in Central India. But this does not include the coastal and mid-land regions of Kerala where sacred groves are abundant.

The following table lists the names of the various sacred groves and the places where they are found in India.

<b>Terminology</b>	<b>Region</b>
‘Dev’	Madhya Pradesh
‘Deoris’ or Deovarisi	Maharashtra
‘Sarnas’	Munda tribes of Jharkand
‘Jankor’	„ „ „
‘Jaher’	Santal „ „
‘Pengenda’	Gonds „ „
‘Oran’	Vanis, Kenkris, and Shamlet Dehs tribes of Rajasthan
‘Jogmaya’	Rajasthan
‘Deorali’	Darjeeling
‘Lakynthang’	Meghalaya
‘Sidharavana’	Karnataka
‘Devarakadu’	„
‘Pavithravana’	„
<i>Kavu</i>	Kerala and Tamil Nadu
<i>Sarpakkavu</i>	„ „
‘Nagam’	„ „
‘Mundya’	North Kerala
‘Vallikkettu’	North Kerala

In Kerala sacred groves are widely distributed from the West Coast to the Eastern high lands. They are known by various names as *Kavu*, *Sarpakkavu*, *Nagam*, *Mundya*, *Vallikkettu*, etc.

The practice of keeping sacred groves was prevalent among different communities depending on their cultural practices. Tradition in the study area of preserving a patch of wilderness as sacred had been interpreted differently by various scholars. Gadgil and Vartak, (1976) record Western Ghats as one of the important regions with sacred groves. This includes only the highlands of Kerala. Even though there is lack of clarity in mentioning the region, they do not consider sacred groves as relatively unimportant in Kerala. According to Chandran, Hughes and Gadgil, (1997) the history of sacred groves in Kerala may be traced back to the hunting-gathering societies which attributed sacred value to patches of forest within their territories, similar to the way they treated several other topographic or landscape features like the mountain peaks, rocks, caves, springs, and rivers. According to Ramachandran and Mohanan (1991) Hindus in Kerala set aside a portion of land around the house as abode of God, Goddess or Serpent and this was also a means for preserving medicinal plants. They attribute the origin of sacred groves to more secular causes, for the preservation of rare, valuable plants. They hold that the practice started well before sixth century AD. It is inferred that the practice of setting aside patches of forests as sacred groves was strengthened with the spread of shifting

cultivation involving clearing of forests. The reason for this could be religious and cultural compulsions as well as subsistence and ecological needs.

Historical evidence shows that the human habitation in North Kerala started about 5000 years ago. Even though the Brahmin migration to this region began in the early centuries of Christian era, well organised Brahmin settlements began to appear only by the 7-8<sup>th</sup> century AD. One of the consequences of the Brahmin settlements was the spread of settled agriculture especially in the costal plains and the midland, leading to deforestation in these regions.

Introduction of the commercial plantations in the highland by the British invariably resulted in the destruction of the highland forests and its fauna. Initially highland cultivation was restricted to the areas with less incline such as Wayanad. But later a major part of the highland forests of Kerala has been cleared for cultivation of tea, coffee, cardamom, and other cash crops. In spite of the massive destruction of forest elsewhere, there were patches of forests in Kerala set aside in the form of sacred groves.

### **Sacred groves as centres of biodiversity**

The prime concern of any society is to ensure constant supply of raw materials and resources to its members. At present our natural resource base is degrading, depleting or degenerating due to wanton exploitation. This undermines the very sustenance of the society.

This generalisation is especially true in the case of genetic resources, one of the most powerful and strategically important raw materials of the present day society. As biotechnology expands its reach to encompass the domains of agriculture, medicine, and industrial production, the search for new genetic materials to suit the emerging needs is intense. Most genetic engineering at present hardly goes beyond discovery and patenting of the use and the denial of use rights. Need for long-term conservation of raw materials and the necessity to permit the continuity of organic evolution, which produces that genetic material, are easily overlooked. This is especially true in the case of tropical countries, most of which faced with the choice between short-term economic growth and long-term resource conservation, are confused. Meanwhile, the situation is getting worse as traditional institutions of resource conservation disappear due to short-sighted policy formulations. Passivity stemming from ignorance about biological resources makes the situation further worse.

Biological diversity or biodiversity, as the term is commonly used, is the sum total of life forms at all levels of organisation in the biological system. The term biodiversity has been defined by scholars in many ways. One of the internationally accepted definitions is given by the Convention on Biological Diversity (CBD). Article 2 of the CBD defines Biological diversity as the variability among living organisms from all sources including *inter alia*, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part. This definition includes biological diversity within species and of ecosystem.

Biodiversity is the totality of life-forms from where we directly or indirectly draw ecological, economic, and aesthetic benefits. Biodiversity maintains the dynamics of ecosystems. The entire biosphere forms a macro ecosystem and biodiversity offers the buffering capacity and

sustainability to life on the planet. Any attempt to list the ecological, economic, commercial, and aesthetic values of biodiversity would remain incomplete, as our knowledge of life in toto is also incomplete.

As more and more natural vegetation is lost in the inhabited areas, the remaining patches of forests in the form of sacred groves come to acquire a crucial role in buffering biodiversity. Thus sacred groves acquire importance from the point of view of ecology and conservation of biological diversity.

### **Sacred groves as biodiversity refugia**

The most tangible evidence of the deterioration of biodiversity is seen in the tropical vegetation. The forests are fast disappearing, threatening the very existence of a major portion of global biodiversity and also challenging the very process of organic evolution. The genes are product of millions of years of evolution. We have to currently look for existing remnants of climax communities (Climax community is the one which has attained a steady state after a long period of ecological recession. It is a stable biotic community.) for the sustenance of genetic diversity. In spite of the widespread destruction of forests, there are still left aside certain natural landscapes in various countries which are culturally protected as sites of worship by local people. What remains after destruction, offer refugia for species. Such refugia, even though fragmented, may be maintaining the minimum viable population of some species and are thus capable of maintaining part of the biodiversity. All over the world, in the course of human history, some such isolated patches of natural vegetation which remain in spite of the wanton destruction of large stretches of forests have been protected by clothing them with sacredness. At present, they are known as sacred groves. We are indebted to the cultural practices of our ancestors for maintaining such refugia.

Cultural practices always have their impact on environment. They determine the community use (and abuse) of natural resources. They determine who will manage those resources and how. They modify the fragile ecological balance and diversity of our plant and animal life, and sometimes destroy it, leading to the loss of biota. Cultures in turn are shaped by the environment. Climate and natural resources condition the ways of life of a population influence the nature and scope of its interactions with other human groups and also inspire its artistic expression. Since the birth of humanity, populations have derived from nature, aesthetic or spiritual sustenance and used it to creative ends.

The multiple aspects of culture and environment are reflected in activities of a number of UNESCO programmes. Examples include studies within 'The Man and Biosphere Programme' on the role of sacred groves in the conservation of biodiversity and the rehabilitation of degraded lands, the promotion of ethno botany and the sustainable and equitable use of plant resources. The present study provides additional glimpses into some of these multiple dimensions of culture and environment including the role of religious sanctuaries and sacred places in contributing to the conservation of biological diversity.

### 3. Exploring the Study Area

The present day Kannur district and the southern part of Kasargod district form the area of the present study. They correspond to the former principalities of Kolathunad, Alladam (Nileswaram) and the southern part of Kumbala. The area lies between latitudes 11 40' and 12 30' North and longitudes 74 58' and 75 54' East. It is bounded by the Western Ghats in the East (Coorg district of Karnataka), Kozhikode and Wayanad districts in the south, Lakshadweep Sea in the west and Chandragiri River in Kasargod district in the north.

According to 1991 census, Kannur is the ninth most densely populated district in the State. It has a population density of 759 per sq. km (It is highest in Kannur *taluk* - 1627). Only 49.13 percent of the population inhabit villages. Yet, the Kannur and Kasargod districts are predominantly rural. It is because of the special nature of human settlements in this region.

Under British rule the Kolathunad and lands lying further south to it were included in the Malabar district. The lands lying north to Kolathunad formed part of the South Canara district. In 1956 while the Kerala State was being linguistically organised, Cannanore district was formed by merging the erstwhile Kolathunad and the southern part of the then existing South Canara district (that was the land once lying under Alladathu *Swaroopam* and Kumbala *Swaroopam*). Kasargod district was constituted from Cannanore district in 1981 by bifurcating the Hosdurg and Kasargod taluks. The entire region has common physiographic, climatic, vegetation, and geological features. Even though there are local variations, there exists a general uniformity in the cultural aspects.

#### Climate

The area has a tropical humid climate. The hot season extends from March to the end of May. This is followed by the southwest monsoon, which continues up to August. The northeast monsoon, which follows, extends from October up to December. During hot season, the mean daily maximum temperature is about 35 C. The average minimum temperature is around 20 C. during December-January. Occasionally night temperature may go down to 16 C. Annual rainfall is 34.38 mm. More than 80 percent of it occurs during the period of southwest monsoon. The area receives 68 percent of rain in July.

#### Physiography

The land in the southern part of Kerala may be divided into three geographic zones – the highland, midland, and low land or coastal zone. The highland region occupies more than half the total area and comprises mainly of Western Ghats and their foothills. Up to the time of independence the entire tropical forests in this highland region, mainly rain forests in this area were under the ownership of local landlords. With the influx of people from the south the entire forest was cleared and converted into croplands up to the crest of Western Ghats leaving only a few isolated patches of forests. Today highlands are the areas of major plantations like coffee, rubber, cardamom, etc. Four rivers, Chandragiri and Karyankode in Kasargod district and Kuppam and Valapattanam in Kannur district originate from the highland region.

The midland region lying between the highland and the lowland is the region of undulating hills and valleys. This is an area of intense agricultural activities. Ten rivers originate from the midland in the study area. Most of the midland lateritic capped hills have unique ecological characteristics. Towards the plains, coconut and paddy forms the main crops.

The lowland comprises of a complex array of wetlands backwaters, estuaries, and seashore.

### **Sacred groves in relation to the gradient of the land**

Low land in North Malabar is a narrow strip and has lesser number of sacred groves (52 groves). Taboos have weakened and offer less protection than in the past. The free access into Edayilekkadu and its degradation exemplifies this. Agrarian economy is fast changing in the entire region.

The midland has strong agrarian tradition and some of the evidences of early inhabitation dating back to the megalithic period are sighted here. It is believed that midland could have been the cradle of shifting cultivation and settled cultivation in the region. Many of the sacred groves remain well protected here by means of myths and taboos. Yet problems associated with the Sanskritisation process (to be discussed later) cause new threats to their existence.

Highland occupies a major portion of the study area where formerly human settlements were limited. The settlers from South Kerala occupied all the hill area beyond the foothills of the Eastern Mountains, converting the forest into plantations relatively recently. Hence, very few sacred groves exist on the hills further east. Kodom-Belur and Panathady are exceptions, because these *panchayat* areas were the last ones occupied by the settlers. The State boundary here does not make any difference to the existence of sacred groves. The six sacred groves in Madikkeri *panchayat* of Coorg district, at the Kerala border are in the land in continuation with those of Panathady. But the entire ecosystem became unstable under the influence of the immigrants. They now own almost all the available lands. They are attempting to encroach the sacred groves also. In the words of an informant, “everywhere there is sound of blasting in the stone quarries and there is always dust clouding the atmosphere.” One of the largest sacred groves in Kerala, the Kammadathkavu is located in the highland. It is a typical *Bhagavathikkavu*. This piece of rainforest is surrounded by estates of Christian settlers.

### **Flora**

Natural vegetation consists of different types of forests. In spite of the generally uniform climatic conditions, vegetation is diverse. In certain restricted regions with their own microclimate or special edaphic features, plant formations assume different compositions, from mangroves to rain forests. Coastal region has a narrow zone. Soil is rather loose and sandy. Water holding capacity is poor. Hence plants have xerophytic adaptations. Mangrove vegetation is another conspicuous feature of this zone. Mangroves are found in the estuaries and on the fringes of backwaters. They often extend to the interior along banks of rivers. Human interference has caused much change to the vegetation in this zone.

Midland has an undulating terrain with numerous hills, valleys, and plateaus of lateritic caps. Soil is lateritic with underlying rocks or disintegrated gneiss. Natural vegetation in the midland is restricted to the riverside and certain pockets in other regions. Those in the valleys are of evergreen type. Semi-evergreen growths remain in more arid areas. Deciduous species are found but deciduous forests are rare. Undergrowth consists of a variety of annuals and perennials.

The mountains are a continuation of the midland region gradually ascending to the main ridges of the Western Ghats. The natural vegetation has been mostly destroyed and only fragments of rainforest remain.

### **Geology**

Geological formations in the area are of Archean and recent age. Archean formations comprising of gneisses and charnockites occupy the major portion. Foliated hornblende-biotite gneiss, generally grey or greyish white in colour is one of the main rock types. Another type consists of quartz, microcline biotite, magnetite, and occasional zircon. Laterite and alluvium represent recent formations, which cover the Archeans. Laterite is developed along the midland and coastal areas. Laterite forms flat-topped ridges and hills covering gneisses. Shell-lime stone and lignite are only of local occurrences. Coastal sands and alluvium are rich in heavy minerals.

### **Agriculture**

The main crops grown in the area have been paddy, coconut, pepper, cashew, tapioca, areca nut, and rubber. Paddy occupied the largest area among annual crops. The percentage of area under paddy is decreasing year after year. A high percentage of paddy fields have already been converted into coconut plantations. These changes in the long run affect the sustainability of the landscape. A major portion of the highland is also converted into rubber plantations.

### **Local bodies**

A total of 110 local bodies are included in the study area. Kannur district has 81 *Grama Panchayats* and 6 Municipal towns. The selected area in Kasargod district is its southern part and comprises 22 *grama panchayats* and one Municipal town.

### **The sacred groves of the study locality**

The sacred groves are of three types: *Daivakkavu*, where a male God is worshipped, *Bhagavathikkavu*, where a female God is worshipped, and *Nagam* or *Sarpakkavu*, where snakes are worshipped. *Nagam* or snake groves are numerous. Many of them are of small size. Yet large snake groves like Edayilekkadu exist in this region.

Sacred groves are present throughout Kerala. In Kannur and Kasargod districts their distribution extends from West Coast to the foothills of Western Ghats. They exist as holy places for

worshipping Gods, Goddesses, and Serpents. Many of them have small shrines attached to them. Thick climax vegetation persists in many sacred groves, whereas in some others it is degraded; in still others, the entire vegetation has been cleared leaving only the shrine. Complex rituals are performed in almost all of these groves which include periodical performance of *Theyyam*, a practice of worshipping Gods and Goddesses in north Malabar. Each shrine, which stands in the name of a *Theyyam*, was associated with a sacred grove or situated within a sacred grove. But in many at present the vegetation has been destroyed and only the shrine exists. Another remarkable feature is the large size of the sacred groves in this area, when compared with those of south Kerala.

In Kasargod and northern part of Kannur district *Kavu* means sacred forest. The word *Nagam* is generally used here to denote a serpent grove. Shrines are present in association with many sacred groves of Gods and Goddesses. But some of them have only a small holy place in the form of a stone, idol, platform or a single tree for worship. In serpent groves usually there is no shrine inside or outside. Some idols or stones represent the place of serpent god. The term *Mundy* is also used for sacred forest of God worship. At present in many cases *Kavus* or *Mundyas* have turned to be simply shrines since the associated forest has been destroyed in the name of development.

Sacred groves are abundant in Kannur district. However, in density of sacred groves Kasargod stands first in the study area. The study of Ramachandran and Mohanan (1991) showed the presence of largest number of sacred groves in Alappuzha district where there were 65 sacred groves. Iringol *kavu* of Ernakulam district was the largest *Kavu* in their findings. It had the size of 20.23 hectares and was the only grove of more than five hectares in the southern districts. Sacred groves in the study area ranges from very small (about one cent) to 24.282 hectares. If Kottiyoor sacred forest is given the status of sacred grove, the size reaches 36.423 hectares. Four groves larger than Iringol *Kavu* are present in the study area.

The sacred forests of this region are ecologically better preserved. The forest type is mostly of wet evergreen. A few have drier types ranging from semi evergreen to deciduous. All maintain fertility of soil and purity and humidity of air in the surroundings. The neighbouring lands get water from them. They are centres of village biodiversity.

Many of the sacred groves are now private property forming part of home gardens. Others are in community properties of a cluster of related families. Still others exist as common property of the village community. Many of the groves attached to homesteads have been destroyed.

### **Number and types of vegetation**

Our survey revealed the abundance of sacred groves in this area compared to places further south and further north. Five hundred and seventy-eight groves were located in the study area. They included the Kunnathurpadi, a holy land in the foot hills of the Western Ghats. The total area of the 578 sacred groves was 3.3710 sq. km, excluding sacred places with single trees, which were 50 in number. The number of groves having size of 5 cents and more was 481.

The number of groves in local bodies varied from none to 53. The maximum of 53 sacred groves were located in Kodom-Belur *panchayats*. Certain local bodies, especially the municipalities, had no sacred groves of any significant size. Payyannur Municipal area was an exception, where 36 sacred groves were located. This was due to the presence of sacred groves in the suburban villages like Korom and Vellur of that Municipality. Larger sized sacred groves were seen mostly in interior villages. The largest one was Kottiyur sacred forest having an extent of 36.423 ha. The other conspicuous groves were *Theyyotkavu* (24.282 ha, Kankol-Alapadamba *Panchayat*), *Thavidisserikavu* (12.141 ha, Peringome *Panchayat*), *Kammadathkavu* (24.282 ha, West Eleri *Panchayat*) and *Kunnathoorpadi* (21.0444 ha, Payyavoor *Panchayat*). Among these, best maintained groves were *Theyyotkavu* and *Thavidisserikavu*.

Four hundred and three sacred groves have evergreen vegetation and 96 are semi-evergreen. There are only 28 *kavus* with deciduous type of vegetation of which four groves have scrub vegetation. Our survey reveals that *Thazhekkavu* in Mattool *Panchayat* is the only sacred grove with mangrove vegetation; 50 others are with one or two trees. The wet tropical climate of the locality supports growth of evergreen species, resulting in the majority of the groves having evergreen vegetation. Single trees worshipped are all of the evergreen type. Groves in drier areas exhibit semi-evergreen nature. Upper portion of *Aravanchalkavu* is semi-evergreen. Natural deciduous vegetation is rare in the Western slopes. So, deciduous groves are comparatively fewer. Evergreen trees generally have less timber value. However, owing to increased demand for wood, huge trees like mango trees are felled from some groves. Demand from plywood industries has added a new threat for the generally non-commercial trees. *Kavu*'s with deciduous trees of higher timber value thus face the threat of felling.

### **Distribution, density, and size**

The first documented study of sacred groves in North Kerala (Unnikrishnan, 1990) recorded 62 sacred groves in Kasargod and 57 in Kannur district. That study included only groves of significant extent. According to Ramachandran and Mohanan (1991), there were only 15 *kavus* in Kasargod and 19 in Kannur. They were supposed to have listed all sacred groves with an extent of more than five cents. In their report, Alappuzha district with 65 groves stood first and Thiruvananthapuram with 31 occupied the second place. But our survey reveals a total of 226 sacred groves in the southern part of Kasargod district falling under the study area and 352 all over Kannur. Of the 578 sacred groves in our study area, 483 are having an extent of more than 5 cents. In the light of these findings, in density of *kavus*, the surveyed part of Kasargod district ranks first.

Unnikrishnan (1990) recorded Theyyotkavu (24.282 hectares) of Kankol-Alappadamba *panchayats* as the largest grove in his study area. Largest *kavu* according to Mohanan and Ramachandran was Iringolkavu in Ernakulam district (20.234 hectares). The earlier surveys have missed Kammadath, Thavidissery, and Kottiyurkavu. Kammadath and Theyyottu *kavus* are larger than Iringolkavu. Next large ones according to Mohanan and Ramachandran were in Kannur and Kasargod districts and only 12 sacred groves exceeded one hectare in extent in this region. According to our study, however, 29 sacred groves in Kasargod and 32 sacred groves in Kannur district exceed one hectare in extent.

The Kottiyoor forest is having sacred status even though it cannot claim the tradition of other *kavus*. Thus it becomes the largest sacred-forest (37.2324 hectares) in the study area and also in the entire Kerala State. In Alappuzha only four sacred groves exceed one hectare and the largest one is Vallikkavu of 3.444 hectares. The *kavus* in the present study area are more in abundance and larger when compared to those of the southern districts.

## 4. Sacred Groves in the Study Area: Social History, Administration, and Practices

### Ritual practices in sacred groves of Kerala

*Kavus* are sacred gardens. There is diversity in deities worshipped in *Kavus*. Each has a presiding deity and most of them have associated deities too. Presiding deity may be a God, Goddess or Serpent. Many *Kavus* are dedicated to snake alone. Snake is also the associated deity in many other *Kavus*. The deities are known by different names in northern and southern parts of the study area.

The rituals represent a mixture of the practices of an agrarian society and a hunting society. *Nira* and *Puthari* are parts of harvest festival. *Nira* means bringing harvest products to each house and to the *Kavu* of the village. *Puthari* is the inaugural cooking of the new harvest. The first share is offered to *Kavu*. *Sarpabali* is a method of worshipping snake. *Noorum Palum* is another way of Snake worship. Rice powder, turmeric powder, milk, tender coconut, *kadali* banana, and ghee are offered to snake Gods. *Pamputhullal* performed by girls and main priest accompanied by prayer songs, *Pulluvakkudam* or *Pulluvan Pattu* are performed to please Snake God. *Kalam* or *Kalampattu* is performed to please Goddesses, spirits of demons and lord Ayyappan. *Yakshaganam* is a ritualistic worship especially in Kasargod district.

*Theyyam* is the unique ritual related to *Kavus* of north Kerala. *Theyyam* rituals are most attractive and amazing. '*Theyyamthullal*' are dances performed with costumes of gorgeous colours and *mudi* (headgear) or crown of varying size (and shape) worn on head. The ritual comprises of ancestral worship, hero-worship, demonolatry, virginal cult, cure deities, zoolatry, and blood cult. Ritual hunt is performed in order to please the deity. At present, hunting and slaughtering animals have been prohibited by law. Hence they are performed symbolically. Yet in Kasargod district ritual hunting are known to be conducted in secrecy.

There are folklores explaining the power of each deity. Folklores have evolved into myths which compel the society to worship deities and to perform rituals. Strong taboos prevented the society from exploiting the resources of the sacred groves.

Each *kavu* is a subject in the folklore. *Thottam*, the ritual song recited at the beginning of *Theyyam* is a poetic narration of the legend of the deity (ies) in sacred groves. The songs narrate the emergence, life, and power acquired by the deities. Folklore spreads the fame of the deity of *Kavu*. Male and female Gods are the symbols of hero worship. In certain places like *Paliyerikavu*, the presence of Brahmanical deities and associated rituals indicate the 'Sanskritisation' process at work. 'Sanskritisation' is a term introduced by late Prof. M. N. Srinivas, the sociologist. It is the process by which the lower classes emulate, imitate, and adapt the behavioural patterns of higher classes in an attempt to move up the social ladder. In 'Sanskritised' sacred groves, the deity is worshiped by daily *pooja*, and *theyyam* ritual is performed only on a fixed date. From the oral history collected from elderly persons the remarkable similarity in the history of many *kavus* could be noted.

One of the oldest religious practices in India is snake worship. Many a narrative alludes to the origin of Kerala being related to serpent. In India snake worship was practised in Kerala since early times. *Pulluvanpattu*, a prominent folk song of Malayalam, reflects this culture (Vaalath 1992). He points out the relation of snake worship with Buddhism. Serpent worship might have reached India from Egypt or West Asia.

Till recently serpent groves were considered to be the pride of *tharavadu*. According to Rigveda Dravidians were snake worshippers and Aryan were not. But at some later time Aryans took over the rights to worship snake as priests replacing the original Dravidian priests. Interestingly most of the Namboodiri families own sacred groves. The ultimate right for snake worship is now embodied in the famous *tharavadu* of Pambumekkattu *Mana* in Thrissur. It also acquired supreme power to take a decision on the strength of astrological predictions on the fate of serpent grove or *Nagam*. That power is alleged to be misused. Astrologer's decisions are alleged to be influenced by money motives. Wider appreciation of ecology and eco-aesthetics of *kavus* might act as a countervailing influence.

The owners as well as the managers of *Kavus* have the responsibility of conducting rituals. The community in turn has the responsibility of providing resources for the purpose.

### **Sacred groves as social institutions**

*Kavus* were Dravidian centres of worship. Each *kavu* has its own folklore and myths regarding its origin. Taboos are strong in some and weak in others. There are also deities common to several *Kavus*. For example, Maniyanyies have *Kannangottu Bhagavathi* and in that place Vaniyas have *Muchilottu Bhagavathi*. Among Thiyyas the prominent deities are male gods such as *Kathivanoor Veeran*, *Vayanattukulavan*, and *Muthappan*. *Daivathar* is worshipped by different communities towards south. *Bappiriyan* is considered in the south as representing Hanuman and towards north this deity is believed to be a Muslim hero. Mukri Pokkar *Theyyam* in East Eleri is another deity representing a Muslim hero. Harijans have their own gods. There are also common gods common to some communities.

Various *kavus* are interconnected and form a network of institutions. Generally backward communities have *kavus* as worship centres (Kurup, 1980; Valath, 1992). *Sarpakkavus* have similar features. Brahmins have the authority to perform rituals. *Sarpakkavu* may be owned by various communities including backward communities. Offerings are accepted from everyone but *pooja* is conducted only by Namboodiris. According to oral history, the only priest who has acquired the power to conduct '*sarpabali*' is the Komaram of Gurukkanmar *kavu* in Peralasseri *panchayats*. The *kavu* belongs to Thiyya community. Temples like Peralasseri and Payyanur had snake groves which are at present existing only for names' sake.

There is no idol worship in *kavu*. The rituals involve the participation of the entire community. Daily worship, if any, is limited to lighting of lamps. The rituals are restricted to specific seasons and specific days in certain months. *Nira*, *Pathamudayam*, *Puthari*, etc., are such days. *Theyyam* festival will be once in a year, usually lasting for three days, as in Karakkakavu and Edayilakkad. Parassinikkadavu is an exception having *Theyyam* everyday. In certain

*Kavus*, *perumkaliyattam*, a grandiose *Theyyam* ritual is conducted after long intervals. In some others like Gurukkanmarkavu, preliminary functions of *Theyyam* called *vellattam* are performed on days like *thulappath* (10<sup>th</sup> day of the Malayalam month of *Thulam*), Makarakkoythu (20<sup>th</sup> of the Malayalam month of *Makaram*), Vishu *Samkramam* (last day of the Malayalam month of *Meenam*) etc. The village society collectively takes part in these rituals. By conducting the rituals the entire community is believed to be blessed. It represents unity and collective action of the community. Here both rights and obligations are strengthened.

Blood cult existed in the past. Sacrifice of a large number of common fowl was done in Gurukkanmarkavu but is stopped by law now. Communal hunting is the part of the ritual of *Vayannattukulavan theyyam*. Generally, at present, symbolic hunting is performed to satisfy the spiritual need of this ritual. In Kasargod district, hunting is still alleged to be practiced secretly.

*Daivakkavu* and *Bhagavathikavu* are owned by non-Brahmin communities including Harijans. They are purely Dravidian institutions (Kurup, 1991). Deities in these *kavus* are also gods and goddesses of Dravidian concepts. During the mixing up of cultures Aryan Gods and Goddesses have become the centres of worship in a number of such shrines. The concept of Kali, Vishnu, and Siva are Aryan. *Paliyerikavu* is illustrative where Mookambika Devi is a presiding deity and the daily *pooja* is conducted by a Namboodiri. *Theyyam* is performed here seasonally. *Mavilayikavu* is another example.

Temples belong to Brahmanic culture. The style of worship is different in them. There is daily worship there and the rituals differ from that of the generality of other *kavus*. Individuals submit offerings, worship the god/goddesses and get their own fulfilment. Now-a-days in many *Kavus* Sanskritised ceremonies such as *vidyarambam* are performed.

Astrology has an important role over rituals and offerings. Astrologer decides the qualifications of the person to be chosen as priest in most shrines. He decides the date of *theyyam* in *kavus* where there is no fixed date. He declares the need for an additional *theyyam* during festivals. He fixes the dates for special festivals like *perumkaliyattam* in some shrines. Individuals seek the advice of astrologer for finding out the kind of offerings to be given by them in order to escape from wrath of deities which are supposed to be manifested in the form of severe diseases, financial crisis or sterility. The common offerings are to perform Kadankot Makkam and Muchilot Bhagavathi to cure diseases. *Kathivanoor Veeran* *Theyyam* is offered for winning a case before the court of law. *Kuttichathan* and *Muthappan* are other offerings among many examples.

The same astrology is now alleged to be turning into a threat for the existence of sacred groves. In order to cut the sacred trees, the astrologer has the authority to suggest the intervention of Pampumekkattu Mana Namboodiris and to conduct *punaprathishtha*.

### **Sociological context – income**

The relationship which existed between sacred groves and the villagers may be elucidated through studies of folklores. Respect for traditions played a dominant role in the worship in

the sacred groves. The society as such may not be directly dependent on the sacred groves. Yet there are classes of stakeholders benefiting from sacred groves. Sacred Groves with shrines are good examples. Daily worship is performed in some such shrines e.g. *Paliyerkkavu*. The priests and the owners get their share of offerings from the worshippers. In other sacred groves the worship is limited to seasonal rituals. Here the income of the owners and priests are also limited.

Offerings may be in the form of money and other materials. Offerings are also varied. They could be categorised into three classes: (1) Those which are offered for the conduct of rituals: Individuals offer the expenditure to conduct an additional *theyyam* during the festival. Coconut oil is offered at all times. Agricultural products are also offered seasonally. Such materials are shared among the direct stakeholders namely managers, priest, and *theyyam* ritual performers. (2) Offerings to satisfy deity, either in the form of cash or kind: those go to the managers and priests. (3) Offerings directly reaching the ritual performers: *theyyam* performers get money offered for blessings. The helpers also get their share. In Mavilakkavu there is a peculiar ritual called *villattam*. Daivathar *theyyam* and the other ritual performers called *adikkaikonmar* share the amount.

Formerly the *Theyyam* ritual performers were fully engaged in it as a profession. *Theyyam* season lasts for about eight months excluding the rainy months. During off-season they resorted to visiting individual houses to perform rituals such as *Vedan*, *Adi*, and *Kothammoori*. Some of these were related to harvests.

As the former agrarian economy diversified and as the 'village' ceased to exist as a unit of agricultural production these communities could not depend on such income alone for survival. Hence the ritual performers could not depend entirely on their traditional income for survival. Most of the members from the younger generation have taken up government employment and are content with the new status. Descendents of one of the most reputed *Theyyam* ritual performers, 'Kannan Peruvannan' prefer employment in banks and other government departments over the traditional ritual rights. Very few of them continue in the field of *Theyyam* and related rituals.

Each household has to make offerings of a fixed amount of agricultural products to the *Kavu*. Rice and coconut are among the major offerings. Plantains and other products will be collected during festival seasons. Recent trend is to collect the value of these products in terms of money.

The custodians of *Kavus* belong to different social groups. Some *Kavus* are owned by individual families, others are held by trusts of families, and some belong to a particular community, a public committee or the state. The well maintained *Kavus* are owned by a trust of some particular community like the Thiyyas or Maniyanies. The trustees are known by various names. The custodians and priests have the right to collect a share of the expenditure from each family belonging to the community. They also enjoy a higher status in the society.

*Kavus* vary in their wealth and the income from the devotees. Owners are responsible for conducting worships and rituals. Priests and ritual performers do not get attractive income

in most *Kavus*. In most cases villagers form festival committees to take up the responsibility of conducting festivals. The number of people attending the rituals varies, depending on the myths and traditions associated with the deity. Taboos also vary on similar grounds.

In the *kavus* where there is a steady income from offerings, priests have got full time engagement. In the case of serpent groves the dependence is very thin; worship is limited to two days in a year or so. Brahmins are the most preferred priests. *Theyyam* rituals are performed by men belonging to the Scheduled Caste/Tribe such as Vannan, Malayan, Mavilan, Pulayan, Velan, and Koppalan communities. Special status is conferred by the villagers to the senior Vannan or Malayan as Peruvannan and Perumalayan/Malayan Panikker as the case may be.

From some sacred groves local people collect materials such as firewood, medicinal herbs etc. Poaching is also reported from some groves. Some are used by local people as recreation grounds.

### **Kazhakam**

According to the legend on the formation of Kerala, the Keralites were assigned the festivals like *Kaliyattam*, *Daivattam* or *theyyam* or *theyyattam* by Lord Parasurama. The right of performing *theyyam* was given to castes such as Panan and Velan. Parasurama did *prathishta* of goddess like Chamundi and Durga. The tendency of Sanskritisation induces the conversion of *kavus* into temples.

Payyanur of North Kerala is believed to be one of the first Namboothiri settlements of Kerala (Kurup, 1980). Legends state how Parasuraman brought Brahmins to Kerala and made them settle in 32 villages. These villages were then divided into four administrative units called *kazhakams*. It is probable that the Aryans integrated the then existing institutional structure of administration into their scheme of hegemony. Following this pattern, the then inhabitants of North Malabar also were organised into four *kazhakams*. Each *kazhakam* includes worship centres. They are associated with sacred forests, even though many of them at present have degraded into single tree-type or into 'concrete structures'.

Study of Ramavillyam *Kazhakam* (Kurup, 1980) gives a clear picture of the network of institutions. Each *kazhakam* has under it worship institutions known as *mundya* or *sthanam* which had forest patches associated with them. *Mundya* is commonly called *Ara* and it is a collectivity of the entire *Thiyya* community of the village. Some Gods and Goddesses are worshipped in *Mundya*. According to old customs *Thiyya* had to keep himself 32 feet away from Brahmins (Pulaya had to keep himself 64 feet away from Brahmins). Members of the *Thiyya* community had no opportunity to worship in Brahmin centres of worship. These backward communities fashioned their own worship centres. There are five local *Mundyas* under the jurisdiction of Ramavillyam *Kazhakam*: 1) Olavara *Mundya* 2) Kooleri *mundya* 3) Kuruvappalli *mundya* 4) Thadiyan Kovval *mundya* 5) Padanna *Mundya*. Of these Olavara *Mundya* is maintaining a fairly thick sacred grove. In all these *mundyas* local deities are worshiped in the form of *theyyam*. Among these, Vishnumoorthy is worshiped as a common goddess. Thus it seems that Aryan Goddess has become a deity of worship by Dravidians.

But the style of worship is that of Dravidians. The legend about Ramavillyam *kazhakam* is related to Parasurama. The main deity here is believed to be ceremoniously installed by Parasurama who with his bow hit the place of *Prathishta*. Thus the *kazhakam* attains fame through the stories of Parasurama and that of Arya-Dravida heritage and *Purana*.

Ramavillyam *kazhakam* also provides an example for how a Dravidian centre of worship differs from a Brahmin temple. The administrators and priests belong to *Thiyya* community. However, the centre of worship is now converted into a temple by clearing portions of existing forest.

The *kavus* coming under major communities are under the umbrella of *kazhakams*. Between rivers Chandragiri and Valapattanam there are four such *kazhakams* belonging to *Thiyya* communities: Kuruvanthatta *kazhakam* of Ramanthali, Ramavillyam *kazhakam* of Elambachi, Nellikkathuruthi *kazhakam* of Cheruvathur and Palakkunnu *Kazhakam* of Kottikulam. Similarly *Maniyani* community also has four *kazhakams*: Kalliyot *kazhakam*, Molavannur *kazhakam*, Kannamangalam Kannothe *kazhakam*, and Kappat *kazhakam*.

Dravidian shrines are interlinked. *Perumkaliyattam* occurs only once in a while. For this, representatives of all '*sthanam*' between Chandragiri and Valapattanam have to be invited. These include shrines of various communities. All communities offer money or materials for performance of the rituals. This is a mutual practice. Similarly Paliyerkkavu is related to the Veerabhadran temple of Cheruvathur.

Upper class communities have priority over *kazhakam*. *Kazhakam* authorities have to go and take permission from superior castes, first from Brahmin and then from Nair chief, before the commencement of the rituals of the festival. This starts from Thazhakkattu *Mana* of Elambachi. *Punnyaham* is performed in the *Palliyara* (the main shrine) and associated shrines by Tharananelloor Namboodirippad. By such activities Brahminical superiority is retained. The lamp has to be lighted from Chakrapani temple and Udinoor Koolom. Similarly the *theyyam* ritual performers have to first take blessings from Chakrapani Temple. Throughout the days of festival, a *kedavilakku* is kept burning in Beerichery *Mana* of Nambi and in Chakrapani Temple. Nair/Nambiar communities do not have such strong institutional structure with reference to their sacred groves. Myths are not sufficiently binding as to protect the sacred groves under their ownership.

The ritual of sacrificing of fowl is performed outside the compound wall of the temples.

### **Sacred Groves: Ownership, administration, and *dramatis personae***

*Kavu* as a place of the worship has a different kind of ownership regime and management practice. Generally a *kavu* is governed by the following body:

1) As an institution, sacred grove has a *karanavar* representing the owner of the *kavu*. *Karanavar* belongs to a particular community who claims the ownership of the *kavus*.

2) For administrating the *kavu* there will be a traditional group known by various names such

as *ooralanmar*, *koottayikkar/koottaymakkar*, etc. They have the responsibility of collecting contributory shares from the community, and conducting festivals. At present in many *kavus*, this responsibility is taken up by a public committee. In any case, *karanavar* has to implement the decision of this administrative body. He gets a share of the offerings. He is allowed to cultivate a small plot of land owned by the *kavu* as in Paliyerikkavu.

3) Priest: Irrespective of the caste of the owners, the priest of a serpent grove is generally a Brahmin, except in the case of Scheduled Caste-owned groves. Brahmins do not conduct *pooja* in the groves of Scheduled Castes or Tribes. In some of the *Daivakkavu* and *Bhagavathikkavu*, there is daily *pooja* conducted by Brahmins, e.g. Paliyerikkavu. In a majority of *kavus* of backward communities, the priest belongs to the same caste. They are named *komaram*, *anthithiriyar*, *achan* and their responsibilities also vary. For example, *Thiyya* community has priest *komaram* in south and *achan* in northern part of the study area. *Vaniya* and *maniyani* has *anthithiriyar*. Two priests of Ramavillyam *Kazhakam* also are named *Anthithiriyar*. The position - *Achan* is present in the *kavu* of the Nair community of *Paliyerikkavu*. The practices also vary in the case of priests of Dravidian shrines. The role of the priest is to light the lamps daily, receive offerings and perform rituals. As mentioned earlier, daily *pooja* is not a practice in *kavus* except in certain cases.

In the occasions other than when the *theyyam* is performed, the *komaram* or *anthithiriyar* is believed to acquire the power of the deity and could bless the devotees. Some ritual dances are also performed by them. Priests of *Harijans* are having different practices. The priest also has to look after the shrine. In certain *kavus* the priest will be assisted by persons appointed by the *karanavar* or the committee. The priests usually do not get any salary. He and his family have to depend on the offerings from the devotees. A large chunk of the annual offerings will be received during *theyyam* and other seasonal festivals. They have to share this with other members of the administrative body.

4) Other performers: We do not dare to call all these players as 'ritual artists' since the legend of *theyyam*, *Narthakarathnam*. Sri. Kannan Peruvannan advises us to call him as *Theyyakkarar* instead of *theyyam kalakaran* (*theyyam* artist). According to him, '*theyyam* is not merely an art; it is an expression of devotion'. In a *kavu* they have the right to perform *theyyam*, the major functions being once in a year. The team of *theyyam* performers include *theyyakkar* and *vadyakkar*. *Theyyam* is performed by backward communities such as Vannan, Malayan, Mokeyan, Velan, Panan, etc. *Vadyam* (music) is performed by Malayan, Mokeyan and such other castes. These people get their share of remuneration from the *kavu*. In addition, they have the right to get a share of the harvest from each household of the community in the village.

The *karanavar* and the priest of the shrine acquire power and superiority over the community due to myths associated with the *kavu*. Everyone respects them. Every one has to obey their decisions on social matters. The villagers do not dare to disobey the orders of *karanavar* and priest fearing divine punishments for their infringements. The cases of wrongdoing were brought before the court of *kavu*. Usually a compromise was sought. Mostly compensation was collected from the offender and given to the sufferer. Rarely the offender was sentenced to *ooruvilakku* (ostracisation). In such cases the person was not permitted

to participate in the social activities of the village. The cases of conflicts among villagers and among family members were also brought before *kavu*. Sometimes the upper class representatives were invited to witness the hearing. In course of time, this enabled the *kavu* administration to acquire political power. Until recently this was the position. In the case study of Gurukkanmar *kavu* it is seen that such power relations existed in *Thiyya* community up to 1960s. This is a shrine with rich folklore, deep myths, and strong taboos. It played a prime role in the unity and social integration of this backward community with harmonious relations with others. A well known Nambiar family, Ayillyath Kutteri (of which the parliamentarian Sri. A.K. Gopalan was a member), has pre-eminence in this shrine. This *kavu* illustrates the hierarchy of caste systems which existed in this region.

In the post-independence period the new political situation brought changes in the attitudes of new generations. As education spread and libraries and reading rooms claimed for themselves a niche in the cultural scenario, the importance of *kavu* gradually diminished. This also affected the political power of *kavu*. Some members of the new generation even started looking upon the system as totally based on superstitions. They did not respect the social importance which others were giving to the shrine. For others, the myths and taboos are still valid. The *kavu* remains for them as a centre of worship and festivals. So there is a conflict of interests. In many places, clearing of forest occurred due to weakening of myths and taboos.

Relationship among ritual performers is well delineated. Generally Vannan and Malayan castes have the right to perform rituals in *kavu*. Others are Moyor, Velan, Panan Koppalan, Karimbalan, etc. They belong to Scheduled Castes or other eligible communities. The senior Malayan of the village (*Ooru*) is given the position called Malayan Panikker or Perumalayan. Similarly the senior Vannan is given the position of Peruvannan. They have to control other Malayans and Vannans. If the services of additional ritual performers are needed for the festival, these *panikker* or *peruvannan* has to go to another *ooru* and invite them in person.

Harvest festivals are persisting, yet have lost their glory. With the disappearance of the paddy fields due to reclamation, it has become impossible for the villagers to bring their harvest produces for *nira* or *puthari*. So the materials for the harvest festivals are now purchased from the market.

The treatment for diseases was done in two ways. One is based on myths. The priest accepts offerings and conducts *pooja* for treatment of the patient. *Pooja* will be conducted for individuals or for the entire society in the event of epidemics. People believed that they survived due to the curative power of the deity in the shrine. The second method is herbal treatment. The priest in the shrine like Gurukkanmarkavu has Ayurvedic knowledge. They give medicines. The *komarams* are believed to possess the capacity for treating snakebites. The treatment is based on herbal medicine.

## 5. Ecological Significance of Sacred Groves in the Study Area and Need for their Conservation

### Ecological significance of sacred groves

From time immemorial the sacred groves in India have been the focus and symbol of a way of life. In such groves the highest levels of biological diversity are still found; there humans interact with nature (Marglin and Mishra, 1933, as cited by Hughes, 1998). According to Ramakrishnan (1996) ecologically valuable species function as keystone species in an ecosystem and contribute to the enhancement of biodiversity. They are also species that are socially valued by the local village communities for cultural and religious reasons. Specific rules regarding usage of sacred groves varied from place to place and from time to time. The usual attitude concerning sacred groves was that nothing in normal circumstances ought to be broken, killed or removed from there. However, certain limited forms of use such as gathering for medicinal purposes were sometimes permitted. Those regulations became effective in providing refugia for species that otherwise would have disappeared from the ecosystem. Herbs like *Nervilia sp.* of Edayilekkadu and tree species like *Myristica fatua* of Paliyerikkavu are cases in point. Best examples for animal species are *Presbytis johni* (Nilgiri langur), *Loris tardigradus* (slender loris), and *Manis pentadactyla* (Pangolin) of Thavidisserikkavu and *Spizaetus cirrhatus cirrhatus* (white bellied sea eagle) of coastal groves like Edayilekkadu. Kammadath kavu maintains a microclimate similar to that of the rainforest and it harbours a species of tree fern, *Cyathium*. Normally there would be loss of species due to the small size of many groves but the relics would still be of great importance from the point of view of landscape ecology.

The sacred groves of Kerala are relics of wet evergreen forests. The protection they obtain on spiritual grounds help them to survive (Unnikrishnan, 1990; Ramachandran and Mohanan, 1991). Our investigation reveals that each grove is maintaining a microclimate with rich biodiversity. The selected groves show the existence of many species of medicinal plants. The rare endemic elements of the Western Ghats are fairly well preserved in *Kavus*. Balakrishnan and Induchoodan (1996) compare the floral diversity of rain forest with sacred groves. According to them, nearly 960 species of angiosperms are present in the 90 sq. km in Silent Valley whereas sacred groves contain 722 species per 1.4 sq.km. This may not be the right way of comparing diversity because the *kavus* are widely dispersed within a greater geographical area. Yet it indicates the species richness in *kavus*.

### Flora

Sacred groves in the study area represent a variety of forest types occurring in Kerala. They stand as evidence for the type of climax vegetation formed as a result of organic evolution. Based on the preliminary studies conducted in five selected sacred groves in North Kerala it is clear that these groves are rich centres of biodiversity. The selected sacred groves are *Kammadathukavu*, a high land evergreen patch, *Aravanchalkavu*, a midland laterite grove, *Paliyerikkavu*, a myristica swamp, *Karakkakavu*, a dipterocarp forest and *Edayilakkadu*, a

coastal grove. We listed out the flora included in Angiosperms, Gymnosperms, and Pteridophytes. The floristic data is based on a total survey of each selected grove.

In those five groves, we found 246 species belonging to 83 families of flowering plants. Only two very common species of Gymnosperms of north Kerala grow abundantly in these groves. Fern flora is also rich in the groves. 26 species of ferns are listed from 5 sacred groves.

Among the 246 species of flowering plants, 24 species are endemic to peninsular India. The dominant family of angiosperm is Orchidaceae. The other abundant and widely distributed families are Fabaceae, Rubiaceae, Euphorbiaceae, and Moraceae. Very common genera are *Naravelia zeylanica*, *Sida acuta*, *Holigarna arnottiana*, *Connarus monocarpus*, *Abrus precatorius*, *Syzgium caryophyllatum*, *Ichnocarpus frutescence*, *Merremia umbellate*, *Acampe praemorsa*, and *Bulbophyllum neilgherrens*.

Kammadankavu, an evergreen highland grove, which is about 1200ft above sea level, harbours a variety of species of plants including Angiosperms, Gymnosperms, Pteridophytes, Bryophytes, and Lichens. Presence of many peninsular endemic species is the characteristic feature of this grove. Endemic species like *Hopea parviflora*, *Hopea ponga*, *Ancistrocladus heyneanus*, *Losneriella arnottiana*, *Holigarna arnotiana*, *Memecylon umbellatum*, *Hoya wightii*, *Strychnos aenea*, *Gymnostachium febrifugum*, *Myristica malabarica*, *Knema attenuata*, *Curcuma oligantha*, *Curcuma oligantha var. lutea*, etc., are growing in this grove. More tree species are also found here. Large trees such as *Lagerstroemia lanceolata*, *Mesua ferrea*, *Xylia xylocarpa*, *Dalbergia latifolia*, and *Antiaris toxicaria* are the other interesting species found in this grove. A deciduous buttressed tree *Tetrameles nudiflora* of Dasticaceae is the largest tree of the grove. On either side of the stream there is an excellent patch of *Ochlandra rheedi*. A fine patch of myristica swamp is another feature of the grove. This freshwater swamp consists of species like *Myristica malabarica* and *Knema attenuata*.

Another remarkable feature of the grove is the luxuriant growth of pteridophytes. Nearly 20 species of pteridophytes are recorded from either side of the stream alone. *Crepidomanes christii*, a rare species, is a major finding in our fieldwork. The microclimate of this grove is very suitable for the growth of the highly habitat-specific filmy ferns. Another species, *Crepidomanes intramarginale* is also growing in association with *Crepidomanes christii*. Occurrence of *Alsophila gigantea* – a tree fern which is a rare and endangered species, points towards the richness of biodiversity. *Alsophila* is growing on the stream bank in association with *Angioptelis evecta* – a giant fern. Other important fern flora is *Leptochilus bahupanktika*, *Bolbitis appendiculata*, *Bolbitis subcrenata*, *Cheilanthes tenuifolia*, *Vittaria elongata*, *Pityrogramma calomelons*, etc.

Orchid diversity of this grove is comparatively more than in other groves. Of 18 species of orchids recorded from five sacred groves 16 species are growing in Kammadathu kavu. The orchid flora consists of the ground orchids like *Nervilia praineana*, *Zeuxine longilabris*, *Malaxis rheedii* and the like, and epiphytic species like *Cotonia pseuduncularis*, *Schoenorchis nivea*, *Oberonia species*, *Epidendrum tenuifolium*, *Porpax reticulata*, *Pholidota pallida*, *Gastrochilus flabelliformis*, and the like.

From the floristic study it is clear that this sacred grove is one of the remarkable treasure-houses of biodiversity of north Kerala.

Aravanchalkavu, a midland laterite grove, harbours about 142 species of plants. This sacred grove represents semi-evergreen forest, myristica swamps, and dry deciduous and grassland type of vegetation. The different plant groups like trees, climbers, stragglers, woody climbers, epiphytes, hydrophytes and parasites constitute the flora. The peninsular Indian endemics such as *Goniothalamus cardiopetalus*, *Holigarna arnottiana*, *Holigarna beddomei*, *Hopea parviflora*, *Jasminum malabaricum*, *Knema attenuata*, *Lepidagathis keralensis*, *Loesneriella arnottiana*, *Melastoma malabathricum*, *Myristica malabarica*, and *Strychnos aenea* are the important species of this grove. Top canopy consists of *Diospyros buxifolia*, *Terminalia paniculata*, and the like.

*Myristica malabarica* and *Knema attenuata* represent Myristica swamp. On the sides of the stream *Pandanus tectorius* is dominant. A recently reported laterite species called *Lepidagathes keralensis* (Acanthaceae), *Curcuma oligantha*, *Curcuma oligantha* var. *lutea* are also reported from here. In wet season good growth of ground orchid *Malaxis rheedii* is noticed. Woody climbers like *Strychnos aenea*, *Dalbergia horrida* var. *horrida*, *Gnetum ula*, *Calicopteris floribunda*, *Anamirta cocculus* etc. are growing abundantly.

Paliyerrickavu is a typical example of a Myristica swamp forest. A south Indian endemic species *Myristica fatua* var. *magnifica* is recently reported from this grove. Besides this species *Myristica malabarica*, *Knema attenuata* and another endangered species called *Syzygium travancoricum* represent the Myristica swamp flora in this kavu. *Syzygium travancoricum* is a western-ghat endemic plant in the south, once considered as extinct due to inadequate regeneration. The other endemic species found in the grove are *Cinnamomum malabathrum*, *Gymnostachyum febrifugum*, *Holigarna arnottiana*, *Jasminum malabaricum*, *Knema attenuata*, *Loesneriella arnottiana*, *Myristica fatua* var. *magnifica*, *Myristica malabarica*, *Strychnos aenea*, *Syzygium travancoricum* and *Vateria indica*. Aquatic herbs like *Nymphaea stellata*, *Nymphoides cristata*, *Cryptocoryne spiralis*, *Utricularia flexuosa*, and *Rotala rotundifolia* are found in the stream. Abundant growths of woody climbers like *Gnetum ula* and *Dalbergia horrida* var. *horrida*, Climbing pteridophyte, *Stenochlaena palustris* are other attractions of the grove. Even though more than 100 species are found in the grove, the major parts of the grove are occupied by the myristica species.

Edayilekadu is a coastal grove with cane breaks (a portion of the area fully occupied by cane). More than 100 species are recorded from this grove. The soil is sandy. The kavu is situated just about half a km from the sea and is almost at sea level. Important species growing here are *Hopea ponga*, *Diospyros peregrina*, *Madhuca longifolia*, *Madhuca neerifolia*, and *Syzygium zeylanicum*. Evergreen plant species like *Cinnamomum malabathrum* and *Cinnamomum verum* are also reported. Another peculiarity of the grove is the presence of endemic orchids like *Nervilea praeneana*, *N. infundibulifolia* and *Malaxis rheedii*. Abundant growths of these orchids are noticed during the season. A very thick patch of *Calamus rotang* is found on one side of the grove associated with a pteridophyte climber *Stenochalena palustris*. The border of the kavu is demarked by the growth of *Madhuca neerifolia*, *Hopea*

*ponga*, and *Diospyros peregrina*. Due to human interference the *kavu* is separated into two small strips. But the vegetation is almost the same in the two strips. Cane breaks are absent in the second grove.

Medicinal plants like *Morinda unbellata*, *Remustatia vivipara*, *Cyathula prostrata*, *Gloriosa superba*, *Ipomoea sepiarea*, *Ipomoea digitata*, *Naraveilia zeylanica*, *Salacia reticulata*, *Sarcostigma klenii*, and *Tinospora cordifolia* are very common in this grove.

Karekkakavu, a dipterocarp forest is the most severely disturbed among the five surveyed groves. The floristic diversity is much less due to over-exploitation. In this grove *Hopea ponga* is the dominant tree species. Ground vegetation is sparse. Cattle grazing combined with criss-crossing pathways have completely destroyed the ground flora. The common species include, woody climbers like *Calicopteris floribunda*, *Dalbergia horrida var horrida*, *Gnetum ula strychnos aenea* etc. Important tree species are *Hopea ponga*, *Ficus benghalensis*, *Ficus religiosa*, *Holigarna arnottiana*, *Mangifera indica*, *Plumeria rubra*, *Strychnos nux-vomica*, and *Xanthoxylum rhetsa*. Orchid flora comprise of very common species like *Acampe praemorsa* and *Bulbophyllum neilgherrense*. A large climber which is common in semi-evergreen forest, *Raphidophora pertusa*, small evergreen tree, *Naringi crenulata*, a rare medicinal plant *Morinda umbellate*, an endemic species *Loesneriella arnottiana* are the other plant species growing in Karekkakavu.

The present study establishes the biological richness of the sacred groves of north Kerala. Species diversity is more in these selected groves and each grove represents a different forest type. Each forest type harbours typical forest species. Endemism is also a remarkable phenomenon in these groves. So from the conservation point of view, these groves are most useful for *in situ* conservation of biodiversity.

### **Physiognomy, vegetation, typology**

North Kerala falls under the bio-geographical sub region-Western Ghats and the typical vegetation in this locality is west coast tropical evergreen forest. But due to some anthropogenic factors this ecosystem is getting degraded everywhere.

The selected five sacred groves of north Kerala may be categorised under identified six plant community, i.e. (1) evergreen grove, (2) Terminalia-Xylia grove, (3) cane breaks, (4) fresh water *Myristica* swamp grove, (5) Dipterocarp grove, and (6) Coastal grove. It is very difficult to give a true classification of the vegetation types of sacred groves. The floristic components are more comparable to the west coast tropical evergreen forest. The species found in some sacred groves show the typical characteristics of evergreen forest i.e. cauliflory, buttress root, etc.

The general phytosociology of sacred grove is extremely complex. Woody plants are the dominant species which include trees and lianas. The sacred groves of Kerala show remarkable physiognomic features in stratification, girth class, presence of epiphytes, vines, lianas, etc., due to the specific characteristics of the locality and the various degrees of interference made by the associated fauna and by man (Rajendra Prasad, 1995). The three strata of trees,

shrubs and herbs, climbers and stragglers, epiphytes and parasites are the floristic elements of a grove. This stratification is prominent in groves like Kammadam and Aravanchal. Here the upper canopy includes trees with straight and slender trunk and branches are produced at the top. The height of each stratum varies from place to place. Common emergent tree species are *Hopea ponga*, *Hopea parviflora*, *Artocarpus hirsutas*, *Alstonia scholaris*, and *Tetrameles nudiflora*. The second stratum includes members like *Hydnocarpus alpina*, *Strychnos nux – vomica*, *Holigama arnottiana*, *Carallia brachiata*, and *Mimusops elengi*. The lower stratum consists of species like *Polyalthia korinti*, *Lannea coromandelica* and *Aporusa lindleyana*. Due to the massive growth of spreading climber like *Acacia intsia* the canopy is more or less continuous. The physiognomy is common for all the sacred groves selected for study. The structure described above is very evident in Kammadam, a typical evergreen patch.

The herbaceous flora in a sacred grove is rain-dependent and most of them are annuals. The number of herbaceous plants is less in dry season. The density and species composition appearance of herbaceous flora is according to their demand for light. Luxuriant herbaceous vegetation is found where the canopy is open. In the interior part of these groves, only shade-tolerant species and seedlings of the upper strata members are abundant. Ground flora includes ground orchids like *Nervelia*, *Zeuxine*, *Malaxis*, *Curcuma*, *Biophytum*, *Naregamia*, *Geophila*, *Elephantopus*, *Piper*, and many pteridophytes.

The dominant group is trees, which may be categorised into large trees, medium trees, and small trees. Based on our preliminary floristic study we categorised the flora into nine groups i.e. trees, shrubs, aquatic herbs, herbs, climbers, woody climbers, stragglers, epiphytes, and parasites. Of 273 species observed, 98 species are trees (large, medium, and small), 32 species are shrubs, 75 species are herbs, 6 species are aquatic herbs, 38 species are climbers, 6 species are woody climbers, 16 species are epiphytes, and 2 species are parasites.

Very large trees are not common in the groves selected for study. The common tree species growing in these sacred groves are *Dillenia pentagyna*, *Polyalthia korinti*, *Goniothalamus cardiopetalus*, *Hydnocarpus alpina*, *Hopea parviflora*, *Hopea ponga*, *Vateria indica*, *Lophopetalum wightianum*, *Tetrameles nudiflora*, *Largerstroemia lanceolata*, *Holigarna arnottiana*, *Holigarna beddomei*, *Albizia chinensis*, *Xylia xylocarpa* *Terminalia paniculata*, and *Strychnos nux- vomica*. In the myristica swamp, *Myristica malabarica* and *Knema attenuata* are the dominant species.

Climbers and stragglers are conspicuous features of the sacred groves of Kerala. These groups compete actively with the trees for space and light and considerably affect the structure and function of the whole eco system. The most common members found in the sacred groves are *Gnetum ula*, *Anamirta coculus*, *Cissus pallida*, *Strychnos aenea* *Connarus monocarpus*, *Tinospora cordifolia*, *Cissus latifolia*, *Butea monosperma*, *Dalbergia horrida* var. *horrida*, *Derris trifoliata*, *Calycopteris floribunda* etc. In climbers some are herbaceous like *Naravelia zeylanica*, *Cyclea peltata*, *Cayratia carnosa*, *Abrus precatorius*, *Gymnema sylvestre* and *Gloriosa superba*. *Acacia intsia* is a gregarious climber which spread over the top canopy of the grove and affect the free growth of the top stratum. *Gnetum ula* – a woody gymnosperm climber, which has evolutionary significance, is very common in all the groves.

Epiphytes are another common group of the sacred groves. The epiphytic vegetation includes Mosses, Lichens, Pteridophytes, Orchids, and other flowering plants. The tree top epiphytes include mainly orchidaceae and stragglers like *Ficus tjahela* and *Fagraea zeylanica*. *Ficus* and *Fagraea* begin their life as epiphytes and often develop afterwards into independent trees rooted in the ground. These two plants are found in some groves of north Kerala. Important epiphytic species such as *Hoya wightii*, *Pothos scandens*, *Bulbophyllum neiigherrans*, *Oberonia spp.* *Acampe praemorsa* *Cotonia peduncularis*, *Dendrobium ovatum*, *Pholidotta pallida*, *Remustatia vivipara*, *Drynaria quercifolia*, and *Bolbitis appendiculata* constitute the epiphytic flora of the groves.

Parasite members are also common in sacred groves. The species include the families Loranthaceae, Moraceae, Loganiaceae, and Santalaceae. A rare medicinal plant, a parasite belonging to family Loranthaceae, *Loranthes lageniferous* is located in Aravanchalkavu, a midland laterite grove. Its large cup-shaped involucral bract which is dark brown in colour makes it easy to identify. *Loranthes longiflorus* is a common parasitic species abundantly growing on the branches of some trees. A Loganiaceae member, locally called *modakam* ie *Fagraea zeylanica* is a semi-parasitic species.

In the groves a number of species of bryophytes, pteridophytes, and lichens are present in various levels of their life forms. Even though the bryophytes and lichens are rich in the sacred groves, in our present study we focussed only on Angiosperms, Pteridophytes, and Gymnosperms. The estimated total number of angiosperms, pteridophytes, and gymnosperms in our survey are 248, 22, and 2. The floristic composition changes seasonally around the year. The annuals most commonly found in sacred groves are from families like Rubiaceae Asteraceae, Poaceae, Cyperaceae, Acanthaceae, Amaranthaceae, Malvaceae, Dioscoriaceae, Araceae, and Zingiberaceae. The annuals appear at the onset of monsoon. Perennial herbs such as *Dioscorea bulbifera*, *D. oppositifolia*, *Amorphophallus sylvaticus*, *Gloriosa superba*, *Curcuma oligantha*, *Globba bulbifera*, *Costus speciosus* etc. show some kind of vegetative growth. In these species the vegetative foliage alone disappears with the onset of drought. At the onset of next monsoon flowers appear. Two recently described plants i.e. *Curcuma oligantha* and *C. oligantha var. lutea* are very common in Kammadam and Aravanchalkavu. The former bears yellow flowers and latter white.

The soil types found in the groves are sandy loam and laterite soil. Species like *Sida acuta*, *Sida rhombifolia*, *Sida fryxelli*, *Naregamia alata*, *Desmodium poly carpum*, *Desmodium triflorum*, *Zornea diphylla* etc. prefer this kind of habitat. These species are abundant in all the sacred groves.

Due to the presence of perennial water sources and adequate soil moisture, an abundant growth of pteridophytes is found in some groves. Kammadamkavu and Aravanchalkavu are the prime examples for this. These two groves harbour a variety of seasonal pteridophytes. Very rare and habitat-specific ferns are recorded from these groves. The pteridophytes include rare species like *Crepidomanes christii*, *Crepidomanes intramarginata*, *Alsophila gigantea*, *Leptochilus bahupunctika* and other species including *Adiantum luulatum*, *Cheilanthes tenuifolia*, *Vittaria elongata*, *Bolbitis appendiculata*, *Angiopteris evecta*, *Christella dentata*, *Selaginella ciliaris*, and *Lygodium flexuosum*.

Annual species, which are cosmopolitan in distribution such as *Chromolaena odorata*, *Hyptis suaveolens*, *Ageratum conyzoides*, *Mikania cordata*, *Aerva lanata*, *Passiflora foetida*, *Tridax procumbens*, *Vernonia cinerea*, *Achyranthes aspera*, and *Clerodendrum viscosum* are very common. Typical species dominating the midland sacred grove are *Artocarpus hirsutus*, *Hopea ponga*, *Hydnocarpus alpina*, *Holigarna arnottiana*, *Holigarna beddomei*, and *Vateria indica*. *Carallia brachiata* belongs to the mangrove family. *Rhizophoraceae* is seen widespread in the sacred groves in the midland laterite hills.

Myristica swamp is an endangered freshwater swamp ecosystem. In three sacred groves i.e. Kammadam, Aravanchal, and Paliyeri *kavu* this fresh water swamp is present. This swamp may give rise to perennial streams. Evergreen forest trees with various root adaptation such as stilt roots and breathing roots and many other plants commonly associated with swamps are seen here. Special kinds of roots called pneumatophores which are negatively geotropic are the characteristic features of the myristica swamp. A good patch of myristica swamp is recorded in Kammadam which harbours *Myristica malabarica* and plants such as *Knema tenuata*. In Aravanchalkavu, a small area consists of swampy vegetation and *Myristica malabarica* is the dominant species. A good patch of swamp vegetation is noticed in Paliyeri *kavu*. *Myristica fatua* var. *magnifica*, a rare, endemic plant is reported from this grove. It is a broad leaved species with stilt roots and breathing roots. Two small trees of this species are growing in Paliyeri *kavu*. *Syzigium travancoricum*, another endemic species, is also reported from Paliyeri.

A dense canebrake is growing in Edayilekkadu – a coastal grove. *Calamus rotang* is the dominant species with a pteridophyte climber *Stenochlaena palustris*.

The overall plant community organisation of the sacred grove is typical of the monsoon tropical forest ecosystem. At the same time, within the grove different associations are noticed.

### **Animal diversity of sacred groves**

A variety of species of animals are found in the sacred groves. They spill over the borders and are found outside if there are treecover. There are regional differences in the fauna. Lowland sacred groves have typical wetland birds and other common animal forms. Lower mid-land sacred groves are also having similar faunal composition. The fauna of the higher midland and highland sacred groves are typical of rainforests.

General observations on the fauna of various sacred groves were recorded in our survey. The most prominent groups of animals inhabiting sacred groves were observed and the species listed in order to assess the richness of the faunal diversity. Groups observed and listed under non-chordates included butterflies and spiders and those under chordates included Amphibia, Reptilia, Aves, and Mammalia.

The role of sacred groves as refugia becomes evident from the abundance of varied groups of animals in these forest patches; 117 species of butterflies, 8 species of spiders, 11 species of amphibians, 23 species of reptiles, 178 species of birds, and 24 species of mammals were

identified from the sacred groves in the various localities in the study area. Of these, 10 belong to schedule I in Wildlife (Protection) Act 1972.

It is thrilling to note that faunal elements that have evolved through millions of years are preserved in these small isolated pockets of forests. The undisturbed sacred forests retain such typical forest forms otherwise found only in the more extensive parts of the Western Ghats. Thavidisserikkavu, a prominent mid-land grove of Peringome *panchayat* is a case in point. A rare, endangered primate, *Presbytis jhonii* (Nilgiri langur) is present in this grove. The troop composition has not been recorded since no one is permitted to go inside. Presence of slender Loris and pangolin (Damodaran K, personal communication) also prove the role of the sacred groves as biological refugia. Unlike many other parts of India, In Kerala, monkeys do not get protection due to religious beliefs. Monkeys moving outside the grove risk their lives. The bonnet macaques of Aravanchal, Kammadath, and Edayilekkad are safe only when inside the sacred groves. The condition of jackal and porcupine is the same. Some species of birds finding refuge in sacred groves are also seen utilising the nearby vegetation as their habitat. Sacred groves are the refugia of the large bird of prey, the white bellied sea eagle. Apart from sacred groves there are only few shelters left for Varanus and smaller mammals in the open country. In the sacred groves there are a large number of species occupying crucial positions in the different trophic levels in the food chain. Amphibians escape the lethal effect of pesticides when sheltered in sacred groves. The availability of unpolluted water is the main reason. The presence of large number of butterflies indicates the availability of sufficient variety of their food plants in sacred groves.

### **Ecosystem services**

Sacred groves deliver a number of ecosystem services. The benefit conferred, when compared with their small size, is relatively greater. Generally *kavus* provide a variety of ecological services such as

1. Our *kavus* are isolated patches of evergreen forests. As a biological resource, each kavu has its individuality. Rare species of plants exist in them. The animals depending on them also find *kavus* as refugia. Observations of Sasikumar. C (1996) on the biological spilling over from sacred groves support the argument of Dr Janzen (1988) that small wilderness patches in man-modified tropical landscapes can act as biodiversity inocula.
2. Plants in the groves increase the quantity of oxygen in the village atmosphere. Transpiration will increase humidity in the immediate vicinity and provide a more favourable microclimate for many organisms. The humidity and the cool atmosphere are blessings for the villagers. Plants absorb dust. Hence the grove acts as the lung of the village.
3. *Kavu* prevents the spreading of desiccation and reduces the incidence and intensity of fire, at least in some terrains as in the midland laterite beds in the region. Aravanchal kavu and Thavidisserikkavu retain such potential

4. Forests form our main watershed areas. Groves are as good as rain forests in storing ground water, and are providing more dependable sources of water for the organisms inside as well as in the neighbourhood. Almost all sacred groves contain water in the form of groundwater, springs, pools, lakes or streams. The vegetation enables replenishment of groundwater resources. Rivers originating in the midland in this region are perennial partly owing to the sacred groves. Arvanchal stream originating from Aravanchal *kavu* after receiving springs from Thavidisserikkavu joins Peruvamba River. Paddy fields near Paliyerikkavu, Kammadath *kavu*, Thavidisseri *kavu* Edayilakkadu etc., get sufficient water from the groves. Groves are also helpful in sustaining freshwater springs that empty into water bodies situated near salt water. The well inside the sacred mangrove of Thazhekkavu (Thekkumbad, Mattool) contains freshwater in spite of the fact that it is adjacent to brackish water and is illustrative.
5. Fertility of the soil in the vicinity of groves is increased by the humus from them. During monsoon these organic matters even reach the coastal sea to sustain fish fauna. When litter accumulates, organic materials build the soil and are returned to the biomass of the standing forest. In this process, many micro-organisms, invertebrates, fungi etc., will flourish and many species not found in the ploughed fields and secondary forests are present in the groves.
6. There are many species, such as *Adapathiyam*, *Ilipa*, *Eenthal*, which directly give us food. Groves play an important role in maintaining the food chain in the locality, harbouring a variety of forms ranging from micro-organisms in the humus to large plants and animals. The bird population in the groves help control the agricultural pests.
7. Medicinal plants, fast disappearing from the homesteads, are still preserved in several groves. They can be used for further propagation. A variety of seedlings of medicinal plants are available in various groves.
8. Plants like *Kammatti*, *Cherikkotta* etc. are raw materials used by traditional artisans among the villagers.
9. Above all, the groves are surviving gene pools. They are important in preserving the genetic diversity of the wild ancestors and allies of the cultivars and of indigenous fauna. Wild varieties of pepper, ginger, turmeric, cardamom, etc., are present in several groves like Kammadathkavu. Their seeds could be used for propagation as well as experimentation. Seeds and seedlings for social forestry may be selected from the groves.
10. Groves can promote eco-aesthetics. Groves have to be maintained as centres of social and cultural prospect as in the past. They will be useful as study centres for historical researchers.

## **Necessity of conservation**

Sacred groves are to be considered as critical habitats offering resources directly as well as indirectly for the people of the locality. Strong taboos were helpful for their continued conservation. But will these beliefs help further their protection is the question before us. Out of the 578 sacred groves, only 114 are recorded as remaining without quantitative degradation, and 105 as without qualitative degradation. Owing to human interference others have undergone degradation to various degrees.

Conservation of sacred groves is an urgent necessity because the gene pool surviving in these groves might be lost forever if any further degradation is allowed to these fragile ecosystems.

## **Relevance of taboos**

The degradation shows the weakening of taboos. The large sacred grove, Thavidisserikavu is well protected because people still comply with the taboos. People do not dare to break the taboos. They do not enter the grove except to seek divine intercession. However, some people secretly shoot monkeys coming out of the grove. This is evidently pointing towards the weakening of taboos. In the case studies taken up only Aravanchalkavu is at present free from harmful human interventions. In Kammadathkavu and Edayilekkadu there is wanton collection of materials. Edayilekkadu and Paliyerikkavu are under threat of encroachment. Karekkakavu is facing the problem of trespass in the name of development activities and continuous biomass removal.

The *kavus* could be cleared when the astrologers and Namboothiris of Pampumekattu *Mana* give consent. This provision has become a shortcut to overcome the taboos protecting the trees. The Mararveettukavu of Karivellur was recently cleared in such a way. Here, the immediate benefits went to the owners. The astrologer and priest also were alleged to have received a share. The Subrahmaniya Temple *Sarppakavu* was cleared for the sake of widening the adjacent road. Here destruction of a *kavu* is done in the name of developmental activity.

## **Ecological interpretation of taboos**

There is a general perception that taboos are mere superstitions. Case studies reveal that villagers in general are not aware of the ecological importance of *kavus*. However, they protect the *kavus* because of their belief in taboos. Taboos persist because believers are afraid of the wrath of the deities on those who break the taboos. Thus taboos gain ecological value. The major ecological value is related to water. There is a well known old saying in Malayalam: “do not enter the grove: the pond will dry up”. A preliminary observation is enough to show that the water holding capacity of a piece of forest is the source of water for springs feeding the nearby ponds and the streams originating from it. Another taboo is based on the belief that *kavus* are natural habitat of snakes and other animals. The destruction of *kavu* would result in the wrath of the Snake God which would bring about infertility and leprosy in the family. The *kavus* are the abode of snakes like cobra and rat-snake that control rodents. Birds living in them will also control the insect populations.

In the changing social system we cannot depend on taboos for the protection of sacred groves. In the seminars conducted, the main subject of discussion was the ecological importance of *kavu*. The elder persons among the owners were stressing the importance of taboos in which they believe. To a degree they may also be seen to be projecting the importance of stakeholders in the traditional system. Focus group discussions proved to be more fruitful. The group always involved young people who had some basic ecological knowledge. They are also interested in acquiring knowledge on the biodiversity. The fear of the elder generation is that the rituals may be renounced when ecological consciousness is promoted because many people may discard traditional activities as superstitions. Here an integrated approach is necessary. Rituals must persist as such because they maintain an institutional set-up giving a place for the *kavus* in the heart of the villagers. Ecological awareness must not mean keeping away from the traditions. Those who believe in traditions may protect the *kavu* due to their traditional beliefs. Others, who do not subscribe to such beliefs, could still protect the *kavu* for ecological reasons. All people have vital interest in the preservation of the ecosystem, though many are not aware of it at present. It is essential that every effort should be made to make people conscious of the need for the conservation of our bio-resources.

## 6. Decline of Sacred Groves

### Degradation and threats

We could categorise the sacred groves on basis of their perceived threat status:

1. Relatively safe groves: These may be further classified:
  - a. Those with no quantitative degradation: there are 145 of such groves where most people respect and abide by taboos and so these groves are safe under the present social conditions.
  - b. Those without any qualitative degradation: Of the 145 mentioned above, 105 groves are also without any qualitative degradation.
  - c. Those without any kind of harmful human intervention: Of the 105 groves mentioned above, 51 are without any significant harmful human intervention.

The balance of groves in the study area is under some kind of threat. They may be further categorised as:

2. Relatively safe but with vulnerable status: There are 16 groves of this category. *Kavus* like Mandapuram, Kammadath, and Edat Nagam are at present relatively safe. But the first two are under threat of encroachment. Sometime back, owners of Edat Nagam sought the advice of astrologer for felling the trees for development activities. Fortunately the decision was negative.
3. Groves not degraded quantitatively, but highly disturbed by human interventions: there are 47 such groves. Edayilekkattukavu is disturbed by activities such as collection of wood and tourism. Family friction among managers threatens the existence of Paliyerikkavu. Disturbance at Pongilat Mundy of Kunhimangalam is due to construction of roads within the *kavu* and intrusion by antisocial elements.
4. Partially destroyed: There are 418 sacred groves of this category in the study area. A considerable portion of Chamakkavu has been destroyed for providing playground for Vellur Higher Secondary School. A large area of Chekkicherykavu of Alakkod *panchayats* has been encroached by the nearby people. Neeliyarkottam of Morazha, and Andalurkavu have lost most of the undergrowth due to human intervention. A considerable portion of Karakkakavu has been taken over for developmental activities.
5. Completely destroyed: Our study revealed that 50 sacred groves have been destroyed leaving behind only traces of its earlier existence as a *kavu*. For its name sake a tree or a few trees are left where believers could continue the worship. Payyanur Subrahmanya Swami Temple grove, Malliyotkavu, Mavialayikkavu, and Peralassery Temple grove are instances.

### Causes for decline of sacred groves

Religion played an important role in preserving sacred groves. Hindu way of worship

incorporated many cults related to trees and nature. Jainism and Buddhism also absorbed nature cults. Temples were built around a sacred place or garden as centres of worship. The community was constantly guided to protect such groves. A number of legends grew up telling the terrible things that happened to those who violated their sanctity. They indicate that even in early times transgressions occurred.

Use of their resources was one of the main motives for disturbing the groves. Another was war; the sacred groves of defeated enemies were burnt or cut either to kill or flush the enemies out or to express contempt for the defeated. The following are the existing threats and major reasons for the decline of sacred groves.

### **Loss of faith**

Myths and taboos associated with the deity and the sacred grove provide protection to the grove from human intervention. But wherever their influence has weakened, the sacred groves are under threat irrespective of the importance of the presiding deity. The younger generation tends to look down at these rituals. According to Mr Venu, a young conservationist of Pulloor Village, youngsters mock at the rituals and 'feel ashamed of participating in those activities'. Rationalist thought and campaigns against superstitions have also played their part in the loss of protection of *Kavus*.

### **Sanskritisation**

The original structure of *kavu* was a space of worship in the midst of the forest patch, or beside it. This space was marked either in the form of a stone or a tree. For centuries this sacred space was left undisturbed by the power of taboos. By the process of Sanskritisation, many sacred groves were later converted into shrines. Temples were built inside the groves. A considerable area of Karekkakavu has been destroyed for the construction of accessory buildings to the temple. The shrine has been constructed in the form of elaborate temples. The perennial pond inside the grove has been modified with concrete sidewalls. In addition an auditorium has been constructed inside clearing a portion of the grove. Such a kind of development is not in harmony with the original culture of *kavus*. Paliyerrickavu authorities are planning to build accessory structures at the cost of vegetation in a small area. The committee members are ignorant of the degradation that would happen to the myristica swamp due to clearing of an area inside. Many *kavus* like Malliyottukavu in Kunhimangalam *panchayats* have been completely destroyed leaving symbolic representation of the forest and converting the entire remaining area into buildings and courtyard.

Two factors are to be noted here: first one is the cultural change associated with Sanskritisation. This gets approval from the believers associated with the sacred grove. Many village communities are yearning to keep pace with the pervasive cultural changes taking place around them. They fail to remember the value of their earlier heritage. There is reason to believe that they are misguided by the new outlook of having 'prestigious buildings' for worship. Lady participants in seminar at Knahangad were found giving more value and significance to the changed modes of worship. They also were ignorant about the ecological value of *kavus*.

The second is the intrusion of antisocial elements into the representative body governing the shrine and rituals. Such persons have an eye on the valuable timber in the sacred forest. When the trees are cut, these people get their illegal share. So they are alleged to employ extra-legal methods to influence the decisions of astrologers, Namboodiris, and other authorities to achieve their nefarious ends.

### **Extraction of timber by Devaswam**

The resources of the sacred groves are used sometime with religious justification. Timber from the grove is used to construct temples. A number of trees of Edayilakadu have been removed by the original owners belonging to Udinoor Kovilakam under the pretension of their use for divine purpose. The support of an astrologer sanctifies such actions. Compared with the ultimate and complicated goal of preserving biodiversity, which in any case animates the minds only of those with ecological awareness, the immediate returns, whether material or spiritual, from the cutting of trees create the impression in the minds of those who manage the groves that they are relatively larger. This may well be an illusion.

### **Shifting of deity/restricting the abode of the deity**

Shifting of the Snake god is done in important centres for snake worship in Kerala such as Pambumekkatu *Mana* (Thrissur district), Mannarsala, Vattikot (Alappuzha district) and Peralassery. In some cases, the main deity is still worshipped but the associated groves have been cleared. Rituals are performed there with modifications. Symbolic representation of grove is done by retaining single large trees. Snake worship and *theyyam* rituals are performed under modified conditions. The common factor here is the weakened faith.

Some people with selfish motive are alleged to exploit the situation under influence of market economy. Such interests aim at the timber available in the grove for extraction. The chain of interests behind the 'mechanism' for exploitation of groves is vaguely visible. According to myths, the Brahmins of Pambumekktu *Mana* and similar families have the power to authorise cutting the trees in the sacred groves. An astrologer predicts whether the snake god in a grove is to be shifted to a shrine. He also suggests the Brahmin family to be entrusted with the *pooja*. The Brahmin charges an enormous amount as remuneration in cash and kind for conducting the *pooja*. The expenditure ranges from Rs 20000 to 2 lakh. The Brahmin grants the owner the authority to cut the trees. Usually the clearing is initiated by a Namboodiri by making a ritual cut on a tree. The expenditure for the *pooja* is met by selling timber in the grove. Here the major beneficiary is the Namboodiri. Conspiracy and mutual understanding between astrologer, Namboodiri, and the owner is alleged to occur. The astrologer too gets his share. Owner gets his land cleared for agricultural or other domestic purposes at the cost of the clearing of sacred trees. Once the deity is shifted he is relieved of the duty and cost of performing rituals also.

Instead of shifting the deity, restricting and confining the deity to a small newly built shrine at a corner of the sacred place also takes place. The rituals required to make such a change has also been carried out by a Brahmin priest. In some cases a single tree is left in front of the newly built (often concrete) shrine to symbolise that it is a *kavu*. Once

such rituals are performed the owner of the land utilises the spared land for his secular purposes.

In the changing socio-economic scenario, the shifting of the deities has sealed the fate of many groves. In Kunhimangalam *panchayat*, three sacred groves were exterminated during the last decade. One of them gave way to the *panchayat* ground. The other two belonged to families of 'rationalist' politicians. Shifting of deities was carried out in these two. Payyanur temple grove and Mararveettukavu (Karivellur) met with the same fate last year. Fortunately none of the selected groves is at present facing such a threat.

Many sacred groves were destroyed since 1950 and converted to agricultural lands. Most of them belonged to forward castes such as Nambiar and Nair families. These communities do not have social institutions sanctifying sacred groves comparable to those of *thiyyas* in any of their villages. They are less bound by the taboos. Many of them have straight away destroyed the sacred groves while others have resorted to shifting of the deity or restricting the deity to a newly built area. At the same time, Brahmins are also maintaining sacred groves in the form of snake groves. Some Brahmin families are respected as the ultimate authorities on issues related to snake groves.

### **Clearing of *kavus* for development activities**

Owing to the loss of faith, *kavus* were destroyed for constructing houses and other buildings, roads, etc. The social mechanism failed to protect them. In these cases also astrologer's support is obtained for clearing of *kavus* for developmental activities. Local people do not seem to be concerned of the importance of their heritage. Recently a portion of Chamakkavu in Payyanur was destroyed for providing land for the nearby school. Sometimes local conflicts of interests arise between developmentalists and the sacred grove owners. Ultimately the grove owners are even alleged to be bribed by certain vested interests to agree to the clearing of *kavus*. The conflict between the road committee and the owners of Elambachi and Trikaripur groves are of recent occurrence. Both these *kavus* escaped destruction by the resistance of local people's group organised by SEEK.

In Karekkakavu an auditorium has been constructed at the expense of the grove. Traditionally, marriages are not conducted in *kavus*, since the Goddess who resides there is considered a virgin. But here they have neglected the tradition in the name of development. Marriages are being conducted in the auditorium. A network of footpath criss-crosses the grove. A road passes through the *kavu* separating it into two halves. In addition another road circumvents it. Newly installed underground telephone cable has destroyed the undergrowth. Similarly a considerable area of Paliyerikkavu has been cleared for road construction and for open space. Edayilakadu, Chamakavu, Kakkerakavu in Kadannapally, and Poomkilat Mundaya in Kunhimangalam have deteriorated due to the construction of roads.

### **Biomass removal**

Collection of biomass has become a regular practice in the case of several sacred groves.

124 groves are subjected to biomass removal. Traditionally only Kusava Caste has the right to enter certain sacred groves for collecting firewood. But nowadays other people also enter freely in many groves. Dry-wood is collected from Edayilekattukavu and Kammadathkavu. Biomass in the form of green manure, medicinal herbs, branches of trees, etc, is removed from 56 *kavus*. In Poongottu *kavu*, there is intense collection of green manure, dry litter and firewood. Local people cut branches of trees to use them to provide support for banana and other plants. Those poles will later be used as firewood. There is massive litter collection in Karekkakkavu where dry litter is auctioned every year. Problem of reed collection and deterioration of undergrowth exist in Kammadathkavu. Cane collection is a major problem in Edayilekadu. Fuel wood is collected from all *kavus* of Cheemeni and similar laterite-bed regions of the midland. Over-exploitation of medicinal herbs also result in the degradation of sacred groves. Ayurvedic physicians at Cheruvathur and nearby places depend upon sacred groves of Cheemeni for medicinal plants. *Malaxis radii* and *Ionidium suffrutcosum* are collected extensively. Such collections are done from Edayilekadu and Amboottumkavu also. Recently the managing committee has stopped removal of biomass. Unrestricted biomass removal may spell doom for the *Kavus*.

### **Poaching**

Myths, customs, and social restrictions generally prevent encroachment of *kavu* for poaching. But, when the animals come out of the grove they are fired at or caught by traps. Even in Thavidisserikkavu, about which strongest myths prevail, the Nilgiri langur coming out of the grove are often shot by the people around. Grey jungle fowl of Kammadathkavu are sometimes trapped by the people living around. Similarly people from areas of Mundampramkavu steal the eggs of peafowl.

### **Encroachment**

Nearly sixty sacred groves face the problem of encroachment. A civil suit exists before the High Court of Kerala regarding the attempted encroachment in Edayilekkadu. In Kammadathkavu there is threat of encroachment from the neighbouring people who belong to another religion. In Paliyerikkavu there is conflict among family members. One group of people who hold property around the *kavu* led by a local person has become a constant threat to the grove. They are attempting to encroach the sacred land. Chekkicherykavu in Alakkod *panchayats* is associated with Amboottumkavu (Thimiri) and Chekkichery Bhagavathikkavu (shrine). The owners visit Chekkicherykavu only during festival. Around this grove the land is owned by Christian settlers. Originally the grove had 12 acres of land. At present only eight acres remain. The people living around have encroached upon the rest. Mundampramkavu formerly had an extent of 3.5 acres; at present it is only two acres in extent.

### **Migration and occupation of lands by people of other faiths**

Migration has been important in the occupation of highland regions. Christian migrants are dominant there. They do not show sufficient consideration for, and often do not even tolerate,

the native culture respecting sacred groves. Similarly, land transfers by *Kavu* owners to persons belonging to other faiths have also caused destruction of *Kavus*.

### **Land reforms**

The Kerala Land Reforms Act resulted in the break-up of large land holdings. Big owners lost portions of their land. They could not afford to have sacred groves in the remaining portions and were unable to spend money for rituals. Also, many people had lost faith in traditions and myths. Owing to the emergence of the nuclear families, in many cases, *tharavadu* or ancestral home was partitioned and sold to new owners who lacked traditional beliefs. This led to the extermination of sacred forests. Themamkottu Nagam of Kunhimangalam was recently cleared leaving only a single tree for worship.

### **Felling by governments**

According to Hughes et, al (1997) the groves were subjected to economic exploitation as early as the period of industrial revolution. In India, those groves managed by the forest department are often subjected to selection felling. In the study area 11 groves are owned by the state government. The major ones are Kammadathkavu and Poongottukavu. Kammadathkavu originally belonged to the family of *Pathillam Thandrikal*. At present it is under A.W. land (Assignee Wasteland is the land taken over by the State Government as the owner has not paid the tax for a prolonged period. Usually such lands are assigned to families without land in procession.) Six years ago an attempt was made by the Forest Department to auction a fallen tree for timber. But the local people who worship the grove as the place of Bhagavathi resisted the attempt. At present the practice of selection felling has been stopped in Kammadathkavu. However, there is no guarantee that the sacred groves under the government would escape selection felling. There is no evidence to believe that governmental authorities are aware of the ecological importance of protecting the *kavus* than the general public.

### **Degradation in the selected 5 sacred groves**

Many of the major groves at present are under private management. However, they are administered as if they are common property resources. They face problems of human intervention because of mismanagement. Initially they were under the ownership of a *tharavadu*. But at present, they are managed by committees organised by the villagers. Some others are under the control of well-organised institutions. One cannot generalise the problem since the context of each grove is different from others.

Karekkakkavu (seven acres), located on NH 17 at Kalikkadavu in Pilicode *Panchayat*, Kasaragod district, is managed by a well-organised institution belonging to *thiyya* community. It is facing two major problems. The land in the grove has been used for what the management considers to be development activities. They have constructed an auditorium recently by cutting a part of the vegetation. The shrine is a complex of buildings situated at the centre of the grove. A number of footpaths in the form of a network are allowed to crisscross inside

the grove. Even telephone cable is allowed to pass through the grove. Continued biomass removal affects humus formation and the quality of the soil. Here a few individuals get the benefit and the loss is suffered by the entire villagers.

Edayilekkattukavu is in Valiyaparamba *panchayat*. It originally belonged to Udinur *Kovilakam*. Presently it is managed by a committee of the villagers. But this committee is not a well-organised institution. There are two groves in Edayilekkadu. The larger one called *nagam* (11.38 acres) is for snake worship. Smaller one called *kavu* (1.88 acres) is meant for *theyyam* worship. There are no shrines for the deities. *Kavu* is situated about half a km away from *Nagam*. They are situated on the island of Edayilekkadu within one km from the sea. The main problem of Edayilekkattukavu is encroachment. A civil case exists in the court between an individual and the committee on the ownership of 50 cents of land attached with the *nagam*. Entry is not restricted into the groves. Canes are largely collected from the groves. The troop of monkeys inside often used to raid neighbouring coconut plantations. There is also disturbance to the white-bellied sea eagle breeding in the smaller grove.

Paliyerrickavu (2.40 acre) is owned by Paliyeri Tharavadu in Karivellur-Peralam *panchayats*. It is a unique myristica swamp with several rare species of plants. Family friction among the owners is a problem here. Some members of the *tharavadu* are in conflict with the *karanavar*. They are alleged to be wanting to exploit the timber from the grove. Present *karanavar* Mr Raghavan Nair has entrusted the power of managing the grove to a committee of the villagers. A civil case exists in court regarding this issue. This grove may be considered the most endangered one.

Aravanchalkavu (7 acres) is a midland grove situated in the midst of the barren laterite terrain of Peringome *panchayat* on the main road. It is managed by a committee of the villagers. They have restricted entry of the public to the grove only on festival days. There are complaints of the monkeys from the grove raiding nearby plantations. The committee has succeeded in getting funds from the forest department for digging a pond near the grove. They believe that it would be helpful for the monkey population which may otherwise raid the nearby households for water.

Kammadathkavu is a highland grove in West Eleri *Panchayat*. It is one of the largest groves (60 acres) selected for case study. According to villagers, the area in the records must be more than that. It belongs to AW land owned by state government. The sacred forest is situated at about a km away from the shrine of Kammadath *Bhagavathi*. Two smaller groves are also owned by the shrine. The grove faces problems of encroachment, felling of trees, poaching and collection of firewood. It is surrounded by estates of persons who do not have faith in groves. There is no well-organised committee to manage it, even though many people are interested in protecting the grove.

Thus four groves of the five studied face degradation in one way or other. Kurup (1980) based his studies on Ramavillyam *Kazhakam* narrates the success of well-organised institution in maintaining our cultural heritage. In the case of Thavidisserikavu and Theyyottukavu the conservation is almost complete since they are under well-built institutions. The success of

these institutions is based on the strong faith of the villagers. The villagers of Thavidisseri respect and fear Goddess Vallikkettilachi (mother in the grove) and they would not even think of violating the customs protecting the *kavu*. Unnikrishnan (1990, 1995) relates the success of the institution to *thiyya* caste. He believes that *thiyyas* with their faith in altruism are successful in maintaining the *kavu*. But this also cannot be generalised. Karekkakavu is also managed by *thiyya* community men. But it has become degraded. Here loss of faith is the problem. These examples lead us to a conclusion that faith as far as it exists is well and good for conservation of sacred groves. But it is not dependable. In the present condition, if faith is lost, we have to expect a sudden collapse of the climax forest of Thavidisserikkavu. Environmental awareness is the only alternative available to protect the sacred groves. The institutions must be restructured in order to make the sacred groves survive in their pristine condition.

## **7. Continued Conservation of Sacred Groves**

### **Need for ecological rationale**

Sacred groves had preserved biodiversity within their boundaries for a long time. Now they are under threat. It is in the ultimate interest of humanity as a whole to preserve at least the surviving bio-materials which had been safeguarded in those groves for this long. For that, it is necessary to make society responsible for shielding the surviving sacred groves from further degradation.

Conservation of biodiversity and maintenance of the eco-system is of overriding importance for the survival of the human race itself. The sacred groves have played a role in that endeavour. Those benefits might, however, soon be lost if they are allowed to be degraded or destroyed. Thus protection of sacred groves must gain priority over other less important goals.

Each sacred grove or sacred site is having its own story of origin mostly connected with a deity and very often related to serpent worship. In many cases snake itself is the deity. Folklores have evolved based on a continuous thinking process (Singh G. S, et al, 1997). The importance of traditions in saving some parts of the natural ecosystem become evident when we examine the stories behind the origin of sacred sites and the actions protecting these sites from all sorts of human disturbances.

Nature worship has been a key force in shaping the human attitude towards conservation and sustainable utilisation of natural resources. The worship embodies an appreciation primarily for ethical, intrinsic, existence, non-use, and indirect values of biodiversity and secondarily for direct or consumption values. With the passage of time emphasis on use values over non-use value has increased. This has reached extremes where the original concept of sacredness of natural objects was altogether replaced by the concept of sacredness in artificial objects like idols therein. The state supported social welfare measures such as building schools or roads in the lands belonging to sacred groves was myopic because they failed to recognise the role of the sacred groves in preserving biodiversity. Sacred sites have turned into tourist centres to serve economic interest. Again, this has caused irreversible destruction of valuable species in the eco-system. Increasing commercial value for land, supplemented by the immediate economic interest in the value of timber, is the social reason for erosion of many traditions promoting conservation in Kerala. The new land tenure and land rights policies did not recognise the age-old values of local efforts of conservation. Large-scale conversion to Christianity is also said to be a major factor causing degradation in many places but this factor alone cannot explain the erosion of traditional conservation practices.

There are limits to the utilisation of natural resources in a subsistence economy. Such limits are not a concern in market economy until the threats of exhaustion of the capital or negative impact of excessive resource use are felt. Monetary economy is increasingly becoming an

attraction to the traditional societies too. Cultural causes alone cannot rejuvenate conservation ethos in the present situations unless conservation is promoted as a means of sustainable economic development.

Moral boundaries of restraint in using natural resources cannot be depended upon for conservation in the present context because the traditional cultural consciousness is getting lost from the modern mind. When the moral order is declining the fundamentalist forces are becoming stronger.

The factors causing erosion of traditional conservation culture are,

1. Increasing economic interest of the society.
2. Profit-motivated activities of the managers.
3. Ignorance of the public committee vested with the management of the grove on the ecological and cultural importance of the groves.
4. The changes in the lifestyle of the villagers which have caused the rituals to be neglected.
5. *Kavu* has lost the status as the centre for the governance of the village community.

The conservation of sacred groves would require change of ownership from private hands to local communities. In addition, external inputs would also be required in many cases. The sequence, sources, and style of these inputs will have to be determined keeping the spirit of conservation in mind. Intervention at the state level is necessary to avoid conflict among the local communities and state bureaucracy. We cannot conserve diversity by keeping the people poor. One solution for this is by generating incentives for the owners. They may be compensated when they transfer their rights to the village communities.

Sacred groves are spots where the local communities have been involved in the conservation of their own immediate environment. For the continuous protection of groves, the village communities must be given ownership. The responsibility for managing the economic resources and their sustainable protection must vest with them. At present, most of them are owned by private persons or by trusts. They must be transferred from private ownership to the village community. Currently there are some positive developments such as the demand for a healthy environment, the expressed desire for environmental education and teaching of the importance of conservation of biodiversity and maintenance of the ecosystem, which should prove useful in reawakening the consciousness to protect our biodiversity. The importance of the sacred groves was 'rediscovered' in Kerala in 1970s. NGOs have played a crucial role in this (Sasikumar, 1998).

Transfer of ownership to village communities is a crucial aspect. The private owners are not in a position to bear the unpredictable large cost of maintaining the forest biotic community. Social desire is the most critical resource for conservation. There should develop a social

desire in the mind and heart of the people to rebuild wild-land agro ecosystem. The wild lands can generally play the same societal roles as do libraries and museums. The need for conservation of wild land eco-system must be integrated with the educational systems. Their preservation can generate some kind of protective responsibility in the society. A new approach to the biodiversity conservation must emerge as people's initiative rather than through state enforcement (Singh G.S. et.al, 1997). Sacred groves preserved for religious and cultural reasons offer an opportunity to rebuild age-old traditional ethos of conservation. When compared to other ecosystems, quantitative information is very limited on the following aspects of the sacred sites:

1. Biodiversity status;
2. People's perceptions on tangible and intangible benefits from biodiversity in sacred groves; and
3. Opportunities and constraints in improving the biodiversity resource base and its sustainable utilisation in the present scenario.

The traditional knowledge, which evolved through sacred system, may be incorporated while forming modern institutions for conservation. The challenge is to combine utilitarian logic with spiritual concerns for conservation – that is to build a new ideology to fill an old gap.

The 'intact natural habitats' in the study region have vanished. What remains as wild lands are almost in the form of scattered remnants. Sacred groves form a considerable portion of this. Janzen (1988) has suggested that these deformed fragments must be used as inocula for restoration of habitat and for conservation of biodiversity. He also points out that any further delay in action could result in natural and anthropogenic perturbations wiping out most of the habitat remnants, and along with them, those organisms which do not have the minimum viable population size. Such species may be considered 'the living dead'. Even though he has not specifically mentioned sacred groves, his observation is relevant to them also.

The demand for land is a major problem in Kerala. Almost the entire rainforest belt has given way to agricultural landscapes. Sacred groves with a few patches of natural vegetation, analogous to mangroves and some other wetlands in Kerala, perform part of the function of 'intact habitat' even though these are only residual debris. Anthropogenic pressure can wipe out these. They are at the same time essential for us as basic tools for the restoration of habitats. Even the ill-kept and low-grade sacred forest contains several species that will be obliterated when the habitat is converted into agricultural land or is destroyed in other ways. In Kerala unoccupied lands that could be used for the restoration of original natural habitat is limited. But restoration may be achieved in the degraded sacred groves.

The forest plant community undergoing secondary succession may have fewer species than the climax forest community there. But if invasion of adequate inocula of biota occurs, the habitat may get restored. Kammadath *kavu*, Aravanchal *kavu*, and Paliyerikkavu are intact habitats. Karakkakkavu and Edayilekkatu *kavus* require restoration to a certain extent.

In the study area no sacred grove is having continuity with the natural habitat of the area. Only sacred groves remain natural and the outside are fully agricultural landscapes. Hence a comparison between two nearby areas is not possible. When compared to the similar forest types elsewhere, sacred groves prove to be holding occasionally more diversity than the non-sacred natural forests. The immediate surroundings of sacred groves are not protected from grazing and similar interventions. This indicates the need for a buffer area around each sacred grove.

On the basis of the findings of this study following measures for the conservation of sacred groves are suggested:

1. Faith in sacredness of groves, even if considered superstitious by some, has to be respected. It must be supplemented by ecological consciousness by all people.
2. The ownership and control of the groves must be transferred to the village communities.
3. Government should undertake the protection by declaring the groves as heritage sites preventing entry except for worship, and declare a total ban on the exploitation of its natural wealth. Now the state itself poses a threat to some existing sacred groves because it plans to take them over to undertake developmental activities in the lands belonging to those groves.
4. The state government should provide financial support for the upkeep of the grove.
5. It is essential to carry out a resurvey of the groves to recover encroached areas.
6. Physical protection to sacred groves by fencing is essential.
7. A mass awareness campaign must be launched aiming at the local people focusing on the need to protect the groves.
8. Preservation of 'intact habitat' within the grove must be given priority together with the restoration of degraded areas.

The results of the study highlight the need for building local ecological knowledge in forming institutions. It is also important to blend the sacred and the secular in the design of institutions. When ownership of *Kavus* is transferred to village communities, they will get metamorphosed from private property to public protected property. They must be preserved like heritage sites. It is essential to connect the public protected property resource institutions with ecological responsibility during the process of negotiation, as and when rules have to be drawn up. The process involves less road blocks because the blocks can be transformed into facilitations by informed persuasion. (Gupta, et al, 1977). The sequence factors in the design are to be sorted out in every case. As Janzen puts it, 'conservation of a relatively intact habitat may seem to require a little more than fencing and a police force'.

## References

- Balakrishnan K, Induchoodan N.C. *Plant diversity in sacred groves of Kerala*, Evergreen No. 36, KFRI. 1996.
- Balasubramanian Arun. *Eco-development: towards philosophy of environmental education*, Singapore: Regional Institute of Higher Education and Development. 1984.
- Chandrasekhara V. M, Sankar. S. *Structure and functions of sacred groves: Case studies in Kerala*, Proceedings of KFRI Regional Workshop on “the role of sacred groves in conservation and management of biological diversity”. 1997.
- Choudhary L U. *Sacred Groves in Pakistan*, Proceedings of KFRI workshop. 1997.
- Freeman J.R. *Gods, Groves and the culture of Nature in Kerala*. Modern Asian Studies 33 (2), Cambridge University Press. 1999.
- Gokhale, Y, Velankar R, Subhaschandran M. D., Gadgil. M. *Sacred woods, grass lands and water bodies as self organized system of conservation*. Proceedings of KFRI Workshop. 1997.
- Hughes J. D. *Sacred groves of the ancient Mediterranean area: early conservation of biological diversity*. Proceedings of KFRI Workshop. 1997.
- Hughes J. D., Subhaschandran. M. D. *Sacred groves around the earth: an overview*, Proceedings of KFRI Workshop. 1997.
- Janzen, Daniel. H. “Tropical ecological and bio-cultural restoration”, *Science*. Vol. 239. 1988.
- Joshi Prabhakaran, Srivastava Yogesh. “Drops of nature conservation - sacred groves”, *J. Hum. Ecol.* ii (5). 2000.
- Kalam M.A. *Sacred groves in Kodagu district of Kamataka (South India): a socio-historical study*. Pondi Paper in social sciences, Institut Francais de Pondichery. 1996.
- Kannan Peruvannan. *Chilambina Ormakal, TheyyakkaranJe katha, Theyyathinteyum* (Malayalam). Kurukshetra Prakasan. Ernakulam. 1997.
- Kurup K. K. N. *Arya-Dravida Ghatakangal Malabarila Nadankalayil*, (Malayalam), Thiruvananthapuram: State institute of Languages. 1980.
- . *Samooham, Charithram, Samskaram* (historical essays in Malayalam), Calicut: Poorna Publications. 1981.
- Maya S. *Biological Diversity*, Newsletter of Society for Environmental Conservation. NACHIKETA. 1998
- Nair, Ramachandran Adoor. K. K. (Ed.) *Kerala State Gazetteer vol. II*. Kerala Gazetteers. Thiruvananthapuram. 1986.
- Nair, Ravindran G. *Snake worship in India*, Publication Division, Ministry of Information and Broadcasting, Government of India. 1993.
- Niek van Duivenbooden. *Integrating stakeholders goals, research disciplines and levels of scale*. ILEA Newsletter. 1995.

- Pascal J. P. *Wet evergreen forests of Western Ghats: a study of structure, floristic and succession*. French Institute of Pondichery. 1989.
- Pushpangadan P. Rajendraprasad M., Krishnan. P. N. *Sacred groves of Kerala - a synthesis on the state of art of knowledge*, Proceedings of KFRI Workshop. 1997.
- Ramachandran K. K. Mohanan C. N. *Studies on the sacred groves of Kerala*, Final project report by Centre for Earth Science studies to Ministry of Environment and forests, Government of India. 1991.
- Ramakrishnan P .S. *Conserving the sacred for biodiversity: the conception framework*, Proceedings of KFRI Workshop. 1997.
- *Conserving the sacred: where do we stand?* Proceedings of KFRI Workshop. 1997.
- *Conserving the sacred: from species to landscapes*, Nature and resources, UNESCO, 32. 1996.
- Reddy A. G. *Biodiversity conservation through sacred groves (Deorais) in Maharashtra: retrospect and prospect*, Proceedings of KFRI Workshop. 1997.
- Robin Grimble, Kate Wellard. *Stakeholder methodologies in Natural Resource Management, a review of principles, contexts, experiences and opportunities*, Natural Resource Institute, The University of Greenwich. 1996.
- Robin Grimble, Man-kwun chan. "Stakeholder analysis for natural resource management in developing countries", *Natural Resource Forum*, 19 (2). 1995.
- Sasikumar C. *A study on the Avifauna of some Sacred Groves of North Kerala. India*, A report submitted to Oriental Bird Club Conservation Grant. 1998.
- Subhashchandran M. D., Hughes. J. D., Gadgil. M. *Sacred groves of the Western Ghats of India - Proceedings of KFRI Workshop*. 1997.
- Suxena K. G., Rao K. S., Maikhuri R. K. *Religious and cultural perspective of biodiversity conservation in India: a review*, Proceedings of KFRI Workshop. 1997.
- Unnikrishnan. E. *A Socio-Environmental study on Sacred Groves of North Kerala - report submitted to RANWA, Pune*. 1997.
- *Part played by sacred groves in local environments*. Project report submitted to centre for science and Environment, New Delhi. 1990.
- *Uttara Keralathile Visudha Vanangal (Malayalam)*. Jeevarekha. 1995.
- Ward, Conner Leuts. *A Descriptive Memoir of Malabar*. Ed. Raimon. Government of Kerala. 1906.
- Withanage H. *Role of sacred groves in conservation and management of biodiversity in Sri Lanka*. Proceedings of KFRI Workshop. 1997.
- Wollenberg E., Colfer C J. P. "Social sustainability in the forests", *IUFRO Newsletter*. 1996.

**Appendix-I**  
**Flora of Selected Sacred Groves - A Comparative Study**

- |                         |                           |                        |
|-------------------------|---------------------------|------------------------|
| 1. Kammadath Kavu (K.K) | 2. Aravanchal Kavu (A.K)  | 3. Paliyeri Kavu (P.K) |
| 4. Karakka Kavu (K.R.K) | 5. Edayilekkad Kavu (E.K) |                        |

Sl. No	Name of the Sps. With family	Vernacular Name	K K	A K	P K	K K
<b>RANUNCULACEAE</b>						
1.	<i>Naravelia zeylanica</i> DC	Vathakkodi	✓	✓	✓	
<b>DILLENACEAE</b>						
2.	<i>Dillenia pentagyna</i> Roxb.	Vazhappunna	✓	✓	✓	
<b>ANONACEAE</b>						
3.	<i>Polyalthia korinti</i> H.F & Thomas	Korandi	--	--	--	
4.	<i>Uvaria narum</i> Wall	Narumpanal	✓	✓	--	
5.	<i>Goniothalamus cardiodpetalus</i> Hook. F. Thomas		--	✓	--	
<b>MENISPERMACEAE</b>						
6.	<i>Tinospora cordifolia</i> Miers.	Chittamruthu	--	✓	--	
7.	<i>Anamirta cocculus</i> W&A	Polla				
8.	<i>Diploclisia glauces</i> sens Diels		--	✓	--	
9.	<i>Cissampelos pareira</i> Linn	Malathangi		--		
10.	<i>Cyclea peltata</i> Diels	Padathali	--	✓	--	
11.	<i>Tiliocora acuminata</i> Miers	Vallikanhram	--		--	
<b>NYMPHAEACEAE</b>						
12.	<i>Nymphaea stellata</i> Will	Ambal	--	✓	--	
<b>CHAPPARIDACEAE</b>						
13.	<i>Capparis zeylanica</i> Linn	Savam Nadathi	--	✓	--	
<b>BIXACEAE</b>						
			✓	✓	✓	

	<b>DIPTERO CARPACEAE</b>				
18.	<i>Hopea parviflora</i> Bedd	Uruppu	✓	✓	--
19.	<i>Hopea ponga</i> (Denst ) Mabbes	Nayuruppu Elapongu			--
20.	<i>Vateria indica</i> Linn	Vellakunthirikkam	--	--	✓
	<b>ANCISTROCLADACEAE</b>				
21.	<i>Ancistrocladus heyneanus</i> Wall ex Grab		✓	--	✓
	<b>MALVACEAE</b>				
22.	<i>Sida cordifolia</i> Linn	Velluram	✓	✓	--
23.	<i>Sida acuta</i> Burn, F.	Aanakurunthoti	✓	✓	✓
24.	<i>Sida fryxelli</i>		--	--	--
25.	<i>Hibiscus hispidissimus</i>	Mathippuli	--	--	--
	<b>STERCULIACEAE</b>				
26.	<i>Sterculia guttata</i> Roxb.	Kavalam, Peenari	--	✓	--
27.	<i>Sterculia foetida</i> .L	Pottakavalam	✓	--	--
28.	<i>Helicteres isora</i> .L	Idampirivalampiri	✓	--	--
	<b>TILIACEAE</b>				
29.	<i>Grewia microcos</i> L	Cherikkotta	--	✓	--
	<b>ELAEOCARPACEAE</b>				
30.	<i>Elaeocarpus serratus</i> Linn.	Cherurudraksham	--	✓	--
	<b>LINACEAE</b>				
31.	<i>Hugonia mystax</i> Linn.	Mothiravalli	--	✓	--
	<b>OXALIDACEAE</b>				
32.	<i>Biophytum reinwardtii</i> E& Hof.	Mukkutti	✓	--	--
	<b>RUTACEAE</b>				
			✓		

41.	<i>Aglaia eleagnoidea</i> (Juss) Benth	Punyava	--	✓
	<b>ICACINACEAE</b>			
42.	<i>Sarcostigma kleinii</i> W&G	Vattodal	--	✓
43.	<i>Lophopetalum wightianum</i> Agn	Venkott	✓	✓
	<b>HIPPOCRATEACEAE</b>			
44.	<i>Salacia reticulata</i> W		--	✓
45.	<i>Loesneriella arnottiana</i> (Wight) A.C. Sm		✓	--
	<b>RHAMNACEAE</b>			
46.	<i>Ziziphus oenoplea</i> Mill	Cheruthudali	✓	✓
47.	<i>Ziziphus rugosa</i> Lamk	Vanthudali	--	✓
	<b>VITACEAE</b>			
48.	<i>Cissus latifolia</i>	Chunnapuvalli	--	✓
49.	<i>Cissus pallida</i> Planch		--	✓
50.	<i>Cayratia carnososa</i> Gragnep	Chorivalli	✓	--
51.	<i>Leea indica</i> (Burn) Merrill	Nhalu	--	✓
	<b>SAPINDACEAE</b>			
52.	<i>Allophylus cobbe</i> (L) Racusch	Mukkannan Peruk	--	✓
	<b>ANACARDIACEAE</b>			
53.	<i>Buchanania lanzan</i> Spreng	Kulilvavu	--	--
54.	<i>Mangifera indica</i> L	Mavu	✓	--
55.	<i>Lannea coromandelica</i> (Houtt) Merrill	Karasu	--	✓
56.	<i>Holigarna arnottiana</i> Hook.f	Cheru	✓	✓
57.	<i>Holigambar beddomei</i> Hook.f	Aanacheru	--	✓

65.	<i>Desmodium triflorum</i> DC	Cherupulladi	✓	✓	--
66.	<i>Desmodium polycarpum</i> DC	Nilathuvara	--	--	✓
67.	<i>Derris trifoliata</i>	Ponnumavalli	✓	✓	--
68.	<i>Derris scandens</i> Benth	Poonhali	✓	--	✓
69.	<i>Pterocarpus marsupeum</i> , Roxb.	Venga	--	✓	--
70.	<i>Zornea diphylla</i> Pers.	Murikootti	--	✓	✓
	<b>CAESALPINIACEAE</b>				
71.	<i>Adenantha pavonina</i> L	Manchadi	✓	--	✓
72.	<i>Cassia fistula</i> L	Kanikkonna	--	✓	--
	<b>MIMOSACEAE</b>				
73.	<i>Acacia intsia</i> Willd	Incha	✓	✓	--
74.	<i>Xylia xylocarpa</i> (Roxb) Tamb	Irul	✓	✓	--
75.	<i>Albizia chinensis</i> (Sb) Merr.	Pottavaaka	--	--	--
	<b>RHIZOPHORACEAE</b>				
76.	<i>Carallia brachiata</i> (Lour) Merr.	Venkana	✓	✓	--
	<b>COMBRETACEAE</b>				
77.	<i>Calycopteris floribunda</i> Lamk	Pullanhi/Narant ha	✓	✓	✓
78.	<i>Terminalia paniculata</i> Roth	Pullamaruth	✓	✓	--
79.	<i>Terminalia bellerica</i> . Roxb.	Thanni thembavu	--	✓	--
80.	<i>Terminalia tomentosa</i> W& A	Karimaruth	--	✓	--
81.	<i>Anogeissus latifolia</i> Wall	Mazhukanhram			
	<b>MYRTACEAE</b>				
			✓	✓	✓

89.	<i>Memecylon malabaricum</i> Logn.	Kashavu	✓	✓	--
90.	<i>Memecylon umbellatum</i> Burm F	Kashavu	✓	✓	--
91.	<i>Rotala rotundifolia</i> (Roxb) Koehne		--	--	✓
92.	<i>Lagestroemia microcarpa</i> Wt.	Venthekku	✓	--	--
	<b>SAMYDACEAE</b>				
93.	<i>Casearia rubescens</i> Dalz		--	✓	--
	<b>PASSIFLORACEAE</b>				
94.	<i>Passiflora foetida</i> Linn.		--	--	✓
	<b>CUCURBITACEAE</b>				
95.	<i>Bryonopsis Iaciniosa</i> Nauds		V	--	--
	<b>DASTICACEAE</b>				
96.	<i>Tetrameles nudiflora</i> R Br.	Cheeni	✓	--	--
	<b>BEGONIACEAE</b>				
97.	<i>Begonia</i> Sps.	Kalthamara	✓	--	--
	<b>UMBELLIFERAE</b>				
98.	<i>Centella asiatica</i> Urban	Muthil	✓	--	✓
	<b>CORNACEAE</b>				
99.	<i>Mastixia arborea</i> CB Clarke	Kattukarpp ooram	--	✓	--
	<b>BUUBIACEAE</b>				
100.	<i>Oldenlandia auricularia</i> K. Schum		--	✓	✓
101.	<i>Mussaenda frondosa</i> Linn.	Vellila	--	✓	--
102.	<i>Randia malabrica</i> Lamk.	Kara	✓	--	--
103.	<i>Ixora coccinea</i> Linn.	Kattachekki	✓	✓	--
104.	<i>Ixora brachiata</i> Roxb ex DC		--	✓	--
105.	<i>Pavetta indica</i> Linn	Pavatta	✓	--	--

113	<i>Elephantopus scaber</i> Linn.	Aanachuvadi	--	✓	✓
114	<i>Ageratum conyzoides</i> Linn	Appa			
115.	<i>Emelia sonchifolia</i> DC	Muyalchevi	--	✓	✓
	<b>MYRSINACEAE</b>				
116.	<i>Embelia tsjeriamcottam</i> Ax.	Veezhal	--	✓	--
	<b>SAPOTACEAE</b>				
117.	<i>Madhuca longifolia</i> (L) Machvrude	Ilippa	--	--	✓
118.	<i>Madhuca nerifolia</i> (Moon) H.J.Lam	Aattilippa	--	✓	✓
119.	<i>Mimusops elengi</i> Linn.	Elanhi	✓	--	--
	<b>EBENACEAE</b>				
120.	<i>Diospyros peregrina</i> Gurka	Panachi	--	--	--
121.	<i>Diospyros buxifolia</i> (Bl) Hiern	Malamuringa	--	✓	--
	<b>SYMPLOCACEAE</b>				
122.	<i>Symplocos racemosa</i> Roxb.	Pachotti	--	✓	--
	<b>OLEACEAE</b>				
123.	<i>Jasminum malabaricum</i> Wt.	Kattumulla	--	✓	✓
124.	<i>Olea dioica</i> Roxb.	Edana	--	✓	--
	<b>APOCYNACEAE</b>				
125.	<i>Plumeria rubra</i> var. <i>acutifolia</i>	Chembakam	✓	--	--
126.	<i>Rauwolfia serpentina</i> Benth	Sarpagandhi	✓	--	--
127	<i>Holarrhena antidysenterica</i> Wall	Kudakappala	--		--
128.	<i>Parsonsia alboflavescens</i>	Ezhuthani	--	--	
129.	<i>Alstonia scholaris</i> (L) R.Br	Ezhilampala	✓	✓	--

138.	<i>Strychnos aenea</i> AW Hill	Vallikanhiram	✓	✓	✓
139	<i>Strychnos nux-vomica</i> Linn	Kanhiram	--	✓	✓
	<b>MENIANTHACEAE</b>				
140.	<i>Nymphoides cristata</i> (Roxb) Kuntz	Neythalambal	--	--	✓
	<b>BORAGINACEAE</b>				
141	<i>Cordia obliqua</i> Willd	Viri	--	✓	--
	<b>CONVOLVULACEAE</b>				
142.	<i>Ipomoea sepiaria</i> Koen	Thiruthali	--	--	--
143.	<i>Ipomoea digitata</i> Linn	Palmuthuku	--	--	--
144.	<i>Merremia umbellate</i> Hallier.f	Vayara			
145.	<i>Erycibe paniculata</i> Roxb.	Irumbithali	--	--	✓
	<b>SOLANACEAE</b>				
146.	<i>Solanum xanthocarpum</i> Schrad	--	--	--	✓
	<b>SCROPHUARIACEAE</b>				
147.	<i>Adenosma capitatum</i> HK. f	--	--	--	--
	<b>LENTIBULARIACEAE</b>				
148.	<i>Utricularia graminifolia</i> Gahl.	Kakkappoovu	--	✓	--
149.	<i>Utricularia flexuosa</i> Vahl	Kakkappoovu	--	✓	--
	<b>BIGNONIACEAE</b>				
150.	<i>Oroxylum indicum</i> Vent.	Palakappayyani	--	✓	--
	<b>ACANTHACEAE</b>				
151.	<i>Justicia</i> Sp	--	✓	--	--
152.	<i>Gymnostachyum febrifugum</i>	Elamuchala	✓	--	

160	<i>Clerodendrum viscosum</i> Vent	Vattapparuvalem	✓	--	✓
	<b>LABIATAES</b>				
161.	<i>Acrocephalus capitatus</i> Benth	--	--	--	--
162	<i>Dysophylla stellata</i> Benth	--	--	--	✓
163	<i>Leucas biflora</i> R. Br.	--	✓	✓	--
	<b>AMARANTHACEAE</b>				
164	<i>Cyathula prostrata</i> Bl	Cherukadaladi	--	--	--
165.	<i>Achyranthes aspera</i> L	Kadaladi	✓	✓	✓
166.	<i>Allmania nodiflora</i> R.Br.	Ponnankanni	--	--	✓
167.	<i>Aerva lanata</i> Juss	Cheroola	--	--	✓
	<b>ARISTOLOCHACEAE</b>				
168.	<i>Aristolochia Indica</i> L	Garudappodi	✓	--	--
	<b>PIPERACEAE</b>				
169.	<i>Piper longum</i> Linn.	Thippali	✓	--	✓
170.	<i>Piper nigrum</i> Linn.	Kattu kurumulaku	✓	✓	✓
	<b>MYRISTILACEAE</b>				
171.	<i>Myristica malabarica</i> Lamk.	Panthapain, Pathri	✓	✓	✓
172.	<i>Myristica fatua</i> var. <i>magnifica</i> Sinclair	Kothappayin	--	--	✓
173.	<i>Kema attenuata</i> Warb.	Chorappayin	✓	✓	✓
	<b>LAURACEAE</b>				
174.	<i>Cinnamomum malabathrum</i> Berthold Presi	Vayana	--	-	
175.	<i>Cinnamomum zeylanicum</i> Blum	Madhurakanharam	✓	--	✓
176.	<i>Cinnamomum verum</i> J.S.	Karuppa	✓	--	--

184.	<i>Kirganelia reticulata</i> Baill	Mashikkaya	--	--	,
185.	<i>Antidesma menasu</i> Miq ex Tul	Puthuraval	✓	✓	,
186.	<i>Antidesma zeyanicum</i> Lamk	Thathalamaram	✓	✓	,
187.	<i>Aporusa Iindleyana</i> (Wt) Baill	Vetti	--	--	,
188.	<i>Mallotus philippinensis</i> Muel.Arg	Kurangumanjal	✓	✓	-
189.	<i>Macaranga peltata</i> Muel.Arg	Vatta	✓	✓	-
190.	<i>Sapium insigne</i> (Royle) Trim	Kannampotti	--	✓	-
191.	<i>Phyllanthus urinaria</i> L	--	--	--	-
	<b>ULMACEAE</b>				
192.	<i>Holoptelia integrifolia</i> Planth	Aaval	✓	✓	,
193.	<i>Trema orientalis</i> (L) Bl	Aamathali nukamaram	--	✓	-
	<b>MORACEAE</b>				
194.	<i>Ficus tjahela</i> Burm.f	Chela karaal	--	--	-
195.	<i>Ficus benghalensis</i> Linn	Peral	✓	--	-
196.	<i>Ficus religiosa</i> Linn.	Arayal	--	--	-
197.	<i>Ficus exasperata</i> Vahl	Therakam	✓	--	-
198.	<i>Ficus racemosa</i> L	Athi	✓	✓	-
199.	<i>Ficus hispida</i> Linn	Parakam	✓	✓	-
200.	<i>Antiaris toxicaria</i> Lisch	Maravuri	✓	--	-
201.	<i>Artocarpus heterophyllus</i> Lamk	Plavu	✓	--	-
202.	<i>Artocarpus hirsutus</i> Lamk	Anhili	--	--	-

210.	<i>Acanthephippium bicolor</i> Lindl		✓	--	-
211.	<i>Cottonia peduncularis</i>	--	✓	--	\
212.	<i>Bulbophyllum neilgherrens</i> Wt.	Mookkittakaya			
213.	<i>Cymbidium aloefolium</i> Sw	--	✓	--	\
214.	<i>Dendrobium ovatum</i> Krzl	Unnisappoovu	✓	✓	-
215.	<i>Schoenorchis nivea</i>	--	✓	--	\
216.	<i>Pholidota pallida</i> Lindl	--	✓	--	-
217.	<i>Rhyncostylis retusa</i> Bt.	Droupadimala	✓	--	-
218.	<i>Oberonia</i> Sp.	--	✓	--	-
219.	<i>Porpax reticulata</i> Lindl	--	✓	✓	-
220.	<i>Epidendrum tenuifolium</i>	Cherumevumarav azha	✓	--	-
221.	<i>Gastrochilus flabelli farmis</i>		✓	--	-
222.	<i>Aerides ringens</i> (Lindl) CEC Fisch		✓	✓	-
	<b>ZINGIBERACEAE</b>				
223.	<i>Curcuma oliganth</i>	Kalamukham	✓	✓	\
224.	<i>Curcuma oligantha</i> var. Lutea	--	✓	✓	\
225.	<i>Globba bulbifera</i> Roxb		✓	--	-
	<b>DIOSCORIACEAE</b>				
226.	<i>Dioscorea bulbifera</i> Linn	Kattukachil	✓	✓	\
227.	<i>Dioscorea oppositifolia</i> Linn	Kattukachil	✓	--	\
	<b>AMARYLLIDACEAE</b>				
228.	<i>Crinum</i> Sps.	--	--	✓	-

236.	<i>Ochlandra rheedii</i> Benth	Oda	✓	--	-
237.	<i>Calamus rotang</i> Linn.	Chooral	--	✓	-
	<b>PANDANACEAE</b>				
238.	<i>Pandanus tectorius</i> Soland	Kaitha	✓	✓	
	<b>ARACEAE</b>				
239.	<i>Cryptocoryne spiralis</i> Fisch	Thakaram	--	✓	
240.	<i>Remustatia vivipara</i> Schot	Marachembu	---	✓	-
241.	<i>Amorphophallus sylvaticus</i> Kunth	Kattu Chena	--	✓	-
242.	<i>Raphidophora pertusa</i> Schott	Odayarvalli	--	--	
243.	<i>Caladium bicolor</i>	--	✓	--	-
244.	<i>Pothos scandens</i> Linn.	Aanapparuva	✓	✓	
	<b>LEMNACEAE</b>				
245.	<i>Lemma gibba</i> Linn	--	--	--	-
	<b>ERIOCAULCEAE</b>				
246.	<i>Eriocaulon</i> Sp.	Choothu	--	✓	-
247.	<i>Scleria lithosperma</i> Sw.	--	✓	✓	-
248.	<i>Hypolytrum latifolium</i> LL Ricb	--	--		-
	<b>FLAGELLARIACEA</b>				
249.	<i>Flagellaria indica</i>	--	--	--	
	<b>GYMNOSPERMS CYCADACEAE</b>				
250.	<i>Cycas circinalis</i> Linn	Eenth			
	<b>GNETACEAE</b>				
			✓	✓	

261.	<i>Angiopterise evecta</i>	--	✓	--	--	-
262.	<i>Athyrium hoheneckerianum</i>	--	✓	--	--	-
263.	<i>Bolbitis appendiculata</i>	--	✓	--	--	-
264.	<i>Bolbitis subcrenata</i>		✓	--	--	-
265.	<i>Christella dentate</i>	--	✓	--	--	-
266.	<i>Crepidomanes christi</i>	--	✓	--	--	-
267.	<i>Crepidomanes intramarginale</i>	--	✓	--	--	-
268.	<i>Leptochilus bahupunctika</i>	--	✓	--	--	-
269.	<i>Parahemionitis cordata</i>	--	✓	--	--	-
270.	<i>Hemionitis arifolia</i>	Elichevi	✓	--	--	-
271.	<i>Pityrogramma calamelanos</i>	--	✓	--	--	-
272.	<i>Pteris pellucida</i>	--	✓	✓	--	-
273.	<i>Pteris qundriururita</i>	--	✓	--	--	-

<p>C - Climber, T - Tree, CS - Climbing Shrub, AH - Aquatic Herb, US - Under Shrub, H- Herb,  WC - Woody Climber, PH - Perennial Herb, ST - Small Tree, PH - Parasite Herb</p>
--

**Appendix-II**  
**Prominent Fauna of Sacred Groves and Its Environs**

**BUTTERFLIES**

1. <i>Triodes minos</i> Cramer ( <i>Troides Helena</i> )	Southern Birdwing
2. <i>Pachliopta aristrolochia</i> (Fabricius) ( <i>Tros aristolochiae</i> )	Common Rose
3. <i>P. hector</i> (Linnaeus) ( <i>Tros hector</i> )	Crimson Rose
4. <i>Graphium sarpedon teredon</i> (Felder & Felder) ( <i>Zetides sarpedon</i> )	Common Blue Bottle
5. <i>G. doson eleius</i> (Fruhstorder) ( <i>Zetides spp.</i> )	Common Jay
6. <i>G. agamemmon menides</i> (Felder & Felder) ( <i>Zetides agamemnon</i> )	Tailed Jay
7. <i>Papilio clytia clytia</i> (Linnaeus) ( <i>Chilasa clytia</i> )	Common Mime
8. <i>P. demoleus demoleus</i> Linnaeus	Lime Butterfly
9. <i>P. liomedon</i> Moore	Malabar Banded Swallow
10. <i>P. helenus</i> (Hampson)	Red Helen
11. <i>P. polytes polytes</i> (Linnaeus)	Common Mormon
12. <i>P. polymnestor polymnestor</i> Cramer	Blue Mormon
13. <i>P. paris tamilana</i> Moore	Paris Peacock
14. <i>P. buddha</i> Westwood	Buddha Peacock
15. <i>Catopsilia pomona</i> (Fabricius) ( <i>C. Pomona &amp; crocale</i> )	Lemon Emigrant Common Emigrant

19. <i>E. blanda silhetana</i> (Wallace) ( <i>Terias blanda</i> )	Three-spot Grass Yellow
20. <i>Delias eucharis</i> (Dury)	Common Jezebel
21. <i>Leptosia nina nina</i> (Fabricius)	Psyche
22. <i>Cepora nerissa phryne</i> (Fabricius) ( <i>Huphina nerissa</i> )	Common Gull
23. <i>Anapheis aurota</i> (Fabricius) ( <i>Belenois mesentina</i> )	Caper White/Pioneer
24. <i>Appias lyncida latifasciata</i> Moore	Chocolate Albatross
25. <i>Parenonia valeria hippia</i> (Fabricius) ( <i>Parenonia valeria</i> )	Common Wanderer
26. <i>P. ceylanica</i> (Felder & Felder) <i>Parenonia</i> (sic!) <i>ceylonica</i> )	Dark wanderer
27. <i>Hebomoia glaucippe australis</i> Butler	Giant Orange Tip
28. <i>Melantis leda leda</i>	Common Evening Brow
29. <i>Elymnias hypermnestra cuadata</i> Butler	Common Palmfly
30. <i>Lethe europa regalva</i> Furhstorfer	Bamboo Treebrown
31. <i>L. rohira neelgheriensis</i> Guerin-Menvill	Common Treebrown
32. <i>Mycalesis persues typhlus</i> Frushtorfer	Common Bush Brown
34. <i>M. khasia orcha</i> Evans	Pale- Brand Bush Brown
35. <i>Orsotrioena medus mandata</i> (Moore)	Nigger
36. <i>Y. ceylonica</i> Hewitson	Celyon Fourring/ White Fourring
37. <i>Y. heubneri heubneri</i> Krby	Common Fourring

46. <i>Pantoporia hordonia hordonia</i> (Stoll) ( <i>Neptis hordonia</i> )	Common Las
47. <i>Athyma perius perius</i> (Linnaeus) ( <i>P. perius</i> )	Common Serg
48. <i>Moduza procris undifragus</i> Fruhstorfer ( <i>Limnitis procris</i> )	Commander
49. <i>Parthenos sylvia virens</i> Moore	Clipper
50. <i>Tanaecia lepidea miyana</i> Fruhstorfer ( <i>Euthalia lepidea</i> )	Grey Count
51. <i>Euthalia aconthea meridionalis</i> Fruhstorfer ( <i>E. gracula</i> )	Common Bar
52. <i>E. lubentina arasada</i> Fruhstorfer	Gaudy Baron
53. <i>Dophla evelina laudabilis</i> Swinhoei	Red Spot Duk
54. <i>Araidne ariadne indica</i> (Moore)	Angled Casto
55. <i>A. merione merione</i> Cramer	Common Cas
56. <i>Junonia hierta hierta</i> Fabricius ( <i>Precis hierta</i> )	Yellow Pansy
57. <i>Junonia orthya swinhoei</i> (Butler) ( <i>Precis orthya</i> )	Blue Pansy
58. <i>J. lemonias</i> (Linnaeus) ( <i>P. lemonias</i> )	Lemon Pansy
59. <i>J. almana almana</i> (Linnaeus) ( <i>P. almana</i> )	Peacock Pans
60. <i>J. atlites atlites</i> (Linnaeus)	Grey Pansy
61. <i>J. iphita pulvialis</i> Fruhstorfer ( <i>P. iphita</i> )	Chocolate Pan
62. <i>Cynthia cardui cardui</i> (Linnaeus)	Painted lady

69. <i>T.septentrionis dravidarum</i> (Frushstorfer) ( <i>D.Melissa (hamata)</i> )	Dark Blue Tiger
70. <i>Danaus chrysippus chrysippus</i> (Linnaeus) ( <i>D.chrysippus</i> )	Plain or Common T
71. <i>D.genutia genutia</i> (Cramer) ( <i>D.plexippus</i> )	Striped Tiger
72. <i>Euploea core core</i> (Cramer)	Common Crow
73. <i>Abisara echerius prunosa</i> (Moore)	Plum Judy
74. <i>Spalgis epius epius</i> (Westwood) ( <i>S.epeus epeus</i> )	Apefly
75. <i>Castalius rosimon rosimon</i> (Fabricius)	Common Pierrot
76. <i>Caleta caleta decidia</i> (Hewitson) ( <i>Catalius caleta</i> )	Angled Pierrot
77. <i>Discolampa ethion vavasanus</i> Frusstorfer ( <i>Castalius ethion</i> )	Banded Blue Pierro
78. <i>Leptotes plinius</i> (Fabricius) ( <i>Syntarucus plinius</i> )	Zebra Blue
79. <i>Neopithecops zalmora dharma</i> (Moore)	Quaker
80. <i>Pseudozizeeria maha ossa</i> (Swinhoe)	Pale Grass Blue
81. <i>Chilades laius laius</i> (Cramer)	Lime Blue
82. <i>C. pandava pandava</i> (Horsfield) ( <i>Euchrysops pandavaa</i> )	Plains Cupid
83. <i>Freyeria trochylus putli</i> (Kollar) ( <i>Zizeeria putli</i> )	Grass Jewel

93. <i>Rathinda amor</i> (Fabricius)	Monkey puzzle
94. <i>Zesius chrysomallus</i> (Hubner)	Red Spot
95. <i>Tajuria cippus cippus</i> (Fabricius)	Peacock Royal
96. <i>Curetis thetis thetis</i> (Drury)	Indian Sunbeam
97. <i>Hasora chromus chromus</i> (Cramer) ( <i>Hasora alexis</i> )	Common Banded Awl
98. <i>H. badra badra</i> (Moore)	Common Awl
99. <i>Badamia exclamationis</i> (Fabricius)	Brown Awl
100. <i>Celaenorrhinus leucocera</i> (Kollar)	Common Spotted Flat
101. <i>C. ambareesa</i> (Moore)	Malabar Spotted Flat
102. <i>Tagana sylvia</i> (Evans) ( <i>T. obscurus</i> )	Immaculate/Suffused Snow Flat
103. <i>T. litigiosa litigiosa</i> (Moschler)	Water Snow Flat
104. <i>Psedocoladenia dan dan</i> (Fabricius)	Fulvous Pied Flat
105. <i>P. indrani indra</i> (Evans) ( <i>Coladena indrana</i> )	Tricolour Flat
106. <i>Sarangesa purendra pandra</i> (Evans)	Spotted Small Flat
107. <i>Odontophiliium angulata angulata</i> (Felde)	Banded/Chestnut Angle
108. <i>O. ransonnetti potophera</i> (Hewitson) ( <i>Caprona ransonnetti</i> )	Golden Angle
109. <i>Iambrix salsala lutipennis</i> (Plotz)	Chestnut Bob
110. <i>Psolos fuligo subfasciatus</i> (Moore)	Coon

## SPIDERS

SCIENTIFIC NAME	COMMON NAME
1. Heteropoda venatora	The Giant Crab Spider
2. Argiope pulchella	Banded Fourleg
3. Hersilia savigni	Common two-tail
4. Peucetia viridana	Green Lynx
5. Oxyopes rufistemum	Brown Lynx
6. Artema atlanta	Round Longlegs
7. Plexippus pykulli	Zebra Jumper
8. Gasteracantha geminata	Tribanded Spiky Orb

## AMPHIBIANS

### FROGS, TOADS & CAECILIANS

SCIENTIFIC NAME	COMMON NAME
1. Rana limnocharis	Paddy Field or Cricket Frog
2. Rana hexadactyla	Indian Pond or Green Frog
3. Rana tigrina	Indian Bull Frog
4. Rana rufescens	Rufescent Frog
5. Rana malabarica	Fungoid Frog
6. Rana cyanophlyctis	Water Skipper or Skipper Frog
7. Microhyla rubra	Red Narrow-mouthed Frog
8. Bufo melanosticus	Common India Toad
9. Rhacophorus malabaricus	Malabar Flying Frog
10. Philautus spp.	Bush Frog
11. Urotyphlops spp.	Common Caecilian

## REPTILES

### TURTLES & TERRAPINS

SCIENTIFIC NAME	COMMON NAME
1. <i>Lissemys punctata punctata</i>	Southern Flapshell Turtle
2. <i>Melanochelys trijuga coronata</i>	Indian Pond Terrapin

## LIZARDS

SCIENTIFIC NAME	COMMON NAME
1. <i>Hemidactylus brooki</i>	Spotted Indian House Gecko
2. <i>Hemidactylus frenatus</i>	Southern House Gecko
3. <i>Calotes versicolor</i>	Indian Garden Lizard
4. <i>Mabuya carinota</i>	Common Skink
5. <i>Varanus bengalensis</i>	Common Indian Monitor

## SNAKES

SCIENTIFIC NAME	COMMON NAME
1. <i>Python molurus</i>	Indian Rock Python
2. <i>Eryx conicus</i>	Common Sand Boa
3. <i>Eryx johnii</i>	Red Sand Boa
4. <i>Eryx whitakeri</i>	Whitaker's Sand Boa
5. <i>Lycodon aulicus</i>	Common Wolf Snake
6. <i>Amphistema stolata</i>	Striped Keelback
7. <i>Xenocropis piscator</i>	Checkered Keelback
8. <i>Ptyas mucosa</i>	Rat Snake
9. <i>Dendrelaphis tristis</i>	Bronzeback Tree Snake
10. <i>Ahaetulla nasutus</i>	Vine Snake
11. <i>Boiga trigonota</i>	Common Cat Snake
12. <i>Bungarus caeruleus</i>	Common Krait
13. <i>Naja naja</i>	Indian Cobra
14. <i>Vipera russellii</i>	Russel's Viper
15. <i>Typhlops acutus</i>	Beaked Worm Snake

## BIRDS

SCIENTIFIC NAME	C
1. <i>Phalacrocorax niger</i> (Vieillot)	Little Co
2. <i>Ardea cinerea rectirostris</i> Gould	Grey He
3. <i>Ardea alba modesta</i> J.E. gray	Large Eg
4. <i>Ardeola striatus chloriceps</i> (Bonnaparte)	Little Gr
5. <i>Ardeola gravil grayil</i> (Sykes)	Pond He
6. <i>Bubulcus ibis coromandus</i> (Boddaert)	Cattle Eg
7. <i>Egretta intermedia intermedia</i> (Wagler)	Smaller
8. <i>Egretta grazetta grazetta</i> (Linnaeus)	Little eg
9. <i>Egretta gularis schistacea</i> (Hemphrich & Ehrenberg)	Reet Her
10. <i>Nycticorax nycticorax nycticorax</i> (Linnaeus)	Night He
11. <i>Ixobrychus cinnamomeus</i> (Gmelin)	Chestnut
12. <i>Elanus caeruleus vociferus</i> (Latham)	Blackwi
13. <i>Pernis ptilorhynchus ruficollis</i> lesson	Crested H
14. <i>Milvus migrans sykes</i>	Pariah or
15. <i>Haliashur Indus Indus</i> (Boddaert)	Brahmin
16. <i>Accipiter badius badius</i> (Gmelin)	Shikra
17. <i>Accipiter trivirgatus peninsulae</i> Koelz	Crested G
18. <i>Spizaetus cirrhatus cirrhatus</i> (Gmelin)	Crested H
19. <i>Ictinaetus malayensis perniger</i> (Hodgson)	Black Ea
20. <i>Haliaeetus Ieucogaster</i> (Gmelin)	Whitebe
21. <i>Spilornis cheela melanotis</i> (jerdon)	Crested S
22. <i>Falco tinnunculus objurgatus</i> (baker)	Indian K
23. <i>Perdicula asiatica vidali</i> Whistler & Kinnear	Jungle B
24. <i>Galloperdix spadicea spadicea</i> (Gmelin)	Red Spu

35. <i>Treron pompadora affinis</i> (Jerdon)	Pompado Pigeon
36. <i>Teron phoenicoptera chlorigaster</i> (Blyth)	Green Pig
37. <i>Ducula badia cuprea</i> (Jardon)	Imperial P
38. <i>Columba livia intermedia</i> Strickland	Blue Roc
39. <i>Streptopelia chinensis suratensis</i> (Gmein)	Spotted D
40. <i>Chalcophaps indica indica</i> (Linnaeus)	Emerald G Bronzewi
41. <i>Psittacula krameri manilensis</i> (Bechstein)	Reseringe
42. <i>Psittacula cyanocephala cyanocephala</i> (Linnaeus)	Blossomh
43. <i>Psittacula cloumbides</i> (Vigors)	Bluewing
44. <i>Loriculus vernalis</i> Vernalis	Indian Lo
45. <i>Clamator jacobinus jacobinus</i>	Pied Cres
46. <i>Cuculus varius varius</i> (Vahi)	Common Bird
47. <i>Cuculus micropterus micropterus</i> (Gould)	Indian Cu
48. <i>Cacomantis sonneratii sonneratii</i> (Latham)	Indian Ba
49. <i>Eudynamis scolopacea scolopacea</i> (Linnaeus)	Koel
50. <i>Rhopodytes viridirostris</i> (Jerdon)	Small Gre
51. <i>Centropus sinensis parrot</i> (Stresemann)	Crow-Phe
52. <i>Tyto alba stertens</i> Hartert	Barn Owl
53. <i>Otus bakkamoena bakkamoena</i> (Pennant)	Collared S
54. <i>Bubo zeylonensis leschenaulti</i> (Temminck)	Brown Fi
55. <i>Glaucidium rediatum malabaricum</i> (Blyth)	Jungle Ow
56. <i>Ninox scutulata hirsute</i> (Temminck)	Brown Ha
57. <i>Athene brama brama</i> (Temminck)	Spotted O

69. <i>Dicrurus hottentottus hottentottus</i> (Linnaeus)	Haircrest
70. <i>Dicrurus paradiseus paradiseus</i> (Linnaeus)	Greater ra
71. <i>Artamus fuscus</i> (Vieillot)	Ashy Swa
72. <i>Sturnus malabaricus malabaricus</i> (Gmelin)	Grey hea
73. <i>Sturnus malabaricus blythii</i> (Jerdon)	Blyth's M
74. <i>Gracula ptilogenys</i> (Blyth)	Hill Myn
75. <i>Acridotheres tristis tristis</i> (Lannaues)	Common
76. <i>Acridotheres fuscus mahrattensis</i> (Sykes)	Jungle M
77. <i>Dendrocitta vagabunda parvula</i> Whistler & Kinnear	Indian Tr
78. <i>Corvus splendens protegatus</i> (Madarasz)	House Cr
79. <i>Corvus macrohynchus culminates</i> (Sykes)	Jungle Cr
80. <i>Hemipus picatus piacatus</i> (Sykes)	Pied Flyc
81. <i>Tephrodornis pondicerianus pondicerianus</i> (Gmelin)	Common
82. <i>Coracina navaehollandiae macei</i> (Lesson)	Large Cu
83. <i>Coracina melanoptera sykesi</i> (Strickland)	Black He
84. <i>Pericrocotus flammeus flammeus</i> (Forster)	Scarlet M
85. <i>Pericrocotus cinnamomeus malabaricus</i> (Gmelin)	Small Mi
86. <i>Aegithia tiphia multicolor</i> (Gmelin)	Common
87. <i>Chloropsis aurifrons frontalis</i> (Pelzeln)	Gold fron Bird
88. <i>Chloropsis cochinchinesis jerdoni</i> (Blyth)	Gold man Bird
89. <i>Irena puella puella</i> (Latham)	Fairy Blu
90. <i>Pycnonotus priocephalus</i> (Jerdon)	Grey Hea
91. <i>Pycnonotus melanicterus gularis</i> (Gould)	Black He

103. <i>Muscicapa ruficauda</i> Swainson	Rufousta (Migrato
104. <i>Muscicapa pallipes</i> (Jerdon)	White be (Endemi
105. <i>Muscicapa rubeculoides rubeculoides</i> (Vigors)	Blue thro Migrator
106. <i>Muscicapa tickelliae tickelliae</i> (Blyth)	Tickell's
107. <i>Muscicapa thalassina thalassina</i> Swainson	Verditer
108. <i>Harpactes fasciatus malabaricus</i> (Gould)	Malabar
109. <i>Ceryl rudis travancoreensis</i> Whistle & Kinnear	Lesser Pi
110. <i>Alcedo atthis taporbana</i> Kleinschmidt	Common
111. <i>Pelargopsis capensis capensis</i> (Linnaeus)	Strokbill
112. <i>Halcyon smyrnensis fusca</i> (Boddaert)	Whitebre
113. <i>Halcyon pileata</i> (Boddaert)	Blackcap
114. <i>Tockus griseus</i>	Malabar
115. <i>Merops leschenaulti lischenaulti</i> Vielillot	Chestnut
116. <i>Merops philippinus philippiuns</i> Linnaeus	Bluetaile
117. <i>Merops orientalis orientalis</i> Latham	Green Be
118. <i>Coracias benghalensis indica</i> Linnaeus	Indian R
119. <i>Upupa epops ceylonensis</i> Reichenbach	Hoopoe
120. <i>Megalaima viridis</i> (Boddaert)	Small Gr
121. <i>Megalaima rubricapilla malabarica</i> (Blyth)	Crimson
122. <i>Megalaima haemacphala India</i> (Latham)	Crimson Coppersm
123. <i>Jynx torquilla torquilla</i> (Linnaeus)	Wryneck
124. <i>Picumnus innominatus malayorum</i> Hartert	Speckled

135. <i>Alauda gulgula australis</i> Brooks	Eastern S
136. <i>Hirundo rusica gutturalis</i> Scopoli	Eastern S
137. <i>Hirundo smithii filifera</i> Stephens	Wire tail
138. <i>Hirundo daurica nipalensis</i> Hodgson	Striated o
139. <i>Lanius vittatus vittatus</i> Valenciennes	Bayback
140. <i>Lanius schach canieps</i> (Blyth)	Rufousba
141. <i>lanius cristatus cristatus</i> Linnaeus	Brown S
142. <i>Oriolus oriolus kundoo</i> Sykes	Golden O
143. <i>Oriolus chinensis diffusus</i> Sharpe	Blacknap
144. <i>Oriolus xanthornus xynthornus</i> (Linnaeus)	Blackhea
145. <i>Rhipidura aureola compressirostris</i> (Blyth)	Whitebro
146. <i>Terpsiphone paradisi leucogaster</i> (Swainson)	Paradise
147. <i>Hypothymis azurea styani</i> (Hartlabub)	Blacknap
148. <i>Cisticola juncidis salimalii</i> Whistler	Streaked
149. <i>Prinia hodgsonii albogularis</i> (Walden)	Franklin'
150. <i>Prinia socialis socialis</i> Sykes	Ashy Wr
151. <i>Orthotomus sutorius guzuratus</i> (Latham)	Tailor Bi
152. <i>Acrocephalus stentoreus brunnescens</i> (Jerdo)	Indian G
153. <i>Acrocephalus dumetorum</i> Blyth	Blyth's R
154. <i>Phylloscopus trochiloides viridanus</i> Blyth	Dull Gre
155. <i>Phylloscopus trochiloides nitidus</i> Blyth	Bright gr
156. <i>Copsychus saularis ceylonensis</i> Sclater	Magpie-R
157. <i>Saxicola caprata nilgiriensis</i> (Whistler)	Pied Bus
158. <i>Saxicoloides fulicata fulicata</i> (Linnaeus)	Indian R
159. <i>Monicola cinclorhynchus</i> (Vigors)	Bluehead Migrator

170. <i>Dicaeum concolor concolor</i> Jerdon	Plaincolou
171. <i>Nectarinia zeylonica flaviventris</i> (Hermann)	Purplerum
172. <i>Nectarinia minima</i> (Sykes)	Small Sun
173. <i>Nectarinia lotenia hindustanica</i> (Whistler)	Loten's Su
174. <i>Nectarinia asiatica asiatica</i> (Latham)	Purple Sun
175. <i>Arachnothera longirostris longirostris</i> (Latham)	Little Spid
176. <i>Petronia xanthocollis xanthocollis</i> (Burton)	Yellowthr
177. <i>Ploceus philippinus travancoreensis</i> (Whistler)	Baya
178. <i>Lonchura striata striata</i> (Linnaeus)	Whiteback
179. <i>Lonchura malacca malacca</i> (Linnaeus)	Blackhede

### MAMMALS

SCIENTIFIC NAME	CO
1. <i>Suncus murinus</i>	Grey Mus
2. <i>Mus booduga</i>	Indian File
3. <i>Rattus rattus</i>	Common H
4. <i>Bandicota indica</i>	Bandicoot
5. <i>Tatera indica</i>	Indian Ger
6. <i>Hysatrix indica</i>	Indian Pro
7. <i>Funambulus palmarum</i>	Three Stri
8. <i>Pteropus giganteus</i>	Indian Fly
9. <i>Cyanopterus sphinx</i>	Short-nose
10. <i>Megaderma lyra</i>	Indian Fal
11. <i>Pipestrellus ceylonicus</i>	Indian Pip
12. <i>Lepus nigricollis</i>	Blacknape
13. <i>Herpestes edwardsi</i>	Common M

### Appendix III

**Table 1 Number of sacred groves in the study area**

District	No. of S.G.			Extent in Hec	
	Municipal area	Panchayat	Total	Municipal area	Pa
Kasaragod	4	222	226	0.5868	10
Kannur	43	309	352	32.1737	19
Total	47	531	578	32.7605	30

**Table 2 Spatial extent**

<b>Total extent of the study area</b>	<b>4000Km2 (Approximate)</b>
Total extent of S.G. in Kasargod District	1.0519 Km2
Total extent of S.G. in Kannur District	2.3192Km2
Total extent of S.G in the Study area	3.3710km2

**Table 3 Ownership pattern**

Sl. No	Owner
1	Individuals of Various communities
2	Trusts of Families
3	Private trust with festival managed by the Public committees
4	Trust of Public
5	Devaswam
6	Trust of Thiyya Community
7	Trust of Maniyani Community
8	Trust of Asari
9	Trust of Kollan
10	Trust of Pulaya
11	Trust of Kulala
12	Trust of Mavilan
13	Trust of Moyor
14	NSS
15	SNDP
16	Graveyard
17	Muslim Makham
18	State Government (Forest Department)
19	Central Government
20	A.W. Land
Total	

**Table 4 Size of Sacred Groves**

<b>Range of Size</b>	<b>No. in Kasargod Dist.</b>	<b>N K D</b>
Less than 5 cents with vegeto completely destroyed, leaving only one or two trees and rituals observed	14	3
Less than 5 cents with natural vegetation	3	4
5-10 cents	52	8
11-25 cents	22	4
26-100 cents	86	8
1.1-10 acre	48	5
11-25 acre		
26-50 acre		
Above 50 acre	1	
<b>Total</b>	<b>226</b>	<b>3</b>

**Table 5 Location**

<b>Region</b>	<b>No.s</b>
Coastal/lowland	53
Midland	432
Highland	93
<b>Total</b>	<b>578</b>

**Table 6 Vegetation**

<b>Type</b>	<b>No. of S.G</b>
Evergreen	403
Semi evergreen	96
Deciduous	28
Destroyed with one or two trees left	50
Mangrove	1
<b>Total</b>	<b>578</b>

**Table 7 Height of Canopy**

<b>Height</b>	<b>No.</b>
Scrub	6
Up to 10 meters	74
10-40 meters	448
Destroyed	50
<b>Total</b>	<b>578</b>

**Table 8 Canopy cover**

Cover	No.
Up to 50%	328
Above 50%	200
Destroyed	50
Total	578

**Table 9 Extent of Human intervention**

Type	No. of S.G affected
Fire	12
Collection	124
Grazing	55
Poaching	26
Felling	162
Roads and footpath inside	21
Undergrowth clearing	9
Encroaching	60
Pollution	5
Total	474

**Table 10 Presiding deity**

God	119
Goddess	345
Snake	81
Muslim Makham	6
God/Goddess with Snake	207
No worship at present	27

**Table 11 Priesthood**

Sl.No	Name of Caste	No. of S.G
1	Namboothiri	251
2	Nambisan	3
3	Nambidi	1
4	Samanthan	3
5	Marati	1
6	Nambiar	22
7	Nair	17

8	Maniyani	45
9	Thiyya	75
10	Poduval	1
11	Saliya	2
12	Vaniyan	3
13	Kollan	3
14	Ptaran	4
15	Mukkuva	1
16	Moyor	3
17	Asari/Viswakarma	8
18	Kanisan	2
19	Kusavan	3
20	Moosari	3
21	Vettuvan	1
22	Vannan	15
23	Malayan	3
24	Pulaya	8
25	Kulalan	3
26	Karimbalan	4
27	Mavilan	46
28	Koppalan (cheruman)	4
29	Cheravan	4
30	Velar	1
31	Kirayan	1
32	Kurichyar(Malakkudiyan)	1
33	Hindu graveyard	3
34	Makham (Muslim)	6
35	No worship at present	27
	Total	578

**Table 12 Quantitative Change in Spatial Extent of the Groves in last 50 years**

<b>Sl.No</b>	<b>Change</b>	<b>No. of S.G. affected</b>
1	Up to 25% decrease	332
2	26 to 50 % decrease	44
3	Above 50% decrease	88
4	No change	114
	Total	578

**Table 13 Qualitative Change in Spatial Extent of the Groves in last 50 years**

<b>Sl.No</b>	<b>Change</b>	<b>No. of S.G. affected</b>
1	Vegetation improved	35
2	Vegetation impoverished	438
3	No change	105
	Total	578

**Table 14 Major threats**

<b>No.</b>	<b>Threats</b>	<b>No. of S.G. affected</b>
1	Shifting of deity	17
2	Biomass removed	56
3	Development activities (renewal of Shrine, other buildings, roads etc.)	71
4	Soil erosion	7
	Total	151

## List of Publications

### Discussion Paper Series

1. *Regional Disparities in Development in Kerala*: K. N. Nair, A. C. Dhas, R. Anandaraj & R. Sanjith (*Out of print*)
2. *Decentralisation in Kerala: A Note*: K. Nagaraj (*Out of print*)
3. *Environmental Factors of Malaria Persistence: A study at Valiyathura, Thiruvananthapuram City*: S. Rema Devi & S. Dass
4. *Technological Change in Kerala Industry: Lessons from Coir Yarn Spinning*: K. T. Rammohan
5. *Development of Women in Rural Areas: A Study of DWCRA in Thrissur District*: U. T. Damayanthi
6. *Inland Fishermen and Inland Fishing: A Study in Neelamperoor Village (Alappuzha District)*: R. V. Jose
7. *Educational Development at Micro Level: Case study of two villages in Kerala*: A. Abdul Salim
8. *Performance Evaluation of Krishi Bhavan Set-up in Kerala*: Jinraj P. V
9. *Employment of Women in the Garment Industry*: Sheela Varghese
10. *Health Transition in Kerala*: P. G. K. Panikar
11. *Causes and Consequences of Change in Cropping Pattern: A Location-specific Study*: R. Mahesh
12. *Awareness and Utilisation of Educational Development Schemes by Tribesfolk of Wayanad, Kerala*: C. Krishnan
13. *Family Counselling in Family Court: An analysis of Psycho-Social Dynamics of Families of Litigants*: Lizy James
14. *Panchayat Resource Mapping to Panchayat-level Planning in Kerala: An Analytical Study*: Srikumar Chattopadhyay, P. Krishna Kumar & K. Rajalakshmi (*Out of print*)
15. *Wetland Resources of Northern Kerala: A Case Study of Pazhayangadi and Kunhimangalam in Kannur District*: Nalini Nayak, D. Nandakumar, M. Amruth, P. Unnikrishnan, T. P. Padmanabhan
16. *People's Planning in Kerala: A Case Study of Two Village Panchayats*: N. D. Gopinathan Nair
17. *Crop Losses to Rodent Pests in Kerala: A Pre-harvest Survey in Select Crop Fields and Survey on Grain Storage Losses*: Punnen Kurian
18. *Evaluation and Planning of the Activities of a Rural Library in Kerala*: S. Gopalakrishnan Nair (late), K. Vijayakumar
19. *Pattern of helminthic infestation in primary schoolchildren of Thiruvananthapuram district*: V. Raman Kutty, C. R. Soman, K. Vijaya Kumar
20. *Changes in Health Status of Kerala: 1987-1997*: T. P. Kunhikannan, K. P. Aravindan
21. *From Decentralisation of Planning to People's Planning: Experiences of the Indian States of West Bengal and Kerala*: Charvak
22. *Building materials and builders in Kerala: Commodification of buildings and labour market dynamics*: K. N. Harilal, Mathew Andrews
23. *Distribution loss of electricity and influence of energy flows: A case study of a major section in Kerala*: P. R. Suresh, Shanavas Elachola
24. *Women's participation in rural housing schemes: A case study of Kerala*: C. S. Meenakshi, P. Ajith Kumar
25. *Solid waste management: Preparation of an action plan and establishment of an environmental information system for Thiruvananthapuram City*: Babu Ambatt
26. *Bamboo Processing Industry in Kerala: A study of an unorganised, household sector in Adimaly panchayat (Idukki district)*: Jayashankar. B

27. *Forest Degradation in Kerala - Causes and Consequences: A case study of Peechi–Vazhani area*: T. Jayanarayanan
28. *Performance of Anganwadi Centres in Kerala: An evaluation and experiment to develop a model centre with community participation*: T. N. Seema
29. *Watershed Development: Reflections on recent developments*: Prof. A. Vaidyanathan
30. *Women in Agriculture: An evaluation of the Central scheme in Palakkad district (Kerala)*: B. Sreekumar, Beena. R, Ajithkumar G. S
31. *Minor Water Bodies in Kottayam Municipality Area: A bio-ecological study*: Susy Abraham
32. *Sub-Marginal Rubber Cultivators: A study of livelihood issues of beneficiaries of ‘Rubber to the Poor’ project of Malanad Development Society, Kanjirappally*: P. K. Kurien
33. *Economic Viability of an Integrated and Sustainable Resource Use Model for Kuttanad*: P. G. Padmanabhan, N. C. Narayanan, K. G. Padmakumar
34. *The Quality of Life of Low-income Groups: A micro-level study*: P. Krishnakumar
35. *Prevalence of Malnutrition among Adolescent Girls: A case study in Kalliyoor panchayat, Thiruvananthapuram*: M. Raheena Beegum
36. *Beneficiary Participation in Irrigation Water Management: The Kerala experience*: C. J. Joseph
37. *Biodiversity Conservation and Livelihood Issues of Tribesfolk: A case study of Periyar Tiger Reserve*: Arun L. K, Jayasankar B, Kurian Mathew Abraham
38. *Self-Help Groups in Empowering Women: Case study of selected SHGs and NHGs*: Jaya S. Anand
39. *Diarrhoea Morbidity among Under-five Children: A comparative study of two villages*: K. R. Thankappan
40. *Women in Local Bodies*: S. Radha, Bulu Roy Chowdhury
41. *Iodine Deficiency Disorders in Schoolchildren in Kannur District*: T. Jayakrishnan, M. C. Jeeja
42. *Education, Employment, and Job Preference of Women in Kerala: A micro-level case study*: Lakshmy Devi K. R
43. *The Lure of Prawn Culture and the Waning Culture of Rice-Fish Farming: A case study from north Kerala wetlands*: K. N. Nair, Vineetha Menon, R. Mahesh
44. *Labour Mobility in the Small-scale Fisheries Sector of Kerala*: J. B. Rajan
45. *Residual illiteracy in a Coastal Village: Poovar Village of Thiruvananthapuram district*: M. K. George, Doni J
46. *Micro-level Planning for Sustainable Land and Water Management: Bharathamala-Vattakkotta Watershed*: P. K. Suresh Kumar
47. *Dalitha Sthreekalude Samoohika-Sambathika Padavi: Oru padhanam*: [Malayalam] Achamma John
48. *Labour Mobility in Rural Areas: A village-level study*: R. Mahesh
49. *Public Housing Schemes for Rural Poor in Kerala: A critical study of their suitability*: G. Gopikkuttan
50. *Environmental Quality and Health in Nattakom Panchayat*: N. Valsalakumar
51. *Destitute Women in Kerala: Psychological resources and psycho-social needs*: M. S. Razeena Padmam
52. *Rape Victims in Kerala*: Usha Venkitakrishnan, Sunil George Kurien
53. *Constraints on Women Entrepreneurship Development in Kerala: An analysis of familial, social, and psychological dimensions*: Nirmala Karuna D’Cruz
54. *Crop Insurance Scheme: A case study of banana farmers in Wayanad district*: Manojkumar K., Sreekumar B, Ajithkumar G. S
55. *Domestic Violence Against Women in Ernakulam District*: Celine Sunny
56. *Water Quality and Health Status in Kollam Municipality*: M. K.P. Roy
57. *Why Low Birth Weight (LBW) is Still a Problem in Kerala: A preliminary exploration*: V. Raman Kutty
58. *The Teaching of English in the Government/Aided Primary Schools in Kerala under DPEP*: Sreedevi K. Nair

59. *Constraints on Diffusion and Adoption of Agro-mechanical Technology in Rice Cultivation in Kerala*: Balachandran Pillai. G
60. *Public Participation and sustainability of Community Assets Created under the People's Planning Programme in Kerala: Selected case studies*: N.D. Gopinathan Nair, P. Krishnakumar
61. *An Overview of 1961 Village Survey Monographs and Other Village Studies in Andhra Pradesh: A Status Paper on Village Surveys in Andhra Pradesh*: D. Narasimha Reddy
62. *Biological Diversity of Kerala: A survey of Kalliasseri panchayat, Kannur district*: T. P. Sreedharan
63. *Morbidity Study - Incidence, Prevalence, Consequences, and Associates*: P. Krishnaswami
64. *Household Cost of School Education*: N. Gopalakrishnan Nair
65. *Social Security and Labour Welfare with Special Reference to Construction Workers in Kerala*: C. P. John
66. *Withering Valli: Alienation, degradation, and enslavement of tribal women in Attappady*: Mariamma J Kalathil
67. *Opportunities for Higher Education: An enquiry into entry barriers*: A. Abdul Salim
68. *Study of Decision-Making Process in Selected Panchayats and Municipalities under the People's Planning Programme*: Padma Ramachandran
69. *Forest-Agriculture Linkage and its Implications for Forest Management: A Study of Delampady Panchayat, Kasaragod District, Kerala*: Amruth M
70. *Mobilisation of resources by local bodies – Potential and feasibilities (A case study of six selected Panchayats in Kerala)*: R. P. Nair
71. *Opportunities for Higher Education: An enquiry into entry barriers*: A. Abdul Salim
72. *Location-specific Environmental Education Input for Upper Primary Schools: A study conducted in the Sreekrishnapuram area of Palakkad district*: Anitha S
73. *Measurement of Employment, Unemployment, and Underemployment*: N. Gopalakrishnan Nair
74. *Artisanal Deep-sea Fishing in Kerala: Prospects and problems*: Titto D' Cruz S
75. *Service Area Approach and Utilisation of Bank Credit in Kerala – A case study of Kannur district*: T. K. Devarajan
76. *Bibliography of Village and Town Studies of Tamil Nadu: A status paper on village surveys in Tamil Nadu*: K. Nagaraj, Rukmini
77. *Costs of Schooling in Kerala: A study of private and institutional costs under different types of management*: Sambhu Nampoothiri N
78. *Rural Libraries of Kerala*: K. S. Ranjith
79. *Informal Sector: Seedbed of industrial entrepreneurship*: Martin Patric
80. *Materia Medica of the Local Health Traditions of Payyannur*: Unnikrishnan E
81. *Changes in the Mode of Labour Due to Shift in the Land Use Pattern*: Omana Cheriyan
82. *Future in the Past: A study on the status of organic farming in Kerala and its viability as a model for sustainable development*: Balachandran V
83. *Small Coffee Growers of Sulthan Bathery, Wayanad*: C. V. Joy
84. *Private Cost of Medical and Para-Medical Education in Kerala*: N. Ajith Kumar
85. *Women Workers in Agriculture: Gender, discrimination, working conditions and health status*: C. U. Thresia
86. *Domestic Violence against Women in Kerala*: Pradeep Kumar Panda
87. *Health-promoting Behaviour in Muthalamada Panchayat, Palakkad District*: C. K. Brahmaphuthran
88. *Women Nurses and the Notion of Their "Empowerment"*: Binumol Abraham
89. *Trade Associations in Kerala: Their functioning and implications*: S. Muraleedharan
90. *Motivating Factors of the Educated Self Employed In Kerala - A case study of Mulanthuruthy Block in Ernakulam district*: Reji Raman
91. *The Economic and Social Effect of a Disabled Child on the Family*: M. Kandamuthan