

FORESTRY IN KERALA : YESTERDAY, TODAY AND TOMORROW

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"Nature care is the supreme form of workshop"

Introduction

The State of Kerala, 'God's own land,' lies in the South-West corner of the Indian subcontinent between 8° 18' and 12° 48' North latitudes and 74° 52' and 77° 22' East longitudes. It is bounded in the East by Western Ghats and in the West by the Arabian Sea. It enjoys 580 km of length of coastal line which runs to almost entire length of the State. The width of the State ranges from 30 - 130 km. Total geographical area of the State is 38,863 km². which is 1.2% of the geographical area of India.

The population of Kerala is 30.05 million with a population density of 749/km². This makes Kerala the second most densely populated State in India. Literacy rate of 91%, life expectancy of 69 years for men and 72 years for women are also ranked among the highest in India. Probably, Kerala is the only State in India where the population growth is heading towards stabilization. Physical Quality of Life Index (PQLI) and Human Development Index are almost at par with developed countries in the world.

The climate of Kerala is tropical monsoonal. Most of the rainfall is received between May-November. The State is also blessed with North-East monsoon. The diversity of physical features within the

State results in corresponding variations in the climate. The annual rainfall ranges from 1,500 mm to 4,500 mm. Temperature ranges from 20°-30°C. The climate of Kerala is always salubrious without major extremes. The soils are predominantly lateritic and best suited for dollar earning plantation crops.

The gross and net incomes of the State are roughly Rs. 180 billions and Rs. 160 billion per year respectively. Six per cent of the GNP is contributed by foreign remittance of Keralites working overseas. Agriculture provides for approximately 30% of the State income. Over 90% of the land holdings are less than one hectare in size (per capita cultivated land is 0.10 ha). Agriculture is dominated by Dollar earning perennial cash crops like Rubber, Coconut, Arecanut, Pepper, Cardamom, Cashew etc. On an average forestry sector contributes Rs. 75 crores a year. Vast stretch of coastal belt and backwaters are famous for aquaculture. With the blessings of mother nature and industrious people, Kerala is one of the most prosperous States of India.

Forests of Kerala before Independence: Our painful yesterdays

Probably till the end of the 18th century almost entire stretch of Kerala might have been covered with lush green thick forests

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and the early inhabitants might have enjoyed the peaceful life of abundance in the sea coasts and on the banks of major rivers. The timber extraction was only to meet domestic needs. With the increase of population, advancement of civilisation and ever increasing demands of British regime, the forests of Kerala were opened up during the first half of 19th century. During later half of 19th century, Maharajas of Travancore and Cochin in South and Central Kerala and British in Malabar, leased out vast stretch of forest land for commercial crops like Tea, Coffee, Cardamom and Rubber cultivation. The real depletion commenced from here and continued unabated till 1980. From 1940 to 1950, at the end of the Second World War, there was acute shortage of food grains. As usual, survival of people had an upper hand over the survival of forests. Large extent of forests including hill ranges supporting climax forest were leased out for 'grow more food programme'. This land never came back to the Department and paved way for large scale encroachments into reserve forests. Till October 1956, State had lost roughly 25,600 ha prime forest land for 'grow more food programme', regularisation of encroachments, hydroelectric projects and for raising cash crops. From 1956 till date State has again lost another 1,48,300 ha forest land for similar purposes. These facts are really hard to believe but true. Thanks to Forest Conservation Act, 1980 and heroic attempts of environmental pressure groups operating from within and outside Kerala, the present loss of forest area is hardly 5-10% of the loss suffered during 1950-1980. This is a welcome change!

Scenario after Independence: Our challenging todays

The Western Ghats, one of the 18 hot

spots of biodiversity conservation in the world, cover roughly 56% of the State's geographical area. Approximately 40% of the forest area of Western Ghats, which stretches from river Tapti in Maharashtra to Kanyakumari in Kerala, falls in Kerala. Out of the 4,000 flowering plants recorded in Western Ghats, approximately 3,800 are found in Kerala.

The total forest area of the State is 11,287 km² which is classified as under :

Natural Forests	7,870 km ²
Plantations	1,530 km ²
Vested forests and area leased out to other agencies	1,887 km ²
Total	11,287 km ²

Natural Forests

Natural Forests of Kerala are broadly classified into following types :

Southern Tropical Wet Evergreen and Semi-Evergreen Forests : These two forests types put together cover an area of roughly 3,470 km². These types of forest are characterised by bewildering multiplicity of vegetational forms. Right from 19th century, these forests are under various stages of degradation under the influence of biotic pressure.

The silvicultural system followed till 1980 was selection felling. The lowest girth limit was generally 180 cm at breast height and the felling cycle was usually 30 years. Total number of trees to be removed from one hectare was usually 8-12. For various reasons, these scientific norms could not be followed strictly.

Southern Tropical Moist Deciduous Forests : This forest type covers an area of 4,100 km². This forest type was the worst hit during

later half of 19th and first half of 20th century. During this period, roughly 1,25,000 ha of these forests were either converted into plantation like Teak or farmland for 'grow more food programme'.

These forests support large number of economically important hardwood species like *Dalbergia latifolia*, *Tectona grandis*, *Pterocarpus marsupium*, *Terminalia tomentosa*, *Terminalia paniculata*, *Lagerstroemia lanceolata* etc.

Tropical Dry Deciduous Forests : These forests cover an area of roughly 94 km², confined to the dry localities in the leeward side of the Western Ghats such as Walayar and Anjanad valleys. Anjanad valley supports the Sandal forest of Kerala over an area of 15 km². This Sandal population is rated as one among the best in the world.

Montane Sub-tropical Forests (Temperate Sholas and Grass lands) : These forests cover an area of 188 km². Much of these forests have been cleared during later half of 19th century for Tea, Coffee and Cardamom cultivations. A major portion of the grassland occurring at higher elevation was also planted up with *Eucalyptus* during the later half of 20th century.

Natural forests of Kerala are very rich in biodiversity and they are to be handed over to successive generations with little or no damage. But right from first half of 18th century this biological treasure is either looted to meet out greed or over exploited to meet out needs. A country wide survey conducted by FSI around 1990 reveals that regeneration is either absent or inadequate in more than 50% of natural forests of India. Kerala is not an exception. However, in Independent India, Kerala has initiated following drastic, heroic measures to check

further degradation of these precious tropical forest ecosystems :

- Under section 61A of Kerala Forest Act (1961) Divisional Forest Officers were given quasi-judicial powers to confiscate the timber and vehicle involved in smuggling of timber, ivory, charcoal and firewood. With this, major problems of organised smuggling of valuable forest produces could be controlled effectively.
- Private forests were nationalised through Kerala Private Forests (Vesting and Assignment) Act of 1971. Around 1880 km² of private forest was brought under State for scientific management. Though it opened a Pandora's box in terms of unending litigations, a large chunk of private forest could be saved from wanton destruction.
- Complete ban on diversion of forest land for non-forestry purposes, without the permission of Government of India from 1980. Really a big sigh of relief!
- Clear felling of Natural forests has been completely banned from 1981 onwards but selection felling continued till 1987. From 1987 selection felling has also been banned. Now only dead and wind fallen trees are extracted with caution wherever it is economical.
- The Kerala Preservation of Trees Act was enacted in 1986 to stop the over exploitation of certain important timber species standing in private holdings and also to check the wanton destruction of ecologically sensitive forest areas notified under the act.
- Salvage felling of trees standing in the encroached forest land was banned during 1988.
- During 1988 forest stations were started in the lines of Police Stations, the first time in India, to strengthen the hands

of front line staff involved in forest protection. Today, there are 88 forest stations all over the State covering 11 major Forest Divisions of the State. State has also introduced Personal Accident Insurance Scheme covering all the Forest Department staff. The premia are paid by the Government.

- Afforestation of high elevation grass land has been stopped from 1989.
- Afforestation activities around 4 km radius of high elevation Shola ecosystems was stopped from 1990 onwards.
- Reserve Forest boundaries were consolidated using permanent structure called cairns and by stone walls to prevent encroachments, the well armed staunch enemy of Kerala forests. In the last 15 years, under various schemes, State has consolidated roughly 7,750 km of reserve forest boundary at a total cost of Rs.9.25 crores. Really a gigantic task! The effort has yielded enviable results. The encroachments are very much under control.
- Over the years, 28 committed Non Governmental Organisations (NGOs) working in the State have played a crucial role in the conservation and eco-restoration of various forest ecosystems under the threat of extinction. "Silent Valley" movement was one among them. The saga is on.
- Under Western Ghat Development Programme, State has taken up an innovative scheme of Profuse Mixed Seeding. The scheme aims at regeneration of degraded natural forests by broadcasting seeds of native species followed by protection from biotic agents. So far, State has tackled 9,900 ha of such degraded natural forest at a total cost of Rs. 8.25 crores spread over ten years commencing from 1985. This

attempt has proved beyond doubt that given protection from biotic pressure, degraded natural forest can come back to normal.

Protected Area Network and Wildlife Conservation

The destruction of wildlife all over India was started by Mughals and a new dimension was added to this when the British came to India with their guns and saws. Kerala is not an exception to this. After Independence, the State has lost considerable extent of prime forests which are natural homes of varieties of fauna species. The destruction of wildlife as well as their habitat continued unabated till 1970s. With the promulgation of Wildlife Protection Act, 1972, launch of Project Tiger during 1972, Forest Conservation Act during 1980 and also due to scores of other conservation measures taken by the State, the remaining wildlife habitats, probably some of the best in the world, got excellent protection. At present, the State really enjoys a unique position in the field of wildlife conservation. The protection given by the Acts, complex topography of Western Ghats, high rainfall and fertile soil giving rise to varieties of wildlife habitats, relative inaccessibility of the tract, highly conservation conscious society have made Kerala a comfortable place for peaceful co-existence of man and animal. Today 101 mammalian species belonging to 73 genera, more than 150 species of reptiles, 26 species of hill stream fishes, 111 amphibians, 476 species of birds, varieties of insects and innumerable number of micro fauna are flourishing in Kerala.

After Independence, Kerala has created 12 Wildlife Sanctuaries, two National Parks to conserve and restore the wildlife and

their natural habitats. The total area under Protected Area Network in the State is 2,324 km². In addition to this 1,455 km² of Niligiri Biosphere Reserve set up during 1986 also falls in Kerala. Agasthyvanam Biological Park established by the State during 1992 adds a new dimension to the States efforts of *in-situ* and *ex-situ* conservation of endemic and endangered faunal and floral species of Kerala. Roughly 20.60% of the total forest area of the State is under Protected Area Network against the national average of 18.30%.

The Wildlife Sanctuaries, National Parks and Biosphere Reserve of Kerala enjoy certain unique positions in world. For example, Eravikulam National Park hosts the largest viable population of Niligiri Tahr in the world, which is endemic only to Western Ghats. Periyar Wildlife Sanctuary which attracts people of all clans, colour and creeds from all over the world, is the most ideal habitat for Asiatic Elephants and the only sanctuary in India where Elephants can be observed and photographed at close quarters from the safety of a boat.

Agreed, forests of Kerala are to be preserved for their Biodiversity and for other intangible benefits which cannot be measured in terms of money. Simultaneously, it is not possible to stop a hungry man from cooking his food and also from construction of hut for his shelter. These are his biological needs. For him Biodiversity, Ecosystems, Sustainable Development, Rio Conference, Intellectual Property Rights, Forest Policies, etc. mean nothing. For him the survival comes first.

With so much of restriction on felling in the Natural Forests, National Parks, Wildlife Sanctuaries and Biosphere Reserve,

the State has gone in for plantation forestry to meet the requirement of common man as well wood based industries operating in Kerala.

Plantation Forestry

Plantation Forestry in Kerala is more than 150 years old. The first Teak plantations in the world were raised in Kerala way back in 1842 at Nilambur. Since then, the State has raised plantations of more than 30 species covering an area of roughly 1,55,920 ha to put the scarce forest resource to best use and also to reduce the ever increasing pressure on prime natural forests.

Out of the 1,55,920 ha under plantation crops, 75,320 ha is under Teak, 35,180 ha under mixed plantations, 28,900 ha under *Eucalyptus*, 3,800 ha under Wattle, 4,500 ha under Cashew and balance area is under varieties of other species. Majority of these plantations were raised during second half of 20th century.

Teak covers almost half the area under plantation crops. About 86% of the Teak plantations are under site quality II and III. Around 48,000 ha Teak plantations are in the age group of 10-30 years (raised after Independence). The Mean Annual Increment (MAI) of standing crop is 2.4 m³/ha at 60 years rotation. Whereas, all India average for site quality I is 4.968 m³/ha at 60 years. The low productivity is due to degraded second/third rotation soil, coupled with poor quality planting stock and aftercare. There is a yawning gap between the expected yield and actual yield, indicating tremendous scope for improvement in the coming years. State plants on an average 1,000 ha of Teak every year. Realising the importance of quality

planting stock and aftercare, State has decided to raise minimum of 2,000 ha quality Teak plantations in the coming 4 years using quality nursery stock, required inputs and aftercare. Two modern central nurseries have already been established and during 1999 planting season 100 ha of Teak plantations will be raised using root trainer seedlings. Really a challenging experiment over more than 100 years old stump planting technique!

Another major plantation crop of Kerala is *Eucalyptus*. At lower elevation of upto 600 m MSL, *Eucalyptus tereticornis*, from 600-1,500 m MSL, *Eucalyptus grandis* and at the elevation of more than 1,500 m MSL, *Eucalyptus globulus* are raised. A total of 28,900 ha of State forest land is under *Eucalyptus*. State supplies *Eucalyptus* wood to Hindustan Newsprint Limited and M/s Gwalior Rayons for the production of newsprint pulp and high quality rayon.

For a seedling crop of *Eucalyptus* the MAI is 7.65 m³/ha at 8 years rotation. Whereas, the potential yield could be in the range of 18 m³/ha at 8 years rotations. State has ambitious plans of increasing the yield of *Eucalyptus* at least two fold by clonal forestry. High yielding clones suitable for the State have already been developed and propagations structures like mist chambers have also been built during 1998. State is fully geared for raising roughly 3,500 ha of clonal *Eucalyptus* plantation by 2001 AD.

Roughly 1,56,00 ha of prime tropical forest land is under production forestry. Unless the Department functions like a private enterprise to increase the productivity of forest plantations, there is no salvation. This will be the real challenge for the Department in the coming few years.

Financial support to the sector: Where are we in Independent India?

Forestry sector is starved of financial resources all throughout. Figures available indicate that an abysmal low percentage of 1.5% of the State's annual budget comes to forestry sector. During 1983-84 forest sector received an allotment Rs. 1,670 lakhs which gradually increased to Rs. 9,230 lakhs during 1995-96. Really an interesting trend, which indicates that, in the corridors of power foresters are being heard. Still, for the effective management of ecologically important tropical forest ecosystems and plantations of Kerala we need large extent of financial resources in the coming years. Probably a distant dream!

What we have today

The total growing stock in the forest of Kerala is estimated at little over 200 million m³. Of the total growing stock, more than 60% is from evergreen and semi-evergreen forests, about 35% from moist deciduous forests and 3-4% from plantations. Though the figures are impressive for natural forests, the volume actually available would be much smaller due to ban on various kinds of operations in the natural forests and Protected Area Networks which cover than 20% of natural forest area of Kerala.

Interestingly, a latest estimate indicate that roughly 100-130 million m³ of growing stock is available in the homesteads of Kerala. Out of this about 30% constitutes commercial timber and balance 70% fuelwood. Today, roughly 50% of the timber requirement and 90% of the fuelwood requirement of the State is met from the growing stock available in the homesteads of Kerala. Probably, Kerala is the only State in India where the forestry sector is getting

so much support from homestead forestry in meeting the timber and fuelwood requirement of the State, leading to sustainable management of biodiversity rich natural forests.

What did our forests give in the last few decades?

On an average, the State produces 46,000 m² of timber, 6,50,000 of Teak poles of various classes, 18,000 MT of firewood for domestic consumption, 40,000-50,000 MT of Bamboos, 80,000-1,00,000 MT of reeds for pulp, rayon and other small scale industries every year.

The State also produces roughly 1,200 MT of non-wood forest products like Ayurvedic herbs, nuts, spices, fibres, gum, fodder, vegetable oil seeds, honey, wax, etc. valued at roughly Rs. 20 million/year.

With all restriction on felling, forests of Kerala still earn an average revenue of Rs. 75 crores per year, in accordance with principles of sustainable management.

Where do we go from here? Our hopeful tomorrows

In line with international forestry scenarios and guidelines contained in National Forest Policy 1988, the vision of the Kerala Forest Department for the 21st century shall be :

- To protect and manage the biodiversity rich natural forests for their sustainable ecological functions to be enjoyed both by the present and future generations.
 - To increase the productivity of the natural forests and forest plantations to meet the needs of society on sustainable basis.
 - To improve the standard of living of the forest dependent tribals and village communities.
 - To strengthen the homestead forestry so that the pressure on natural forests could be reduced.
- To accomplish the above visions the State will be adopting the following management strategies in the coming years :
- Complete inventory of forest resources, computerised database and forest management information systems for an effective planning and decision making.
 - Eco-preservation and eco-restoration of degraded natural forests leading to conservation of biodiversity and production of goods and services on sustainable basis for the present and future generations.
 - The productivity of forest plantations will be improved by adopting new improved nursery and planting technologies, by using genetically improved planting stock and by providing adequate inputs and aftercare.
 - Homestead forestry will be further strengthened by providing required financial, technical and legal support.
 - Productivity of Non-Wood Forest Products (NWFP) will be increased through scientific methods of regeneration, harvesting, processing and value addition.
 - Private sector will be encouraged to invest in Forestry sector.
 - Capacity building in the areas of Research & Development and Human Resource Development.
 - Total Forest Management (TFM) involving all the related Government

departments like Agriculture, Tourism, Animal Husbandry, Soil Conservation, Rural Development, NGOs, local bodies and other stake holders.

Unlike in other States, where population growth is eating into all vital progress made by the Forest Department, in Kerala, population growth is heading towards stabilisation. Hence in coming years the pressure on natural resources like forest is likely to come down drastically. Luckily, homesteads of Kerala are supplying 50% of timber and 90% of fuelwood requirements of the State. A 180 degree turn around in

comparison to other States! To top all these, highly literate society of Kerala is conservation conscious to the core. With all these, we see a new dawn in the Western Ghats of Kerala with millions of silver rays. Our future is bright!

As a nation
We have only two options :
Peaceful co-existence with nature
and flourish
or
painful co-destruction and perish
"Choice is ours"

SUMMARY

Kerala is one of the most prosperous States of India. Its natural forests are very rich in biodiversity. It is the only State in India where the forestry sector is getting so much support from homestead forestry in meeting the timber and fuelwood requirement of the State, leading to sustainable management of biodiversity rich natural forests.

केरल में वानिकी : अतीत, वर्तमान और भविष्य

के० सशिधरन् नायर व नागेश प्रभु

सारांश

केरल भारत के अतिसमृद्ध राज्यों में से एक है। उसके प्राकृतिक वन जैवविविधता में अतिसम्पन्न हैं। यह भारत का एकमात्र ऐसा देश है जहाँ वानिकी क्षेत्र को राज्य की प्रकाष्ठ और ईंधन की जरूरतें पूरी करने में घरेलू वानिकी की बहुत अधिक सहायता मिलती है जिसकी वजह से जैवविविधता संपन्न प्राकृतिक वनों का सतत रूप से प्रबंध करना संभव हो पा रहा है।

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