Forest-Agriculture Linkage and its Implications on Forest Management: A study of Delampady *panchayat*, Kasaragod district, Kerala

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1. Emerging Trends in Forest Conservation: Background of the Study

A perusal of the trajectories of changes in access over the forest resources base and of the associated larger political processes would provide insights for planning governmental interventions for conservation. This case-study focuses on the present-day forest users in Kasargod and tries to trace the history of the forest resource use. The attempt is to explicate the relationship between land administration and forest resource use.

Background of the study

Sustainable utilisation of local resources is a prerequisite to poverty alleviation and sustainable development. The fact that the majority of natural resources are open access resources makes it difficult to realise this goal. Today concern for forest conservation and judicious use of biological resources is shared at the global level. Over the past five decades a number of management prescriptions were put forward to address these issues. Nevertheless, little headway has been made in slowing the pace of resource depletion. The case of tropical forests exemplifies this fact.

One of the dominant paradigms in the management of natural resources is the tragedy of commons paradigm. Decades of research and deliberations by a number of scholars of various academic disciplines have thrown light over the norms and the strategies for conservation of resource required for sustainable management.

Communities living in and near forests depend on them for subsistence and income generation. In general, tropical forests are the source of fuel wood, fodder, food, building materials

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and a number of marketable Non-Wood Forest Products (NWFPs). Lack of clearly spelled out property rights and incentives has resulted in over-exploitation of the resource base. The woody components of homestead agro-forestry systems satisfy the requirement of forest biomass to certain extent. The impact of absorption of farmers and traditional communities into the forests by providing them property rights and responsibilities is also looked into.

The Kerala part of the Western Ghats represents a spectrum of latitudinal and altitudinal gradients and resulting climatic and ecological situations. As a result, forests in this part of the Western Ghats are important as habitats of many endemic and rare biota. But, growth of infrastructure and population density has accelerated the pace of deforestation and qualitative degradation of forests. Natural vegetation cover of Kerala decreased from 44 to 17 percent during 1900-73 period. Besides the considerable decrease in the area of forestland due to diversion into non-forest uses in recent decades, serious qualitative degradation of forests is also observed. Forest degradation is because of various anthropogenic activities mainly due to biomass removal for a variety of purposes by several agencies.

To a great extent forests of Kerala have survived large scale conversion for non forestry uses, especially in the past two decades, thanks to change in policies that declared a ban over clear-felling and selection - felling in the natural forests. A number of wildlife sanctuaries were declared, plantation operations in protected areas were banned and the idea of participatory management of forests was recognised as an alternative strategy for managing and restoring degraded forests. However, qualitative degradation of forests continues.

Objectives of the Study

The objectives of the study are the following:

1. To find out the interaction between non-forest land uses and forest land uses and its impact on land resources and labour
2. To trace the evolution of forest dependency and to identify the key players and the policies involved in the process.
3. To inquire into the possibility of alternative strategies for reducing the pressure on the forestlands.

Conceptual framework

Dependence of a people on forests for biomass is decided by various factors. Since accessibility to green manure in the forests is not controlled by strict boundaries and allocation rules, the extent and mode of biomass extraction is a function of availability, requirement and cost of procurement. Green manure requirements of a farmer depend upon the crop he cultivates and the extent of the area cultivated. The extent of dependency will be measured based on the approximate quantities of green manure per unit land obtained from the forest through own labour or from other sources. Changes in species chosen also will be taken into consideration.

Methods

The main sources of information on the earlier systems of resource use were the literature produced during the colonial period and its interpretations and analyses. A household survey using a pre-tested questionnaire was conducted in the forest-fringing locality. Discussions and interviews were conducted with officials and people who were found capable of throwing light in to the local history and past system of resource use.

Study area

Kasargod district, chosen for the study, has a total area of 1961 sq. km and comprises two taluks; Kasargod and Hosdurg. According to the 1981 census, the district had a population of 8,29,604 individuals. The total urban area constitutes less than one percent of the total area and the urban population comes to nearly five percent of the total population of the district[1] . The district is predominantly rural.

The agricultural landscape of the Kasargod district is strikingly different from that of the other districts of Kerala. The most striking departure of the district from the state average is that of the extent of forestland. Only 2.87 percent of the total geographical area of the district is under forests as opposed to 27.83 percent of the state. The proportions of area under cultivable, waste, barren and uncultivable land are higher in the district than in the state as a whole.

Table 1.1 Classification of Area by Land Use: Kasargod and Kerala; 1987-88

Categories	Area (in hectares)		Percentage to total area	
	Kasargod	Kerala	Kasargod	Kerala
Total geographical area	196133	3885497		
Forest	5525	1081509	2.87	27.83
Land put to non agricultural uses	14823	248802	7.56	7.33
Barren and uncultivable land	13634	72491	6.95	1.86
Permanent pastures and other grazing land	235	3089	0.12	0.08
Land under miscellaneous tree crops (not included in net area)	4166	40606	2.12	1.05
Cultivable waste	19851	115342	10.12	2.97
Fallow other than current fallow	1348	28779	0.69	0.74
Current fallow	1794	47605	00.91	1.23
Net area sown	134657	2211274	68.66	56.91
Area sown more than once	241	688581	0.12	17.72
Total cropped area	134898	2899855	68.78	74.63

From: Statistics since Independence, Dept. of Economics ad Statistics, GOK (1998)

District-wise details of the area under cultivable wastelands for the year 1987-88 are provided in Table 1.2. Kasargod comes third in the total extent of cultivable wastelands among the districts in the state. In terms of the proportion of cultivable waste, Kasargod tops the list.

Table 1.2 District-Wise Distribution of Area under Cultivable Wasteland 1987-88

District	Area under cultivable waste land (in hectares)	Percentage to total cultivable wasteland in the state	Percentage to the geographical area of the districts
Thiruvananthapuram	1704	1.48	0.78
Kollam	648	0.56	0.26
Pathanamthitta	476	0.41	0.18
Alappuzha	2311	2.00	1.70
Kottayam	1139	0.99	0.52
Idukki	28870	25.03	5.61
Ernakulam	4571	3.96	1.94
Thrissur	4528	3.92	1.51
Palakkad	23883	20.71	5.44
Malappuram	13444	11.66	3.70
Kozhikode	2384	2.07	1.02
Wayanad	5605	4.86	2.64
Kannur	5928	5.14	2.00
Kasargod	19851	17.21	10.12
State total	115342	100.00	2.97

From Statistics since Independence, Dept. of Economics and Statistics, GOK (1998)

Data on the district-wise distribution of barren and uncultivable land also show that Kasargod has the maximum proportion (Table 1.3).

Tulu and *Kannada* are the main languages spoken in the South Canara district. A number of dialects are also spoken there. *Tulu*-speaking communities identify themselves as a district group different from the *Kannadikas*. The extent of *Tulu*-speaking areas can be traced from various colonial texts[3]. When states were reconstituted on linguistic basis on 1 November 1956, the area under the old Kasargod taluk (which included the present Hosdurg taluk also) was separated from south Canara and made a part of the newly constituted Kerala state (Kasargod and Hosdurg taluks were merged to constitute the present-day Kasargod District in 1984). The remaining portion was transferred to the Karnataka state. Ecological features of these areas were part of a continuum. The major crops include rice, areca, cashew, coconut and rubber. *Tulu, Malayalam, Kannada, Marathi,*

Konkani, and *Hindustani* are spoken in Kasargod. A mix of caste and religious groups is present. Hinduism, Christianity, Islam and Jainism are prevalent.

Table 1.3 District-Wise Distribution of Barren and Uncultivable Land (1987-88)

District	Area under Barren and uncultivable land (in hectares)	Percentage to total are under uncultivable land in the state	Percentage to the geographical area of the districts
Thiruvananthapuram	1721	2.37	0.79
Kollam	670	0.93	0.27
Pathanamthitta	830	1.15	0.31
Alappuzha	341	0.47	0.25
Kottayam	2217	3.06	1.01
Idukki	17200	23.73	3.34
Ernakulam	1858	2.66	0.79
Thrissur	1706	2.35	0.57
Palakkad	11971	16.41	2.73
Malappuram	6340	8.75	1.75
Kozhikode	2020	2.79	0.87
Wayanad	1853	2.56	0.87
Kannur	10130	13.97	3.41
Kasargod	13634	18.80	6.95
State total	72491	100.00	1.87

From: Statistics since Independence, Dept. of Economics ad Statistics, GOK (1998)

As regards District-wise distribution of forestland[2] , with a percentage of 0.52 Kasagod is at the bottom of the list.

Language, religion, and caste help construct a very interesting combination of identities here. Vasudevan (1998)[4] observed thus.

"While the same language is spoken by the members of different communities, in some cases the same community speaks different languages. As for example, a section of Brahmins (shivalli) Bunts and Billavas and most of the lower strata of the Hindu society, Protestants among Christianity and Jains speak *Tulu*. Whereas the *Konkani* speaking population is mainly Gowda Saraswath Brahmins, Catholic Christians and a small section among Muslims called Navayats (Bhatkalis) also speak Konkani. Among Brahmins, there are groups who speak Malayalam, Kannada, and Tulu. Most Muslims, except a few who speak *Hindustani*, speak *Malayalam*."[5]

Koragas, Kudiyas and Maratis are the three ethnic communities (Scheduled as Tribes) in

the Kasargod district. All these three tribes are present in the *Dakshina Kannada* also.

Table 1.4 District-wise Distribution of Forests (1987-'88)

Districts	Area under forests (in hectares)	Percentage to total	Percentage to the geographical area of the districts
Thiruvananthapuram	49861	4.61	22.81
Kollam	81438	7.53	32.34
Pathanamthitta	155214	14.35	57.75
Alappuzha	-	-	-
Kottayam	8141	0.75	3.71
Idukki	260907	24.12	50.67
Ernakulam	8123	0.75	3.45
Thrissur	103619	9.58	34.61
Palakkad	136257	12.60	31.04
Malappuram	103417	9.56	28.47
Kozhikode	41368	3.83	17.74
Wayanad	78787	7.29	37.04
Kannur	48734	4.51	16.42
Kasargod	5625	0.52	2.87
State total	1081509	100	27.83

From: Statistics since Independence, Department of Economics and Statistics, GOK (1998)

Home gardens

Home gardens are a unique feature of Kerala farms. Farmers in this state practise mixedcropping – mixing cash and food crops along with woody perennial species on the same land. Tenure status of the holding and a variety of socioeconomic factors influence the species composition of the home garden. In most cases, a tendency is observed to tilt the species composition in favour of cash crops such as areca nut, and pepper. The productivity of these home gardens depends mainly on green manure inputs. The home gardens of forest-fringing settlements in Kerala depend on the forests for various inputs such as green manure, fodder, fuel wood and poles. Biomass extraction over a long period has resulted in the degradation of forests.

The study area is located in the Delampady panchayat in the Kasargod district. The locality falls under the highlands of the Western Ghats mountain chain. The area gets water from Payaswini, one of the major tributaries of Chandragiri River. The terrain is characteristically of deep valleys, steep slopes and mesa hills. The slopes are cultivated with a variety of crops such as areca, rubber, cashew, rice, pepper and coconut. Pepper, coconut, rice and

areca occupy the valley bottoms the edaphic conditions of which are the most suitable for these crops. Rubber, cashew etc. are grown on the higher slopes. The Forest Department owns most of the hilltops. Since areca and associated crops require large amounts of green manure, every landlord used to procure a part of the green manure from their home gardens till about two decades ago. This was facilitated by the presence of woody forest species in the home gardens. Locally these lands are known as '*Kumaki*' lands. But owing to various reasons, only a few patches of *kumaki* lands remain. In addition, more pressure is felt now on fragmented forests for green manure.

2. Emergence of Forest Conservancy: Historical Overview of Forest Management in Malabar and Canara[4]

Introduction

The changes that have taken place in the forest landscape and the characteristics of the population in the Malabar and Canara region during the past two centuries are overwhelming. Land for raising subtropical cash-crop plantations and trade monopoly in spices and timber were the major commercial interests in forest lands during the colonial period until 1840. The Dutch and the Portuguese were instrumental in the spread of commercial cultivation of cash crops. The initial successes of European planters in raising coffee and tea justified conversion of forestlands into plantations of cash crops. Trade right on the spices of Malabar Coast was highly coveted by most of the colonial powers. Teak came to be viewed as important resource as it was considered the most suitable timber for building mercantile and warships, a key to domination in maritime trade. There are records of large-scale extraction and trade of teak timber in the early 19th century at Alappuzha[5]. The State held monopoly over extraction of fine timber such as teak, anjily, rose wood, ebony and sandalwood.

It was the inhospitable mountainous terrain, absence of well-developed timber market and unavailability of technology that prevented large-scale forest clearance in the early years of colonisation. In the decades to follow, establishment of colonial rule, integration with global economy, demographic changes, diversion of forestland for food production and infrastructure development etc. led to large-scale transformation of forestlands in the region. Growth of infrastructure was slower in Malabar region than in the neighbouring princely states of Travancore and Kochi.[6]

Construction of large and medium scale irrigation projects, canals, installation of power transmission lines and the introduction of motorised transportation in the 1920's resulted in the expansion of road network often opening up forest areas, that had remained inaccessible not only for timber work but also for inmigration and inhabitation. Inmigrations and encroachment got a boost following the control of Malaria in 1948-50 and encouragement given to land reclamation for growing more food crops in the face of food scarcity created by the post-war conditions.

While tracing the trajectory of forestry management in Kerala, Chundamannil (1993) observes that "...forest management in Kerala can be seen as a cycle beginning with conservation in abundant forests for want of options due to market and technology limitations. The limitations were surmounted and forests were modified extensively during a long interlude and finally the return to conservation as a choice" However, it is doubtful if one can refer to the initial stage as conservation-oriented as it was just 'a compelling situation developed due to inadequate technology and market options'.

Forest Management in the Malabar and Canara: Early Colonial Experience

The provinces of Malabar and Canara were under the direct rule of the British. The region comprising the erstwhile Malabar and the South Canara Districts underwent frequent changes in political affiliations[7] which presented complex issues such as land settlement during the British rule. In the absence of trained manpower, the British chose to entrust the revenue administration to local landlords. The Madras government considered all the forests of Malabar, except for a few, as private property and assigned them to the landlords.

The early colonial experience in the region was that of consolidation and assertion of government rights over the land resources which had remained unclaimed till then.[8] There had been no organised system of land administration prior to the British settlement. The only resources of interest to the British were fine timbers such as teak, ebony, sandalwood and rosewood and spices such as cardamom and pepper. Regulation over private appropriation of forest resources was limited to these items.

Little is known about the property right status of forests of the pre-colonial period. Ambiguity in these matters had delayed policy decisions over forest conservancy. There was confusion over the ownership of the forests. Early reports over the country of Canara by Munro and Buchanan described forest as State property. Nevertheless, in 1871, William Robinson, Member, Madras Board of Revenue, expressed his view supporting the proprietors, that forestland forming part of the taxpaying farmland was private forest. Buchy quoting the Indian Law Reports opines that 'there were instances of forests used by rural communities breaking up into private plots doer of generations[9].

Amidst the confusion on the legal rights of forestland in Malabar and the South Canara, timber lobbies 'literally plundered' forests, especially the teak stands. They were also successful in stalling formation of any forest laws. The revenue department was all geared up to increase land revenue and, in their view, forests were not an asset that brought in any revenue income. So formation of a department to manage forest resources was opposed as irrelevant. A department to manage forests was considered a liability to the state exchequer. In Malabar, timber extraction, especially extraction of the teak timber, was a major concern of District Collectors. A European timber syndicate had been involved in the extraction and export of teak from Malabar as early as 1796.[10]

Teak was considered a royal tree during the period of Tippu; it was so in Travancore and Cochin states also. The status continued unaltered during early years of British rule in Malabar and, Canara. Oak forests of England were fast depleting and the alternative to oak for building ships for the Kings' navy was teak. This lead to the appointment of a Conservator in 1806. Meanwhile, in 1805, all government forests were brought under the control of the Bombay Presidency following a request from it, considering the importance of teak timber in building war ships for the royal navy. The situation continued until 1822. Following the decline of popularity of wooden war ships, and the general cessation in the maritime power struggle among colonial powers, the Conservatorpost was abolished in 1823.[11]

Large-scale extraction of teak and other timbers by the timber syndicates and landowners following the abolition of conservatorship led, in a short span of eight years, the Indian Navy Board to recommend the reintroduction of the conservatorship. However, no action was taken on this.

The Collector of Malabar district, H.V.Conolly considering the consistent demand for teak and on the basis of recommendations from the Court of Directors of the East India Company, conducted, during the 1840s, experiments on raising teak plantations at Nilambur. This marked a radical shift in the approach from extractive forestry to systematic resource development in the history of Indian forestry.

Improvement of railway network assumed importance as a national security issue following the political upheavals against the East India Company in late 1850s. Fine timber of various size and quality was required for railway sleepers, charcoal and veneering. The requirement of timber for railways proved to be a much heavier pressure on forests than that for ship-building. It was estimated that about one million sleepers were annually needed for the railways and the sleepers had to be changed every ten years[12] . The situation prompted the administrators to establish a separate department to ensure sustained supply of sleepers for railways[13].

Following these developments in 1847 Alexander Gibson was appointed Conservator in Bombay Presidency and in 1856 Hugh Cleghorn was appointed conservator of forests in Madras Presidency. They had been instrumental in initiating and providing orientation to forest conservancy in the region even before their appointment to these posts. The basic principles of forest management outlined by Dalhousie in 1855 proved to be the crucial foundation on which forest conservancy was built.

Deirich Brandis, a German botanist, appointed as Forest Superintendent in Burma, was posted as Director General of Forests of India in 1864. This marked the beginning of the scientific forestry in India. By this time, the demand for teak as a strategically important timber was fading away. However, the demand for timber for the railways kept on increasing. The initial years of scientific forestry were lead by the principle of sustained yield. The fact that the major requirement of timber was for railways and that this requirement was foreseeable made planning for the forestry sector easier. This heralded an era of planning and execution based on working plans. Yield regulation began to be based on estimates of the number of trees expected to enter the girth class during the period of the felling cycle. Standardised formats of the working plans were fixed[14] and prescriptions in working plans were considered inviolable.

The first working plan for Malabar was Lushington's working plan for Nilambur for the period 1896 to 1905. Soon after the First World War, working plan preparation was resumed with more vigour. During the Second World War, working plans were ignored and requirements of timber from the forests were met at all costs. Over-felling and advance working which became common affected the production potential of forests. Forests in areas under the direct rule of the British such as Malabar, South Canara, and Coorg were

badly affected. Large numbers of plywood factories had also begun functioning by this period. Commitment to sustained-yield forestry faded since Independence. Thus the Second World War formed a clear watershed in the history of forest management in India.

Forest Administration

In 1882, provincial governments were given the power to decide their policies on forests. The state governments sought to increase the revenue from forests as a result of which overexploitation followed in utter disregard to the working plan prescriptions. Soon this approach was reconsidered and the IGs of Forests were given the decision-making powers in matters such as preparation of working plans and management of forests. By 1935 the grant of political autonomy to provinces under the new Act vested rights on forests with the provinces and the chief conservators of forests had to report only to their respective provincial administrators. Economic recession that followed the First World War affected the global timber market. Consequently, intake into forest service gradually decreased and was finally stopped in 1930. It was resumed only in 1960. According to Chundamannil "the absence of a cadre of professional foresters under a framework of the all-India service was inopportune in the post-Second World War period when pressures built up for releasing forest lands for agriculture, colonisation and various non-forestry public sector ventures".[15]

In the Post-War period, new means of communication such as tramways and roads were built to extract timber from the interior and inaccessible forest tracts in Cochin and Malabar. New technologies for sawing, seasoning, logging, and transportation of timber were introduced. Consequently the damage done to the forests of Attappady, Nilambur, Chenat Nair Reserved Forest, and Chalakkudy river basin grew to a scale unimaginable till then.

Forest Acts

The Madras Forest Act of 1882 had detailed clauses for strict control over forestlands and resources. The Indian Forest Act of 1878 had provisions for forming two kinds of forests the 'reserved forests' and the 'protected forests'. In the case of reserved forests the rights to use forests whose boundaries were clearly demarcated were vested with the government only. Use by other agencies and individuals was not allowed unless a privilege for the same was obtained formally from the government. Protected forests were those Government forests that had not yet been surveyed and were temporarily open to limited private use. The Madras Government declined to implement the Indian Forest Act of 1878 as "...the rights of the villagers over the waste lands and jungles were such as to prevent the formation of exclusive State Reserves"[16] The Madras Forest Act also was framed generally on the same lines as the Indian Forest Act. However, the procedures relating to the constitution of reserved forest were made more reasonable and simple.

The colonial forest policies were aimed at reserving the valuable timber forests for exclusive governmental use. They had come into conflict in many ways with the people's interests. People's dependence on forests was not limited to timber alone. They depended on the forests for food, fuel, fodder, manure and marketable forest products. This dependency

assumed a crucial component of their subsistence and everyday life. Another important area of conflict was shifting cultivation. The sole source of subsistence of a large segment of the landless and the labourers was the seasonal shifting cultivation that they practised inside the forests. This mode of cultivation was especially prevalent in Malabar and Canara. In the opinion of the colonial forest officers this was a highly wasteful and destructive activity. Enforcement of control over shifting cultivation and settling of the cultivators was an active topic of discussion even until the first decades of the 20th century. Peasant protests against the reservation of forests and the denial of rights that they had enjoyed over forests continued till the end of the first half of the century.

Period of Turbulence

The period of forty years from 1940 to 1980 is considered as one of turbulence in the history of forest management in India. As mentioned earlier, the major turning point was the Second World War. The period that followed the war witnessed large scale political readjustments and reorganisations starting with the independence of India. More interest groups also had emerged. Planned development under the Five Year Plans helped various sectors of the economy such as, power, agriculture, irrigation and industries which set their own targets of growth without consulting the Forest Department. Several new powerful lobbies / interest groups such as encroachers, owners of large plantations, political parties, engineers of the irrigation Department and the State Electricity Board, come into being.

The period witnessed policy changes that were often contradictory and conflicting. Conservation of wildlife and forest resources was a concern while at the same time, exploitation of the extractive resources was given equal importance. There was pressure on the Forest Department to show financial justification for its existence. There was mounting pressure for diverting forest land for agriculture, irrigation, power generation, road development and for extracting industrial raw materials. International treaties and agreements on wildlife conservation and environmental protection were signed. The period from 1940 is marked also for administrative, economic, social and demographic changes. It was a period which witnessed extraction of forest resources and conversion of forest land on an unprecedentedly large scale.

Malabar presented a picture quite different from those of other areas in the region for a variety of reasons. The most dominant among them was the administrative and land control privileges of the *Jenmis* or landlords. The landlords dictated the landuse and fate of the forest for more than a century. They were slow to expand lands for cultivation; they also prevented their tenants from moving into the forests. Moreover the joint family system followed by most land-owning families made selling of land an extremely lengthy legal process. Lack of communication facilities to interior forests made it unattractive for the planters and entrepreneurs for investing in these lands.

However, a number of policy decisions made around the begining of the twentieth century like liberalisation of wasteland rules (1898 and 1901), award of special grants to settle

'ryots' in the hills and various decisions regarding cardamom lease lands and cultivation in them (1898,1909,1914and 1935) had adverse impact on land use.

When the outbreak of the Second World War disrupted the food supply, the state of Travancore which was an importer of food crops was severely affected. The Travancore government decided to bring more forestland under food crops. Rehabilitation and resettlement schemes for repatriates and ex-service men also found land in the forest area. In Travancore the 'Grow More Food Campaign'[17] and the government-sponsored colonisation programme[18] accelerated the ongoing encroachment and peasant inmigration to the High Ranges.

Encroachment and evictions presented often raucous situations in the social / political spheres of the State during the 1950s and the 1960s. Several committees were set up to investigate the issues of encroachments and evictions. Though the Private Forest (vesting and assignment) Act of 1971 was conservation-oriented, it was promulgated as a land reform act. Table 2.1. provides information on the area under forests in 1940 and 1970 in Kannur, Kozhikode, and Palakkad districts.

Table 2.1 Area of forestland in Kannur, Kozhikode and Palakkad districts, 1940 and 1970
(In Sq. km)

Year	Descriptions	Kannur	Kozhikode	Palakkad
1940[1]	1.Forestland owned by government	460	690	870
	2.Forestland owned by private individuals	880	1500	970
	Total	1340	2190	1840
1970[2]	3.Forestland owned by government	457	662	792
	4.Forestland owned by private individuals	269	822	409
	Total	726	1484	1201

1. In 1940 Kasargod was a taluk under South Canara district of the Madras presidency.
2. In1970 Kannur district included most areas that had been earlier part of Kasargod taluk of the South Canara district of Madras presidency.

The Malabar district of the Madras Presidency had nearly 3106 sq.kms of private forests in 1945[19]. In 1949 the Madras government passed the Madras Preservation of Private Forest Act to check large-scale clearing of private forests in the post-war period. According to Chundamannil (1993)'... "this Act was conservation-oriented. Tree-felling or alienation of land through sale, mortgage or leasing of private forests without the prior permission of the District Collector was prohibited. Due to the non existence or inadequacy of the implementing machinery and the unsurveyed nature of the private forest holdings, the objective of the Act was not fulfilled. The demand for land by immigrant farmers of Travancore and the insecurity of the owners resulted in clandestine deforestation and widespread conversion of forests to agriculture."

Take-over of private forests (after paying due compensation to owners) was part of the National Forest Policy of 1952. A bill containing the same provisions was passed in the Kerala Legislative Assembly in 1962. However, the bill did not get the President's ratification. In consequence, private forest owners began to sell off the trees in their forestlands.

Kerala Land Reform Act (1963) which was intended to redistribute lands of large holdings among the landless had provisions for takeover of private forests. Promotion of agriculture was the stated justification. The major development in regard to private forests during the early 1970s was consolidation of governmental control over private forests through a series of ordinances and judicial interventions[20]. The total area taken over under the Private Forest (Vesting and Assignment) Act of 1971 till 1986 was 1882 sq.km[2], the lion's share of which was from Malabar[21].

Developments in the export trade that followed the First World War favoured the establishment of the plywood industry. Private forests were the major source of raw material for this industry in Malabar. During the period since independence, supply of raw materials to the wood-based industries became a major concern of the forest department. Expansion of the capacity of the wood-based industries led to imbalances in the supply of and the demand for the raw materials. Initially the raw materials were collected from forests of the adjacent districts. Gradually, as the reserves were depleted, more and more wood was imported from the Andamans and, in the late 1980s, from Malaysia as well.

Some of the concessions granted to and contracts made with industrial firms in the private and public sectors also were responsible for large-scale forest degradation and conversion of forest land. Most of such agreements contained provisions for undue privileges to industries for appropriating forest resources at incredibly low prices and rates bypassing the usufruct rights of the forest-dependent people[22]. It is such concessions and agreements that facilitated conversion of forestlands following the plantation boom, the Second World War and the State-sponsored agricultural development projects.

Industrial orientation of the forestry sector was an aftermath of the Report of the National Commission on Agriculture. The report suggested a complete reorientation of the objective of forestry to ensure regular raw material supply for industries[23]. On the basis of the recommendations of the Report for promoting industrial plantation, various forest-based Corporations were started in the 1960s and the 1970s[12]. These Corporations were instrumental in large scale conversion of interior forestlands into plantations of rubber, oil palm, eucalyptus, cardamom, tea, sugar cane, etc.

The plantation boom

Standardisation of the teak-planting technology at Nilambur had been a major watershed in the history of plantation forestry in India. Large-scale plantation activities were undertaken by the forest department all over India. Perfecting of stump technology in 1878 and introduction of the *taungya* method since 1922 had triggered a boom in plantation activities[25].

Post-World War years of the 1940s were characterised by efforts of the forest department to reforest the areas which had been ruthlessly, exploited for timber during the War. The sustained-yield principle was rarely implemented in the field. The basis of forestry planning in India became the National Forest Policy of 1952. Nevertheless, the high priority attached to agricultural production and commitments as regards supply of forest products to industries led to violation of working plan prescriptions. Teak was the most preferred species in these reforestation programmes. Planting programmes continued as part of the Five-Year Plans. Development of timber plantations in the public sector was an accepted mode in the plan funding. Plan fund allocation and certain inherent shortcomings of this mechanism hastened the plantation activities of clear-felling of prime forestlands and degraded forests to raise plantations.[26] A few plantation divisions were established during the period since 1960. Many forest-based industries were set up since Independence. As a result, pulp wood plantations, especially eucalyptus plantations, were established to meet the anticipated demand of the new industries (Table 2.2).

Table 2.2 Growth in Forest Plantations in Kerala

(area in hectares)

Year	Teak	Bombax and Mixed	Eucalypt	All Plantations
1900	546	-	-	551
1910	1685	-	-	10701
1920	2879	-	-	2945
1930	7859	-	-	8088
1940	15258	-	-	15847
1950	21820	60	6	23494
1960	33121	5569	275	47400
1970	53486	16924	23533	101774
1980	73927	23174	32817	140283
1990	76502	31899	31609	153012
1991	76202	32729	32729	153148

Source: Chundamannil (1993)

Development of communication networks to construction sites located in the interior, and hitherto inaccessible areas opened up forests for encroachers. Some of the mega-hydroelectric projects led to migration of workers to forestlands. Most of these workers brought their families along with them and settled on encroached forest land. These settlements became sources of frequent forest fires as the settlers used fire as a tool for modifying their environments[27].

Ascent of Conservation

The late sixties and the early 'seventies of the last century witnessed various international events that influenced policies. The General Assembly of the International Union for Conservation of Nature and Natural Resources[28] (IUCN), held in New Delhi recommended establishment of an umbrella organisation in line with the Department of Interior of the United States for coordinating and implementing conservation programmes. Earlier there were recommendations to set up a Wildlife Wing within the Department of Forests at the Centre and the States. In 1968 an Asst. Inspector General of Forests was appointed to look into the wildlife matters. The precarious status of the tiger population as revealed from the national level Tiger Census in 1972 led to the formulation of the Project Tiger in 1973. Periyar sanctuary was declared as a Project Tiger reserve in 1978. The United Nations Conference on Human Environment and Development held in Stockholm in 1972 was also instrumental in accelerating the conservation measures in India. Two international conservation initiatives are worth particular mention in this regard: the Man and Biosphere programme in 1973 by UNESCO and the World Conservation Strategy launched in 1980. Both the programmes had tremendous influence on the Forest Conservation Act of 1980.

During the period of internal emergency in 1976, forests were included in the concurrent list which facilitated the central government to assert its control over forests more effectively. Powers of the centre on the forests were reasserted through the Forest Conservation Act of 1980 which took away the powers of state governments to de-reserve forests and divert them for non-forestry uses. Thus all powers for sanctioning diversion of forestland for non-forestry purposes got vested with the central government. In Kerala, the popular campaign waged against the proposed Silent Valley hydroelectric project during the late 'seventies to mid-'eighties helped the development -environment debate to sustain and the formation of interest groups.

In the 'eighties, a social forestry programme was launched with the financial aid of the World Bank[29]. The success rate with respect to the survival rate of the saplings distributed as well as planted, was high. However the project was allegedly a failure in addressing its primary objectives[30]. Participation of the general public was considered an objective not only for reduction of costs of sylviculture and creation of labour opportunities but also for technology transfer. The Social Forestry project was a failure in sofar as these objectives were considered. Moreover small plantations were raised either by clear-felling or by clearing undergrowth of the forest fragments that are labelled degraded and unproductive[31]. The contributions of such fragmented forest patches to the rural economy were altogether overlooked. Though fast-growing, the species selected became also targets of criticism as they were mostly exotic and had little use as fuel wood, fodder and manure[32].

Criticism and mass campaign against the Social Forestry project and clear-felling and selection felling[33] in natural forests, were the major issues that had a bearing on the forestry policy of the state. Owing to strong protests from environmental groups, the expansion of eucalyptus plantations was halted in the state in 1983-84. Kerala became the first State in India to ban selection-felling in natural forests (in 1987). The National Forest Policy of

1988 reasserted centre's control over the working plans. The policy is considered a milestone in the history of forest management in Kerala. Influence of the development of environmental consciousness in the international arena is epitomised in this policy statement. It was considered '...a radical departure from the 1952 policy'[34]. Orientation of the policy was diametrically opposite to that of the earlier forest policies. In all senses the policy document was rooted deeply in ecological prudence and sustainable development. The fact that seven out of the total 14 protected areas in the State were declared so in the 1980s testifies the reorientation of the forest policy in the State from industry to conservation. Over the past two centuries a gradual but perceptible social change swept through the region. Though local and specific factors did act, it was only in the backdrop of the larger canvas presented above that such local subtleties have taken shape.

3. Forests and Livelihood: Some Evidence from Official Records

The present-day landuse practices are mostly an outcome of past policies. Kasaragod district, like any other region of the Indian Union, is influenced by the policies enacted by colonial interests. It was the colonial import of the land revenue and forest management systems along with its land reforms of the period since Independence that shaped the society and landuse pattern of the district. A historical analysis is thus warranted for facilitating a deeper understanding of economic, social and ecological situations prevalent in the locality. The aim of the analysis is to reflect on the colonial corollary of the cropping pattern, forest use and human reactions that precipitated the present-day land use pattern.

Land Administration and Agrarian Society

The land revenue system of Malabar and Kasaragod districts had a trajectory altogether different from that of Cochin and Travancore. Regional differences in the land revenue system between the erstwhile South Canara district and the Malabar district were not pronounced.

Sir Thomas Munroe,[35] who was the first collector of the Canara province, is regarded as the father of the *ryotwari* system of land revenue administration. He was so impressed by the system of private property ownership that then existed in the region, that he refused to introduce the *Zamindari* or permanent settlement there; therefore proceeded to strengthen the then existing system.[36] The settlement strategy was that of direct settlement with the *mulpatta*[37] holders or with the actual landholder but not necessarily with the cultivator. Therefore, the proprietor paid the assessed amount directly to the Government. The actual cultivator of land - the tenant – paid rent to the proprietor. *Bijawan* system was adapted to estimate the extent of land, under which the amount of seed required for sowing the land was taken as a measure as no scientific system of survey or the assessment of land holoing had been carried out till then. The aim of the land revenue settlement was generation of the maximum revenue income possible from land. One of the significant changes Sir Muroc introduced was the collection of revenue in cash. This policy was instrumental in the development of a wide network of money-economy and the emergence of merchant moneylenders in an otherwise agrarian economy, especially in a period when the assessment was extremely high[38]. The records testify that from the 1830s onwards the most common mode of sale or property transfer was the one that involved merchant moneylenders. *Ryots* mortgaged their property to pay arrears, which usually happened because of the over-assessment or fall in market prices of the agricultural products. Of the two classes of tenants –*mulagenigars* (permanent tenants) and *Chalagenigars* (tenants at will) - the condition of the latter was getting from bad to worse throughout the 19th centaury and in the early decades of the 20th century. The main land-owning castes in the districts were Brahmins, Bunts, Jains and Christians. From the nineteenth century onwards, they were the main owner cultivators and absentee landlords. The transformation of the

agrarian production system in the early 19th century is outlined by Damle (2000) in the following words:

> "The remaining caste such as Billavas (toddy tapers), *Mogaveeras* (fishermen), *Naikas* (Scheduled Tribes) and many others who belonged to the ritually middle order caste traditionally involved in cultivation constituted the tenancy and agricultural labourers....with the passage of time members of the land-owning castes however acquired modern education, secured government jobs and also thrived in legal and medical professions. In the extensive land transactions, which took place in the first half of the 20th century it was mostly the high-class owners who parted with their land which were purchased by the other members of high caste families of landowners etc. Rarely did the land transacted pass into the hands of middle-caste cultivator tenants. With steadily growing demand for the land, there were fresh recruits of tenant agricultural labourers from among the middle and low castes. Thus, the economic and social cleavage between the labour-hiring high-caste landowners and the tenancy and agricultural labourers of middle and low castes had gradually widened. No doubt, in course of time, as joint families and landlords divided, their successive generations replaced the tenants as owner cultivators on so far leased-out lands and thus added to the class of small cultivators who continued hiring labour force but the rise of this class reduced the middle-class tenants to the status of social labourers."[39]

As the dominant groups such as moneylenders, traders, and landlords came to occupy a commanding position of the whole system of agricultural production and distribution, problems of tenancy and land alienation through sale and mortgages increased. There was a phenomenal increase in the number of tenants, by 125 percent over the 50 years from 1901-1951[40]. According to the 1881 Census, agriculturists and field labourers in the then South Canara district comprised nearly 32 percent of the population (see Appendix-2). The present-day agrarian social structure of the region is outlined by Damle (2000) as follows:

1. Large farmers holding over 4 hectares of land, who are self-cultivating entirely on the basis of hired labour, using modern agricultural methods and deriving all the advantages of institutional credit and amassing substantial assets;

2. Medium farmers holding 2-4 hectares of land who are also modernising their farm operations, self-cultivating mostly based on hired labour, availing of institutional credit with moderately rich assets;

3. Small farmers with 1-2 hectares of land using family labour but occasionally supplemented by hired labour, using modern inputs in agriculture with moderate household assets;

4. Marginal farmers holding more than 1 hectare of land, cultivating it by optimally using their own family labour, frequently practising labour exchange, some hiring themselves out, who cannot afford the use of modern inputs in agriculture and have poor household assets;

5. Agricultural labourers who lead an extremely low standard of living, own a house and a piece of land which is neither irrigated, nor cultivable ,with wage labour as their principal source of income but earning variable wages according to their age, sex, skill, etc.

Agricultural Expansion and Deforestation

The pace of forest reservation and of the colonial assertion of forest resources were slow in the region. Table 3.1 provides the details of government forests in the South Canara district during the 1890s. The Kasaragod taluk had the minimum governmental forests in the district. Other sources confirm that deforestation has already set in the locality by this period.

Table 3.1 Governmental Forestland in South Canara-1890s

Taluk	Reserved Forest	Area (acres)	Number of reserved lands	Area (acres)	Total	
					Number	Area(acres)
Coondapur	4	1985	116	142223	120	144208
Kasaragod	1	2560	62	38040	63	40600
Mangalore	9	4357	4	30541	13	34898
Udipi	7	29437	65	73843	72	103280
Upinangadi	2	25600	734	305797	736	331397
Total	23	63939	981	590444	1004	654383

Source: Sturrock (1894)

Consequent on the imposition of certain constrains in land revenue administration forests of Malabar were left unreserved; instead, the owners of forest continued to be proprietors. There were property owners who held 50to 40000 hectares of land. During the Second World War, firewood prices shot up; in consequence, forests were indiscriminately exploited for fuel. Massive inmigration of Syrian Christian farmers from central Travancore to Malabar was also taking place during the same period.[41] Consequently, large tracts of private forest in the Malabar got converted to agricultural land.

Even during the last decades of the 19th century South Canara district was described as 'essentially a forest district' by Mr. Sturrock, one of its collectors[42]. He has provided an elaborate account of the forests and the cultivation practices in the district:

> "South Canara is essentially a forest district; the slopes of the Western Ghats from north to south are clothed with dense forests of magnificent timber and the forest growth stimulated by the heavy rainfall approaches within a few miles off the coast to the north of Coondapur taluk, and again in the southern *Maganes* of the Kasaragod taluk. Generally heavy forest begins from 20-30 miles from the coast, but to the south

of the Mangalore taluk and the north of the Kasaragod taluk it recedes further inland, the plains being more extensive and the population denser than elsewhere in the valleys of the various streams which flow into the Netravathi river….everywhere throughout an exceptionally large area of wasteland, cultivation in South Canara being confined mainly to the plains close to the coast, and the bottoms of innumerable valleys which wind amongst laterite hills and plateaus from the Ghats to the sea. The only bare spots are some of the hard laterite plateaus which seem nowadays to produce nothing but thatching grass and a certain proportion of the waste which has been recklessly denuded for the supply of fuel and manure. Notable instances of the latter are the hill slopes adjoining the arecanut plantations in the Vittal-Mangalore of the Kasargod taluk. Complete denudation of the slopes of the valleys in the other parts is comparatively rare, but over large tracts mere bushes or low coppice now grow, where fine timber once abounded as can be seen from the patches of carefully consumed *kumaki* lands".

The clearance of land mentioned in Sturrock had been much earlier. Buchanan had noticed the phenomenon in 1801; he noticed the following about the neighborhood of Baltangadi:

"On the hills many trees have now grown up but it would appear that they had all been cleared, and to keep the bushes down and destroy vermin the grass is still annually burned."[43]

Hunters were engaged and rewards were declared to free the country from harmful wildlife. Table 3.2 provides information on the rewards paid by the collector of South Canara district for killing harmful wildlife such as tiger, panther (leopard) and hyena during the five year period from 1888.[44]

Table 3.2 Rewards Paid for Destruction of Wild Animals

Years	1888		1889		1890		1891		1892	
	Number of animals	Reward in Rs.	Number of animals	Reward in Rs.	Number of animals	Reward in Rs.	Number of animals	Reward in Rs.	Number of animals	Reward in Rs.
Tiger	16	1120	13	910	9	395	11	700	15	705
Panther	83	2025	68	1700	37	636	69	1491	52	1025
Hyenas	-	-	7	21	-	-	-	-	-	-

Source: Sturrock (1894)

This clearly shows that conservation of forests and agricultural landuse patterns was a major concern to the British administrators, mainly because agriculture was the only productive activity in the country and of great importance from the view point of revenue. Importance of green manure and the role of forests in meeting the green manure requirement were recognized by the British administrators. Thus forest was the hub of activities of the peasants and the administrators.

As was the case of the adjoining Malabar the right to hold private property in forest was recognised in south Canara also. Assignment of property rights on forests to private individuals was an important episode in the evolution of present mode of landuse in the area. Sturrock summarises the process of gradual regularisation of private property and on forest land:

> "Large areas of forests were always spoken of as forming parts of estates. And in certain cases these views were irrecoverably given effect to, up to 1844, by the formal grant of *mulpattas* for deserted estates, in which full proprietary rights were assigned within specific boundaries which included large areas of waste and forest land. These boundaries were usually the *nettickat* or crest of the hills overlooking cultivated valleys"[45]

Kumaki Rights

During the early period of British power in the district, forest clearance for agriculture was encouraged in every possible way. One of the privileges enjoyed by the *Wargdars* of the district is right on the reserved forest that fringe agricultural lands. Such a right was called *kumaki* or aid to cultivation. *Kumaki* was the right to extract green manure and firewood from the forest. However, it did not include right to convert land or to posses the timber growing on it. Award of *kumaki* rights is an example of the various promotional policies for agriculture adopted at the cost of forest conservancy during colonial rule. It is also an indication of the importance attached by the British to the forests in promoting agriculture.

Originally, *kumaki* was an aid offered to valley cultivation; this included forest growth on the hill slopes up to the *nettikat*.[46] In 1823, an attempt was made to take stock of the government and the private forests in the district, by the then collector of Canara , Mr. Harris. The major chunk of the forest continued to be private property. Mr. Harris gave the following directions :

> "To estates which had no forest land attached to them, 100 yards should be assigned as *kumaki* from the government forests adjoining them. As the opinion gained ground that all waste land was really the property of the government, the term *kumaki* came to be applied generally to the waste situated within 100 yards of cultivated land"

This opinion is reflected in the forest rules of 1864, rule 8 of which is reproduced below:

> " ...*kumaki* land is not usually given on *darkhast* for cultivation except to the owner of the adjoining land, but the government reserve their right to do so, and in disposing of applications for land forming *kumaki* to a *warg* the revenue officers of the district are guided by board's proceedings dated 13th August 1864, No. 5063 paragraph 2 of which is as follows: As a rule such applications should not be admitted and under any circumstances the *wargdar* of the adjoining land is to have the preferential right of occupancy on assessment and of thus including the land on his *warg*. It should by no means be considered a matter of course, that if the *wargdar* refuses to take the land on assessment the *darkhastar* will obtain it, but at the same time it cannot be permitted

that land of good quality should be kept out of cultivation to afford manure and pasture for the adjoining land in every case in which a *wargdar* refuses to pay for land which is sought by another applicant."

In Amara and Sullia *maganes* which had been attached to Coorg until 1834, the place of *kumaki* land was taken by *banes* -, which are pieces of wastelands or jungle assigned in the settlement of 1812 to each landholder for the provision of pasture, fuel and timber. They do not, in all cases, adjoin the cultivated land. Nevertheless, in due course of time, by 1839 onwards, some limitation on the rights of the *wargdar* on the *kumaki* and extent of kumaki holding was imposed.[47] The *kumaki* land was specified thereby as a strip of forestland to the width of 100 yards from the margin of cultivated land.

"*kumaki* has come to mean a semi-proprietary right to forest within 100yards of all cultivation while old *nettikatt* right has become nothing more than a common usufruct of open hill side for grazing, and the collection of leaves for manure and sticks for fuel and fencing. While thus gradually extinguishing proprietary rights the government omitted to enforce strict Government conservancy."

Prior to the Forest Act in 1874, the government directed the removal of all existing restrictions from the exercise of proprietary rights in jungles, which were private property and the demarcation of valuable forests, admittedly the property of government. Almost at the same period, the Bombay High Court passed a verdict supporting the claim of the government regarding the private right over forests as below:

"...it may be made clear...that only a very small area of the forestland in Canara had any legal claim to be considered private forest, while the great bulk was Government property subject only to right of way and water, and rights to pasture and forest produce over the portions adjoining cultivated lands"

Steps to constitute reserved forest were initiated soon by declaring a large number of forests to be reserved lands with the exception of the slopes immediately adjoining cultivation. The approximate area thus reserved was about 1000 sq. miles. In addition, the District Forest Officer was engaged in the identification of blocks of forests over which undisputed claims vested with the Government. Owing to unknown reasons, the process was delayed. Large patches of forest existed that were to be considered for reservation. Claims of the right over forest products raised by cultivators were the major hurdle in the path to enclosure of these lands. The privileges of villagers on the forests were well established by custom in this area unlike in the villages in South Malabar or Travancore and Cochin. Agricultural practices here, relied heavily and continue to be so on the forest biomass for maintenance of land productivity. Such privileges were extensive and were regarded as crucial by the farmers as is evident from the writings of Sturrock(1894):

"the greater part of the wasteland of the Canara is covered with forest or jungle growth of some kind; over all these unreserved lands the villagers exercise considerable privileges in the way of grazing cattle and cutting timber, other than certain specified

trees, for fuel or for building or agriculture or for domestic purposes. The cutting of forest produce for agricultural purpose is a very extensive privilege as immense quantities of leaves, twigs, and even branches are used for the 500 odd sq. miles of land under rice cultivation, a method of cultivation which it need hardly be said, would be impossible, except in a country like Canara, where natural forest reproduction is stimulated by a rainfall of 130 inches in a tropical climate. In the 100 yards *kumaki* lands above alluded to, which usually owe their existence in their present state to the strict conservancy exercised by the holders of the adjoining cultivated lands, the holders are also allowed to fell timber of all classes for their own use and permit for felling trees on them cannot be given by government to anyone else."

There is clear indication that these *kumaki* lands were well protected and were sustainably used by the proprietors when exclusive use rights were assigned.[48] There is no further information in the official records on the area set aside as *kumaki* land in the district. The area of reserved forest, which could be transferred as *kumaki*, compared to that of private forest, was less in extent. However, considering the good forest cover of the district, the area of reserved forest itself was not small and considerable proportion of the forest area was set aside as *kumaki*.

Shifting Cultivation

Towards the last decades of the 19th centaury, the extent of damage caused by shifting cultivation to the forest resources was a major concern to the British Government. Rulers found slash and burn cultivation as a major threat to the timber resource in the forests. By then the timber supply from Oak forests of Britain[49] had drastically declined due to over-exploitation and the teak forests of the Ghats were identified as the major substitute. Forests thus came to be identified as a strategically important resource base.

In 1847, the collector of Canara reported to the Board of Revenue thus:

"There is a subject of much interest and importance and which is deserving of attentive consideration of Government, not so much perhaps with reference to the immediate or future supply of timber for public purposes as in general bearing which it cannot fail to have at no distant period upon the welfare and condition of the province. I allude to the rapid destruction which is going on amongst the forests along the whole length of the district by the process of *Coomeri* cultivation."[50]

'*Punam*' and '*kumree*[51]' are varieties of shifting (slash and burn) cultivation practised in the Malabar and the South Canara districts respectively. The practice is called shifting cultivation because a site is cultivated only once and a new site will be slashed and burned every year. The frequency of a site being cleared again is usually 12 years. The interval between two clearings is called fallow period. However, when land availability decreases, the fallow period gets shortened.

Kumri is practiced usually in remote localities. However, it is probable that initially, when

ample cultivable forestland had been available, *Kumri* was practised in the vicinity of villages. Nevertheless since the yield from *Kumri* depended on the cultivation of virgin soil (i.e. the soil that had not been cultivated for long) and nutrient inputs in the form of ash from the burned vegetal debris[52], cultivators preferred remote forests instead of fallows near villages. So usually, the cultivator divided his time between his village and the remote *Kumri* plot in forest.[23] Gradually *kumri* became a family enterprise wherein the members of one or more families cleared a forestland in the hills for cultivation well before the advent of monsoon rains. The dry remains of the slashed vegetation are burned after a few days. Rice along with a mix of food crops including vegetables, tuber crops, pulses, and oil seeds used to be grown. These were all strictly seasonal crops. Peasants moved to the plot in the hills well in advance of monsoon rains. Permission for clearing land for *Kumri* was obtained from the landowner. A makeshift shelter made out of bamboo and small timber collected from areas adjacent to the plot was set up and a fence around the area, was erected to prevent or check entry of wild animals. The cultivation necessitated continuous surveillance on the crops to protect them from crop-raiding animals such as gaur, sambar deer, wild boar, elephant, monkey, porcupine, and rodents. Hunting and trapping of animals for meat was a subsidiary engagement of the cultivators.

These peasants' perception of life and nature was greatly influenced by their k*umri* experiences. Myths and rituals of the folk in the area invoke memories of *punam / kumri* cultivation. The various aspects of the k*umri* are reflected fairly well in all facets of the material culture and the symbolic system of the tribals. Myths associated with *theyyam* worship[54] corroborate this fact.

Two juridicially distinct forms of shifting cultivation are mentioned in the colonial literature. *sarkar kumri* and *warg kumri* The former is practised by the nomadic or unsettled cultivators in the forests that are not claimed by the proprietors and the latter by tenants on the lands of *wargdars*.[55]

Kumri was practiced mainly in the northern and the southern parts of the South Canara district (i.e. Coondapur and Kasaragod taluks). *Kumri* was prevalent, but on a smaller scale, in the eastern portion of the Uppinanagadi taluk which was comparatively heavily forested. A good account on the method of *kumri* cultivation is provided in the report on *kumri* prepared by the collector of South Canara district, Mr. Fischer (see Appendix VI).

Since South Canara was not surveyed until 1896, the exact area under *kumri* cultivation during the 19th century is difficult to determine.

> "District account for the year 1856 gave the area under *kumri* at 17084 acres for North Canara and South Canara together, of which roughly one-third (5983 acres) were within the limits of Kasaragod taluk (this was mainly *warg kumri*). But it was well known that the actual quantity of *kumri* cut every year was related more to the capacity and means of the cultivators than to the official figures found in government accounts. Large areas of forests ...had long been under untaxed *kumri*...in any case ... the real extent of forestland subject to slash and burn amounted to more than 200000 acres (70000 in Kasaragod)."[56]

The area under official *kumri* must have started decreasing in South Canara from 1860 onwards as a result of the enforcement of restrictive orders and the increasing number of cases charged against *kumri* cutters who violated the permit rules.[57] The assessed area under *kumri* declined in Kasaragod to 35000 acres in 1865. However, the extent of decrease of *kumri* in Kasaragod is thought to be small compared to other parts of the Province. Surveys of the South Canara district were conducted between 1889 and 1896 which reported that an area 0f 140,000 acres was under *kumri* in the district.

Until 1860, the government had not considered *kumri* cultivation seriously. In 1860 "sweeping orders were issued directing its discontinuance except in the five *maganes* of Kasaragod taluk which had been taken over from Malabar in which private property in forestland had been allowed more distinctly."[58] This order was later relaxed in Coondapur and Uppinangadi considering the conditions of tribals who had no other means of sustenance. Banning of *kumri* was often a predi can ent to the administrators as the human inhabitation in forest helped timber collection and trade.

There are indications that deforestation in Kasaragod in the first half of the 19th century had been mainly due to expansion of *kumri*. The collector of South Canara had stated that by 1860 the area under *kumri,* as reported by the *ryots* themselves, had trebled since the British annexation. In reality, the actual figures might possibly have been four or five times higher than what was given.[59] The Special Settlement Officer for Malabar and South Canara in 1894 reported the general effect of *kumri* on the Hosdurg section of forests as below:

> "In these villages I saw hundreds, nay thousands, of acres of the most dismal wasteland. The surface soil had been washed away and the land consisted of sheets of laterite with a few tufts of coarse grass and some miserable shrubs. The village officers admitted that this has been formerly *warg Kumri* and that the *kumri* cultivation had reduced it to this present condition. The *kumri* lands as demarcated far exceed in extent the *kumri* lands shown in the *wargdars chitta*. The *shanbogues* of Pullur and other *shanbogues* told me that 'Government land has been included in *warg kumri* by the surveyors who demarcated exactly in accordance with the requests of *wargdars'*."[60]

Though *sircar kumri* was completely banned, considering the rapid depletion of unreserved land and the distress of the *Mahratis* in the neighbourhood of Adur, Mandekole and Aletti reserves, plots for *kumri* were again allowed in 1899.

A variety of factors might have inspired the spread of shifting cultivation during this period. Clearance of forests in the plains might have been one reason why the cultivators moved on to interior forests that had remained untouched by cultivators. Another reason could be population growth that demanded more land for food production. Owing to scarcity of fuel wood, a market for small timber cut during preparation of land for *kumri*, emerged. The income from sale of fuel wood formed an additional incentive for more people to engage in *kumri*.[61] Another reason for spread of shifting cultivation could be the massive influx of cultivators from Maharashtra and Mysore to Kasaragod following a ban on shifting cultivation in those regions.

Implications of Kumri and Colonial Intervention

Some of the significant implications of the spread of shifting cultivation were on ecology and the land use pattern of the locality. Since sufficiently mature woodland came to be scarce for practicing *kumri,* the fallow period shrank from 12 years to 9 years and then to 7 years. The consequence was impoverished soil and low returns from *kumri*. Low returns pressed the peasant to cut fuel wood to compensate his loss of income.

As these changes took place, the social milieu and actors relating to *kumri* also were undergoing gradual change. Originally, *kumri* was practised by nomadic groups. They made make shift huts and shifted to fresh *kumri* sites annually. Gradually more and more people from villages started pursuing *kumri* who annually migrated to interior hilly areas and returned to village after harvest. Ban of the 1850s on *kumri* was imposed in this circumstance.

> "In the *warg kumri* areas of Kasaragod and elsewhere, *kumri* cultivation was part of the regular business of every *ryot*. But in that case also, the actual *Kumri* cutters were mostly forest dwellers who cultivated the forest as tenants-at-will or labourers of substantial and influential *ryots*..."[62]

In South Canara they where mostly local tribes or *Maratha kudubis*. They had a population of 59500 individuals in Kasaragod around 1860.

To the British, controlling *kumri* meant activities such as curbing the destruction of forests and protecting valuable timber, 'civilizing' the primitive tribes who lived in sub-human circumstances, promoting settled cultivation, and enforcing a land taxation system that expected every piece of land to have a recognised owner for payment of a determined land tax, etc.

Another significant implication of controlling the *kumri* system was privatisation of forestlands. Though it was repeatedly asserted by the revenue department that the *kumri* tax collected 'was but a rent for certain privileges, and did not confer [on the *wargdars*] any proprietary right in the soil', the system exceptionally recognised in Kasaragod was as follows :

> "The rights which these *wargdars* claimed on the forests attached to their estates were held to be of a different nature, superior to those which are denied to the *wargdars* of other parts. Kasaragod was initially part of Malabar, and the *wargdars* there were Nairs. The Government never questioned the rights of property enjoyed by the Nair chiefs on the forests of Malabar. It was only logical that the same course was adopted as regards the *wargdars* of Kasaragod also. *Kumri* cultivation was carried out by the resident *wargdars* of Kasaragod 'as a regular part of their farming, and not by wandering tribes unconnected with the soil,' as in the northern parts".[63] In 1859 two-thirds of the *warg kumri* area of the Canara was located in Kasaragod spread out in a total of 147 estates. These forest areas thus escaped reservation during the forest settlement

> operations at the end of the century. Though some of these *warg kumri*s were subsequently converted to permanent wet or dry agriculture, *kumri*s existed in 21 villages of Kasaragod at the time of the resettlement of 1932-34.[64]

Control of *kumri* also meant settling of the nomadic communities and drawing them to a monetized economy. One of the implications of this was the formation of a landless or near landless labour class attached mostly to landlords as tenants (in some cases as "bonded labour[65]). Availability of cheap labour promoted settled agriculture especially as regards labour-intensive crops such as rice. Moreover there are piecesas regards evidence which suggest that the British benefited from the additional labour force made available due to prohibition of the shifting cultivation system, as there had existed a dearth of wage labourers to carry out works in plantations.

Forest-Agriculture Linkages

"...in no other district is agriculture so dependent on the forest and nowhere else is the proportion of forest lands so great"[66]

This statement made in a Government note in 1829 illustrates the extent of dependence of agriculture on forests in the region. The of agricultural activities affected by the new forest policies were mainly cattle-rearing, slash-and-burn cultivation and spice gardening.

Agriculture in South Canara was affected by the forest laws implemented by the colonial state by 1860. Agriculturists were deprived of many privileges such as the rights to graze livestock, carry out shifting cultivation and collect green manure, fire wood and other Minor Forest Products (MFPs).[67] However the peasants continued to depend on the forests. The conflicts and confrontations which resulted from 'every day resistance' is reflected in the colonial texts of this period. As Buchy elaborates:

> "the peasant, who had virtually no means to defend himself apart from illegal resistance, strove to preserve his system of production and his means of livelihood, while the forester, with the law on his side, claimed to champion the global interests of the 'people of India', which were interpreted in such a way as to coincide with those of the colonial state."[68]

Kadakam Vana Sathyagraham

Kadakam Vana Sathaygraham of 1932 is an eloquent episode in the Civil Disobedience Campaign set forth by the Indian National Congress party all over the century as part of the independence struggle. Kadakam, is a forest-enveloped village a few kilometres north of Kasaragod now known as Karadka. In *Kadakam Vana Sathaygraham* a team of congress activists publicly broke law as part of the Civil Disobedience Campaign against British rule. The law-breaking campaign was launched by cutting, collecting and removing firewood and timber from the Kadakam reserved forest. The *sathyagrahis* used to assemble every day to break the law. Apart from the local people, *sathyagrahis* came also from Payyannur

and other distant localities. In order to diffuse the efforts of *sathyagrahis,* the police arrested them and took them to remote localities at night so that they would not participate in the strike in the succeeding days. Though it cannot be called a peasant protest against the polices of forest reservation and restriction on the people's rights over forest, *per se* the protests came to symbolise the popular sentiments over the issue (see Appendix VII for an incomplete list of participants of the *Sathyagraham).*

Kasaragod Range in the South Mangalore Forest Division[69]

Reserved forests of the division cover the upper catchment areas of Netravati, Kumaradhari and Chandragiri rivers. Reserves are few in number in the coastal region (coastal area had been more or less completely deforested by then); the most luxuriant and large contiguous forests were confined to Puthur and Uppinangadi Ranges. Waste and unreserved lands at the disposal of the forest department had considerable tree growth varying from scrub to high forest.

While discussing the timber potential and vegetation features of the range, Davis mentioned that *reboisement* operations were held at the range some time in 1870. The rose wood and *Aini* woods in the Subrahmania had been cut to such an extent that, in the 1930s, there were hardly any good timber at all in the area. The forestry operations had started in the locality around the 1860s.

South Canara District known as the 'Home of Hopea' had valuable species such as *Artocarpus hirsuta, Hopea parviflora, Dalbergia latifolia, Xylia xylocarpa, Terminalia paniculata and Terminalia tomentosa.*

The deepest and richest detrital loams in the valley bottoms had already been brought under cultivation by *wargdars* in 1930s. It was noted that the 'forests in this district occupied mainly and almost exclusively to the hill slopes overlooking the cultivations which ramified the narrow straggling stretches into all important valleys'.[70]

Forests in the Sullia- Kasaragod region were known for the luxuriant natural growth of teak; hence the name 'Sullia teak jungles'. They stretched eastwards from Sullia up to Parappa. The region, however, had been already under cultivation by the 1930s. (For a sammary of the vegetational characteristics of the forests of the region as provided in the working plan of Davis (1934) see Appendix VIII. Forest reservation in the Kasaragod began as early as 1892 2184.3 acres of forestland was reserved to form the Parappa reserved forest (See Table 3.3 for the dates of reservation of forest areas in the range during 1892-1906 during 1892-1906.) Efforts to demarcate boundaries of forest land were taken up during the first decades of the 20th century; however, this effort was soon discontinued due to the high cost involved. The belts of forestland kept alongside agricultural land for green manure proved a major hurdle to demarcating the boundaries too.

Table 3.3 Forests Declared Reserved in Kasaragod Range: 1892-1906

Name of reserved forests	Extent in hectares	G.O. number	Notification date
Parappa	495.739	Ms. No. 275	21/3/1892
Karadaka	1156.992	Ms. No 739	13/7/1904
Adoor	2052.974	Ms. No81	23/1/1906
Bantage	348.030	Ms. No890	2/3/1910
Kannadka	34.398	Ms. No453	17/1/1908
Kanakamajllu	263.046	Ms. No6	8/1/1908
Muliar	856.318	Ms. No822	6/12/1899
Mandakole	799.253	Ms. No1231	15/12/1906

The Magane of the Adur temple and the *wargdars* of the area claimed in 1845 that they had rights over the forests up to *nettikatt*. "*Shirastadar,* considering the inadequate basis of claims put forward, proposed that as *wargdars* had no private forests, they should be given the privilege of retaining as '*kumaki*' (i.e. assistance) the 100 yards around the cultivated land allowed elsewhere by Mr. Harris".[71] In 1874, the Government relinquished all claims over the *kumaki* giving holders the right to dispose of the produce in such lands without any interference.

The lists of 'Government forests' provided an estimate of a total of 67 forests with an area of 250 square miles.[72] Until 1874, no measures were taken up to reserve the forests. Orders were issued in 1874 to Collectors to demarcate important forest areas for reservation. Subsequently forest officers were entrusted with the task of identifying forests for reservation. Lack of information on the proprietary rights over the forestland made the task difficult for Forest Department. William Sturrock, the then Collector of the district, examined the list of 2432 forests and 71 blocks identified by the Forest Department. He adopted the mode of classification mentioned in sections 10 and 11 of Madras Forest Act. Accordingly, his recommendation on the "...class II forests where rights to *kumaki* were claimed, and class III forests where partial rights to the pasturage or forest produce were claimed," was that "although the forest settlement officer might decide that claim did not exist, it should still be allowed to be exercised as a privilege to the extent compatible with proper conservation and adequate to the real requirements of the villagers...".[73] General Rules circulated along with the proceedings No. 2951 of the Board of Revenue dated 3rd October 1883 were not considered entirely suitable to the conditions of South Canara as the country was not surveyed and cultivated land and forests were scattered throughout. The Collector of the South Canara and forest officers were entrusted with the job of forming a new sets of rules. The new rules were a modification of the already proposed rules by incorporating provisions for the local and regional peculiarities. In 1907-1908 *Kumaki* rules were amalgamated with the rules under section 26 of the Madras Forest Act.

The following concessions were allowed in forests at the time of settlement:

1. Permission to open a road through reserve forests on nominal rent, on application;
2. Permission for taking water from the running streams or springs on a nominal charge;
3. General concessions, granted by the Chief Conservator of Forests, for improvement of cultivation; these concessions were for limited periods and the permit was considered for renewal every year; they included:
    a. clearance of undergrowth (shrubs and bushes of unclassified species) to a distance of half a mile from the limits of private holdings in all reserves except Muliar, Kalanjimale, and Veerakamba reserves;
    b. clearance of undergrowth in Muliar, Kalanjimale and Veerakamba reserves (under fuel working) to a distance of 200 yards from the limits of private holdings
    c. clearance of undergrowth of all reserves sown with hopea parviflora viz. Parappa, portions of Porkala and Padanur and Jalsur East reserves;
    d. free removal of green manure leaves of unreserved and unclassified species, dry leaves of all species and dead fuel.
    e. refund of half the grazing revenue in reserves where the Forest Village System had been introduced only if the reserves had not been burned during the year or in the case of accidental fire, if the fire had been extinguished without delay, and if illicit fellings had not taken place:

The concessions had, nearly in all cases, been taken advantage of in localities where cultivation was extensive. Nevertheless, dependence on government forest did not decline much though it was more in areas in which private forest was less and less in areas where private forest was more.

In 1921, the government considered the question of exemption of prohibition of litter and leaf removal from the forests in the Presidency of South Canara, owing to 'luxuriousness of forest growth which was supposed typical of the whole district. The following reserves were included in the list of areas in which forest exploitation was high: Adur, Kanakamajlu, Anegundi, Jalsur West and Mandekole. In view of the abuse of concessions recommendations were made in 1930 to withdraw all concessions, that were not given effect to immediately.

Forest Village *Panchayat* was an innovative idea for managing forests with the help of the local population by providing some kind of incentives to them by way of use rights. The idea was first put forward by Mr. Longrigg around 1917. Two such panchayats were formed in 1922-23. One for Bellari reserve and another for Porkala. The Bellari Forest Village Panchayat was dissolved in 1928 owing to its unsatisfactory performance. Davis expressed his doubts about the continuance of the Porkala Forest Village Panchayat in the

following words: “the Porkala panchayat has worked moderately satisfactorily but not with outstanding enthusiasm on the part of the *panchayatdars*, and it is doubtful if this will continue much longer”. Probing into the possible reasons of its failure he continues “The villagers are not sufficiently interested in the forest protection, nor are they so dependent on departmental interests as to find it worthwhile accepting responsibilities on its behalf”.

Following the policy decision of the Legislative Council in 1921 to increase area under food production by assigning lands in the forests for cultivation, sixteen plots of 327.35 acres of swampy area was identified as suitable for deforestation. In 1925 eight of these plots (of 160 acre) were cleared (in Kilarmale, Kiribag, Subrahmania, Kombar, Shirdi-sisla and Miyar). The plots were handed over to the Revenue department for settling labourers so that the problem of labour scarcity in these localities for working in forests would be solved. Similarly, enquiries from the higher governmental levels on the land availability for ‘*Bagayat*’ resulted in the creation of large enclosures of garden lands in the protected valleys which often interceped perennial source of water supply. They were surrounded on all sides by forests. These were common in those days and were cultivated mainly by Brahmin landowners.[74]

Illicit felling from *kumaki* and abuse of *kumaki* rights and such concessions were repeatedly reported in the 1920s and the 1930s. However, it seems that large scale timber pilferage was reduced after strict implementation of Timber Transit Rules.

Agricultural Customs and People’s Needs

People depended on the forest for a variety of needs. Green manure, firewood, small timber (for making farming implements and construction materials) and a number of marketable plant parts (leaves, fruits, seeds, barks, resins, roots, tubers) constituted the other forest products. In South Canara, dependence on forests used to be high compared to that in other localities in the Presidency because agricultural practices in this area involved heavy use of green manure inputs. Regarding firewood demand from the reserves, Davis stated that “The local demand in the villages for fuel from Government reserves is practically non-existent, owing to the quantity of small brush wood usually available from unreserves, ‘*kumaki*’ and private *wargas*”.[75] However, he admitted that scarcity of firewood existed in the coastal region due to deforestation in the locality. He predicted that the southern parts of the Kasargod range were liable to experience fire-wood scarcity by the end of the 1950s as the area was under *kumri* cultivation and suffered large scale deforestation. (See Appendix IX for a list of teak *kumris* existed in the rage in 1934).

Villagers used to collect thatching grass from the reserve forest and revenue lands. The demand for this material during earlier days was high. Table 3.4 shows the number of terraced and thatched buildings which existed towards the last decade of the 19 century in Kasaragod *taluk*.

Table 3.4 Houses and Other Buildings in Kasaragod *Taluk* (1891)

Tiled			Terraced			Thatched			Total		
Hoses	Other buildi-ings	Total	Houses	Other buildi-ings	Total	Houses	Other buildi-ings	Total	Houses	Other buildi-ings	Total
303	457	760	-	-	-	54453	3795	58248	54756	4252	59008

Source: Sturrock (1894)

The roofs of nearly 99 percent of the buildings were thatched in 1981. The major source of thatching materialise must have been the revenue lands and forest areas.

Collection of fuel wood, thatching grass, green manure and the shifting cultivation practised in the area were examples of the dominant forms of dependence of the people on forests. However, people's dependence on forest was not confined to these activities alone. Davis (1934) had listed out some common forms of dependence on forests by the local population:

Making farming implements

Ploughs- *Strychnos nux-vomica, Careya arboria, Terminalia paniculata, Cassia fistula, Bridelia retusa*
Yokes-*Adina cordifolia, Calophyllum tomentosum, Gewia tiliaefolia, Bridelia retusa*
Levelling planks-*Lophopetallum whightianum*
Thrashing pestles –*Xylia poles*
Axe handles- Any species available, preferably *Xylia* poles with bamboo batons
Fencing posts- any species available, preferably *Xylia xylocarpa*, with bamboo batons

Building purposes

Temples and house construction
Artocarpus integrifolia (pillars, door and window frames, planks etc.)
Hopea parviflora (especially in temple construction)
Terminalia tomentosa (rafters, veranda posts etc.)
Lagerstroemia lanceolata (roofing work)
Albezzia lebek
Xylia xylocarpa (posts)
Tectona grandis (doors and windows)
Mangifera indica (planks)
Vitex altissima (planks)
Terminalia bellerica (planks)
Vateria indica (largely for rough use and miscellaneous purposes)
Lophopetalam whightianum (planks and rough use)
Holoptelia integrifolia (planks and rough usage)

Furniture and cabinet wood

Tectona grandis, Artocarpus integrifolia, afdina cordiforlia, Dalbergia latifolia

Cow pens, sheds and small huts

Vitex altissima and *Careya arborea* for mud walls, *Bambusa arundinacea* for roofing batons etc. *Terminalia tomentosa* and *Teminalia paniculata* for posts pillars etc.

Miscellaneous

Boat making – *Mangifera indica, Tetrameles nudiflora, Artocarpus hirsuta*
Well curbs-*Phyllanthus emblica*
Rice pounders-*Eugenia jambolana, Odina wodier, Albizzia* species
Oil mills-*Albizzia lebbek, Schleichera trijuga*
Charcol making- *Schleichera trijuga, Terminalia tomentosa, Hopea whightiana*

Other forest products

Bamboos- these are of universal application
Reeds-Used locally in the construction of 'Kadike' thatties for sorting rice
Canes – for rattan baskets, walking sticks , ropes, cart hoods
Fruites- the fruits of *Artocarpus lakoocha* are largely used locally as a substitute for *Tamarindus* fruit. The outer covering of the *Garcinia morella* fruits is driesd and used for cooking purposes. *Eugenia jambolana*, *Ziziphus xylopyrus,* and *Anacardium occidentale* fruits are also collected as being edible. The fruit of *Terminalia chebula* is used for tannin, but is not common. Medicinally, the following are in use in India: *Garcinia, Terminalia chebula, terminalia bellerica*

Barks and fibres

Antiaris toxicaria (gajamara) bark. Straight boles of this tree are cut to the required length of fibre. The bark all round this log is beaten with a light smooth mallet until the surrounding fleshy matter falls away from the fibre, which is then separated from the stem and immersed for several hours in water to remove all remaining fleshy matter. It is used as bags for storing grain, and as bedding.
Helicteres isora bark. Sticks are cut and soaked in water for several days after which they are carefully beaten until the fibre is detached from inner stems. After drying, the fibre is twisted into ropes
Sterculia villosa ('Ane naru' or 'Banna naru') the fibre of this species is used in rafting work, and for tying roofing material.
Terminalia tomentosa ('Banapu') Bark is in considerable local use for preparation of 'chunam'. It is peeled off afew feet from the ground and burned. The operation

is not a licitly recognized one but widely practised. In so far as it has been observed, it does not cause permanent harm to the tree which quickly forms a fresh and somewhat thicker cortex over the wound.
Machilus macrantha ('Gulamavu'). The well known fleshy material of the cortical tissues of the bark is crushed and used for mud-plastering. It affords cementing matter and imparts a polish to the exterior.
Cinnamomum Bark ('Dalchine') _ the thin bark is used for spices. Oil is not usually distilled from the bark found locally.

Herbs used medicinally

Sida rhombifolia ('*Kadir*' or '*Kurundotti*' used for kashayams) Hemidesmus indicus ('Halluberu'): the syrup known as 'sarsa prilla' is prepared using this herb.
Ophiorrhyza mungos and *Rawolfia serpentina* ('Garudupathla') Roots used as antidote for snake bites
Hollarrhina antidysenterica ('Madarasa') used as medicine for dysentery.
Curucuma ('Kuvai') or Indian arrowroot
Aristolochia indica ('Ishwara gida'), The bitter root is used as a stimulant and febrifuge.

Miscellaneous

Areca catechu ('adike ') used in betel chewing, is commonly cultivated in well-watered slopes in reserved forest areas. It also grows wild in evergreen forest. Caryota urens yields toddy, a strong fibre is made from its leaves and the stem is used for constructing aqueducts. It is common in evergreen forests.

Though the nature and the mode of extractive dependence have changed over time, people's dependence on forest continues. Until late 1980s, permits used to be issued to local people for collecting green manure, firewood and other forest products. Permission for cattle grazing and diverting water for agricultural purposes also used to be granted on nominal fees. The Revenue Register of the Kasaragod range office shows following information on the rate of fees charged in 1976.

Elephant grazing fee: Rs. 33.00
Water privilege annual rent: Rs. 1.00 per permit[76]
Lease charge for 2 acre plot for raising areca plantation in Mandekole Reserved Forest: Rs. 50.81
Annual fees for water privilege continue unchanged. At present the major source of revenue is the timber sales from the Parappa timber depot. Revenue income from Non-Wood Forest Products was comparatively meagre (Table 3.5).

Table 3.5 Month-wise Information on the Revenue in Kasaragod Range in the Financial Year 1994-'95

Month	Total revenue Rs.	Contribution from Sale of timber and other produce	Percentage Contribution from timber sales
1994 April	5005	4761	95.12
1994 May	133899	128365	95.87
1994 June	62421	31790	49.35
1994 July	360984	298121	82.59
1994 August	95951	62778	65.43
1994 September	496799	404168	81.35
1994 October	89480	77574	86.69
1994 November	187726	155777	82.98
1994 December	23728	13500	56.89
1995 January	643661	106000	16.47
1995 February	66423	66423	100.00
1995 March	54201	54201	100.00
Total	22,20,278	14,03,458	63.21

Details of the violation of forest laws in the range for two periods 1963-1966 and 1977-2000 are provided in Tables 3.6 and 3.7.

Table 3.6 Nature of Offences in Kasaragod Range during 1963-1966

Nature of offences	1963	1964	1965	1966
Trespassing into Govt. Reserved Forest and illicit cut and removal of Timber (Teak, Maruthi, Venteak)	57	37	36	43
Trespassing into Govt. Reserved Forest and illicit cut and removal of fuel wood, small timber green manure etc.	59	21	22	40
Possession, storage and transportation of timber without permit	10	3	6	6
Unauthorised construction and encroachment in the forest	1	2	1	3
Others	-	2	2	4

Table 3.7 Nature of Offences in Kasaragod Range during 1997-2000

Nature of offences	1997	1998	1999	2000
Tress passing into Govt. Reserved Forest and illicit cut and removal of Timber (Teak, Maruthi, Venteak)	35	22	26	20
Trespassing into Govt. Reserved Forest and illicit cut and removal of fuel wood, small timber green manure etc.	7	5	10	7
Possession, storage and transportation of timber without permit	9	8	9	8
Illicit storage of sandal wood and sandal wood oil	1	3	1	6
Grazing	1	-	-	-
Unauthorised construction and encroachment in the forest	2	2	-	8
Poaching	-	-	-	1
Smuggling of animal skin	-	-	1	-

The most striking difference is in the number of registered cases from the category of illegal cut and removal of fuel wood, small timber green manure etc. If these figures are any indication of the ground realities, it has to be concluded that dependence on forests for small timber, fuel wood, green manure is on the decrease.

During the post-Colonial period, the forest department seems to have continued to follow the management principles of the Colonial era. Raising plantations by clearing of forest patches is continued even now. (Appendix- XII provides a list of plantations raised by this method during 1986-1998).

It was the Colonial land revenue policies and the agricultural promotion activities that triggered forest-land conversion in the locality. Agrarian social setting underwent drastic change following the Colonial intervention to control shifting cultivation. Reservation of forests was a subject that invited people, agriculturalists and landlords to speak up against authority on their rights on forests. Slowly forests gave way for agriculture. Forests became fragmented. Only those patches at the unproductive slopes and hill tops survived and were later taken up for reservation. Forest policies of State and Central governments in the post-Colonial period were instrumental in the conversion of the remaining forestlands to industrial plantations. The brunt of the process of deforestation and forest alienation was borne by the landless and the near-landless peasants. The patterns of forest dependence in the Delampady panchayat are discussed in the next section.

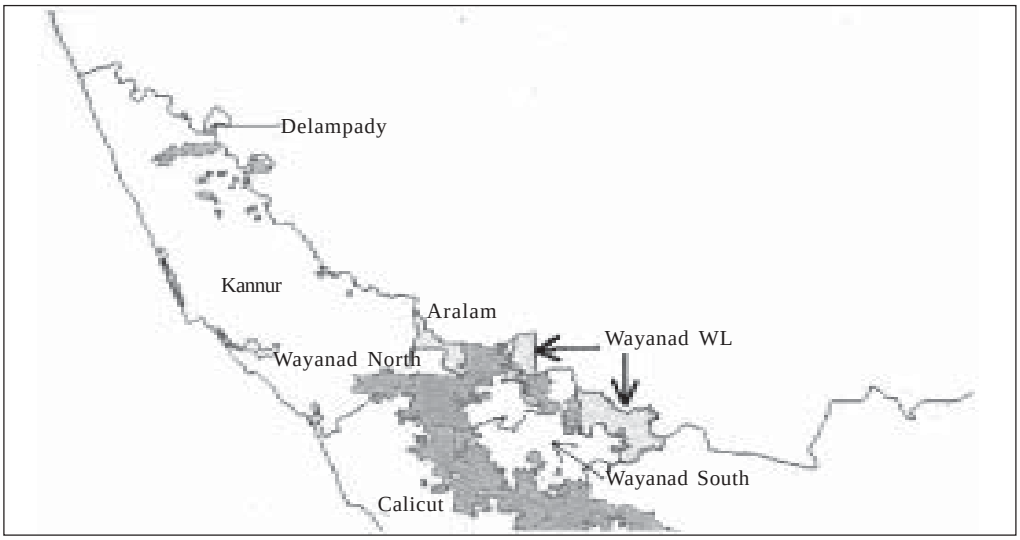
4. Dependence on Forest: The case of Delampady

Delampady *Panchayat* is located approximately 40 km north of Kasaragod town. The *panchayat* has a total area of 50 square km and is constituted out of two revenue villages namely Adur and Delampady. The *panchayat* office is located near Adur. On the Northern and Eastern sides the *panchayat* shares boundary with the Karnataka State. Adjacent *panchayats* on the Kerala side are: Bedadka *Grama panchayat* on the southern side and Karadka *Grama panchayat* on the western side. The majority of the population in the area is Tulu speaking, Kannada, Marathi and Malayalam being the other major languages spoken here. The *panchayat* is divided into 10 wards.[77]

The Adur village in which the present survey on the forest dependency and traditional agro-forestry system was conducted lies on the south-western part of the *panchayat*. The famous Adur Mahalingeswara temple claims a history stretching from the 7 century AD. The temple and the locality were under the control of the rulers of Kumbala till the establishment of Colonial rule in the closing decades of the 19th century.

A number of local leaders who hailed from the region have been instrumental in imparting the nationalistic spirit among the people during the early decades of the 20th century. As a result, nationalistic resistance movements against the Colonial rule addressed issues of local importance relating to people's rights including the right over forest land. Similar issues were also taken up at the initiative of the Karshaka Sangham in the 1940s and the 1950s. In the period since Independence, land reform policies were successful in allocating cultivable lands to landless labourers.

Figure 4.1 Location of Delampady *Panchayat* in Kannur Forest Division Landholding Pattern and Agrarian System



The landholding pattern of the panchayat is provided in Table 4.1

Table 4.1 Landholdings by Size Class in Delampady *Panchayat*

Village	BelowI acre	1-2 acres	2-5 acres	More than 5 acres	Total
Adoor	1553 (38.29)	1656 (40.84)	643 (15.86)	203 (5.01)	4055 (100.0)
Delampady	566 (33.39)	522 (30.8)	555 (32.74)	52 (3.07)	1695 (100.0)
Total Percentage for the panchayat level	2119 (36.85)	2178 (37.88)	1198 (24.84)	255 (4.44)	5750 (100.0)

(Figures in brackets indicate percentages)

Out of the two revenue villages in the *panchayat*, Adur has more land holdings. The number of operational holdings in the *panchayat* are more or less evenly distributed among the three catogories of land owners. Compared to the State averages, the size of the holdings in this *panchayat* is relatively large. This also has a bearing on the forest dependency and risk adjustment behaviour of the farming households.

Most of the large holdings are of Bunts and Brahmins. Moreover, these are located in the most fertile and productive glens and valleys which are most suitable for cultivation of areca-coconut-spice mixed gardens. Not only are these the most fertile lands; they are also proximate to perennial sources of water such as rivers, streams and springs. The importance of irrigation during the summer months for maintaining high productivity is not only understood but suitable techniques are also devised locally for ensuring year-round supply. Springs and sub-surface sources of water are identified and suitable techniques such as *surangams* or horizontal wells and storage ponds, are adopted for their efficient use. Most of the larger holdings have a part of land, usually towards the ridge or upper slopes of the valleys, set aside for natural regeneration of vegetation. This forms the reserves for extraction of fuel wood, fodder and green manure. This is a strategy adopted mainly due to the decreasing accessibility of green manure from forest and public lands.

Owners of the smaller holdings are mostly those belonging to Scheduled Castes and Tribes such as Marathas and Vettuva. Small holdings are located towards the fringes of forests. They were settled in the past two to three decades. These lands are of low fertility and, being on the higher slopes and ridges, have no perennial sources of water. Adur village records show that during the period between 1958 and 2001 approximately 3200 acres of revenue land were allotted for the landless. A total of nearly 250 acres of land was given to large farmers since 1964 most of which was by way of regularisation of old *kumaki* rights.

It is interesting to observe that the area of *poramboke* constitutes still a considerable proportion, to the tune of 500 acres, in this village. This is typical of many of the midland

villages in the Kannur and the Kasaragod districts. Land under other categories are only signifiers of available land use options as lands belonging to wet categories are mostly being cultivated into garden lands cultivated with perennial crops such as areca and coconut (Table 4.2).

Table 4.2 Adur Village: Details land area in each category (In Acres)

Sl. No.	Land categories	Area in Acres
1.	Patta wet I, II, III	1254.55
2.	Patta Garden	520.57
3.	Patta dry	1537.25
4.	Total Patta land	3312.37
5.	Arable waste land - dry	4634.56
6.	Garden	0.44
7.	Wet	1.80
8.	Total arable waste	4636.80
9.	*Poramboke*	497.09
10.	Village total	8446.26

Adur is predominantly an agricultural village. The terrain is undulating and characterised by deep valleys and steep slopes. The village is situated on the banks of River Payaswini which is a tributary of Chandragiri river which drains into the Lakshdweep Sea at the south of Kasaragod town. The Payaswini River is a perennial source of water and is source of irrigation for a large number of farmers.

The major categories of soil found in the locality are laterite, forest soil, red soil, sandy soil and sandy-loam. Sandy loam and red soil cover the major portion of the land area (Table 4.3).

Cropping pattern

Agriculture is the main stay of the economy in the locality. Cash crops such as areca, cashew and coconut predominate. The region is known for production of high quality areca nuts. The cropping pattern has changed over the time. Shifting cultivation and associated seed varieties have almost totally disappeared. The importance of ragi and other crops has decreased mainly due to the shift from *kumri* cultivation to settled cultivation. The available data on the cropping pattern for the late 19 century is insufficient to derive any specific conclusion on the change in the extent of land under each crop. Nevertheless, it is possible to derive qualitative information on changes of a larger scale. For instance, rice cultivation which used to be the predominant landuse in the South Canara district now occupies only a third place next to areca and cashew. Pulses and ragi used to occupy

nearly seven percent of the area available for cultivation in the district; but ragi is no longer cultivated in the village and the area under pulses is negligibly low. Areca had been a major crop in the region in 1890; the same is the situation now.

Table 4.3 Soil Types in the Study Area

Sl. No.	Type of soil	Area in km^2	Percentage
1	Laterite	7.5	15
2	Sandy Loam	12.5	25
3	Forest soil	5	10
4	Red soil	20	40
5	Sand	5	10

Table 4.4 Main Crops: Area and productivity (1996)

Sl.No.	Crop	Area (in hectares)	Production (in 100 kgs)	Productivity (kg/Hectare)
1.	Areca	1400	28000	2000
2.	Cashew	1361	9527	700
3.	Coconut	415	299000 Nos	6000 Nos
4.	Paddy Ist crop	354	5310	1500
5.	Paddy IInd crop	250	4500	1800
6.	Rubber	128	2667	3420
7.	Pepper	75	75	1000
8.	Plantain	61	5490	9000
9.	Mango	25	300	200
10.	Vegetables	21	14.75	700
11.	Pulses	5	40	800
12.	Coco	5	15	300
13.	Tapioca	5	150	3000
14.	Gramboo/mint	3	-	-
15.	Sweet Potato	2	20	1000
16.	Ginger	2	120	600

The earliest cashew plantation in the public sector in the Kasaragod range was raised only in 1937. However, private cashew plantations must have existed even earlier. At present, cashew forms the second largest crop in the village.

Productivity and quality of the areca gardens here are rated the best in the country. The traditional mode of areca and rice cultivation is unique to the locality. This is characterised by relatively high input of organic manure and time-tested low-cost techniques of irrigation. The organic manure or compost is prepared with locally available green manure and cow dung. Since the idea of organic manuring is so deeply rooted among the farmers that they are reluctant to switch over to chemical fertilizers even in the face of scarcity of green manure. Similarly modern techniques and tools are adapted only selectively, and that too based only on rational assessment of their utility. However, finance opportunities such as availability of subsidies and loans seem to be a decisive factor in adoption of techniques.

Composting

The process of compost-making continues round the year. Floor of the cattle shed is spread with fresh green or dry leaves procured either from forest or from own garden and nearby *poramboke* lands. Usually, it is women labourers who are engaged to ensure regular supply of leaves. They are paid for the number of bundles of green manure they procure. However, in the case of smaller farming households the labour is shared among the members of the households themselves. The green leaves along with the dung,are removed to the dung pit on alternate days. Therefore, the floors of cow sheds are constructed usually with a depression to fill it with green leaves. Farmers prefer cows of local breed which are immunologically better adapted to this kind of situations than cross-bred cattle. Though the local breed is considered inferior in productivity by livestock officials, farmers prefer them because they are disease-resistant, economical in terms of fodder consumption and capable of enduring drought conditions. The vegetal matter is fast converted into a kind of compost. This manure, called *sopu*, is applied just before the out break of monsoon, once in two years. This way of applying roughly 12 tonnes of manure per every acre of garden land had been in existence in North Canara even as early as the first quarter of the 19th century.

Re-soiling of the land is the next important task performed once in five years. A new layer of red soil is added to the surface soil in garden lands. This is considered important to restore the mineral loss incurred due to irrigation and for restoring the physical properties of soil. Cultivation of areca garden uses a time-tested technique. A note on the practices of area cultivation and application of manure in the region, as existed in the late 19th century, given in the South Canara District manual, states as follows:

> "The manure commonly used all over the district is chiefly a compost of rotten leaves and the products of cattle. Ashes when available and *Sudu mannu*, a mixture of lopping of trees or twigs and leaves or vegetable rubbish and dry earth burned together are also used very extensively, and in the inland tracts, where forest is still abundant leaves and twigs are some times applied directly to the fields without either being burned or mixed with animal products. The stubble is also ploughed in, that of the first crop being left 8 or 10 inches high for the purpose. For the preparation of cattle manure the floor of the

shed where cattle are penned for the night, is strewed with branches and leaves, which are ordinarily allowed to remain there rotting in the urine and dung of the animals until the whole has been trampled into a pulpy mass. This process is simply a slovenly way of preparing what is generally regarded by European agriculturists as the best of all manures for ordinary agricultural purposes...The manure used for rice lands is usually burned but in gardens the ground round the foot of trees is dug to a small depth and the pit covered over after being filled with fresh leaves, those of *Strychnos nux-vomica* being preferred for coconuts"[78]

The system of spice garden agro-forestry practised in the Sirsi region in the North Canara district had attracted the attention of British surveyors in the early decades of the 19th century. The Havik Brahmins were the major practitioners of this mode of cultivation where a glen or valley properly sheltered from the storms and where perennial source of water was present was considered ideal for raising plantations. A variety of spices were raised here on the terraces made perpendicular to the slopes after clearing the forest. Channels of water in the form of contour canals used to be made to supply water from the pond. An earthen tank was used to collect water from springs. The major crops grown included betel nuts, betel leaves, cardamom and pepper.

The areca trees start bearing fruits in the tenth year of their growth and they continue to yield nuts for periods of 40 -70 years. As the areca trees mature the stocks of other components in the plots are slowly reduced. The mode of application of manure today is not much different from what it was during the late 19th century.

The procuring of manure for agriculture has remained for long a major preoccupation of the farmers and a highly sensitive issue. The farmers' concerns were given importance to while reserving forest lands and assessing revenue lands. Privileges of peasant on the forest and revenue lands for collection of green manure, fuel wood, thatching grass, small timber for agricultural implements, water etc. were liberally granted during the Colonial period. For instance, the *Kumaki* right[79] is a unique feature of the land settlement of this region.

Statistics on livestock (Table 4.5) shows that local breeds of cattle and buffalo are preferred over their cross-bred counterparts. At present, farmers value local breeds highly in the preparation of compost which is considered highly important for maintaining productivity of farms.

A survey of sources of cooking fuel conducted as part of the people's planning process indicates that a large majority, nearly 94 percent, of the households in the panchayat use wood for cooking and that the annual requirement of firewood came to 28404 tonnes (Table 4.6).

Table 4.5 Statistics on the Live Stock in the *Panchayat*

Livestock		Local breed	Cross breed	Total
Cattle	Cow	2367	294	2661
	Bull	325	17	342
Buffalo	Cow	219	-	219
	Bull	134	-	134
Goat		483	-	483
Poultry		24394	-	24394

Table 4.6 Requirement of Cooking Fuel in the Study Area

Sl. No.	Fuel	Number of units	Volume consumed annually
1	Fire wood	3556	28404 tonnes
2	LPG	12	2016 kg.
3	Kerosene	204	89760 litres
4	Gobargas	3	-
5	Electricity	10	1440 units

A vast majority of houses in the *panchayat*, to the tune of 2500, remain to be electrified.

Table 4.7 Electric Connections in the *Panchayat* in Different Categories

Sl No	Category	Number of connections
1	Domestic	800
2	Commercial	60
3	Industrial	2
4	Agricultural	110

137 Applications were pending in 1996

Nearly 1900 houses have only thatched roofs and they depend on revenue lands for collecting thatching grass. Ninetyfour percent of the households do not have toilets. These figures indicate that the fruits of development are still inaccessible to a great majority of the panchayat.

Characteristics of Sample Population

A survey of the 177 households on the fringe area of the forest in the Adur village was attempted in the months of April and May in 2001. The main characteristics of the sample population are summarised in Tables 4.9 and the Occupational profile of the sample population

is provided in Table 4.10.

Table 4.8 Type of Houses

Type of house	Number of houses
Roof Thatched	1921
Tiled	2663
RCC	83

Table 4.9 Summery of Characteristics of Sample Population

Details	Numbers
Total households surveyed	117
Total individuals	682
Children	157
Adult male	270
Adult female	255
Wards covered	V,VI,VII, XI

A total of 117 households were surveyed. The survey covers thus 682 individuals out of which 157 are children, 278 are men and 255 are women. Agricultural wage labourers form a major chunk of the occupational group next only to the group involved in household work. Females form the majority in the latter and males in the former categories. Both these groups together constitute nearly 60 percent of the occupational groups. Categories such as self-employed, business people and salaried class constitute only about 10 percent of the surveyed population. This is indicative of the agrarian nature of the wok force and dependence on land and agriculture for livelihood. The prime goal of the survey was to study the dependence of the various occupational groups on the forests. Qualitative information on the nature of dependence was also collected. Details of the occupational categories of the sample population are given in Table 4.10.

Details of the sample population based on landholdings are provided in Table 4.11.

Dependence on forests

Dependence on forests in the area was mainly for green manure and fuel wood. Apart from this, fodder for live stock is collected from forests or cattle are let loose for grazing in the forests. All these activities constitute violation of forest rules of which the people are aware. In these circumstances, first hand data on the forest resource use were difficult to come by. The questionnaire survey conducted proved to be inadequate. A form of participant observation method was therefore adopted in the second phase of the field studies.

Table 4.10 Occupational Profile of the Sample Adult Population

Occupational categories	Sex	Number of Individuals	Percentage	Percentage
Agricultural wage labour	M	66	12.57	22.28
	F	51	9. 71	
Self-employed	M	15	2.86	4.57
	F	9	1.71	
Household work	M	96	18.29	38.29
	F	105	20.00	
Salaried job	M	18	3.43	4.00
	F	3	0.57	
Business	M	9	1.71	1.71
	F	0	0.00	
Unemployed	M	24	4.57	10.28
	F	30	5.71	
Disabled due to old age	M	42	8.00	18.86
	F	57	10.86	

Table 4.11 Size of Land Holding and Frequency Distribution

Area classes	Frequency	Percentage
Below1 acre	39	33.33
1-2 acres	25	21.37
2-5 acres	20	17.09
More than 5 acres	33	28.21

Table 4.12a Relation between Size of Landholding and Dependence on Forest Products for Own Use

Forest Produces	Number of households procuring forest products from forests for own use			
	Size classes in land holding			
	Less than one acre	1-2 acres	2-5 acres	Larger than 5 acres
Green manure	10	21	13	14
Fuel wood	36	16	8	5
Fodder	18	10	-	-

Figure 4.1a Relation between Size of Landholding and the Dependence on Forest Products for Own Use

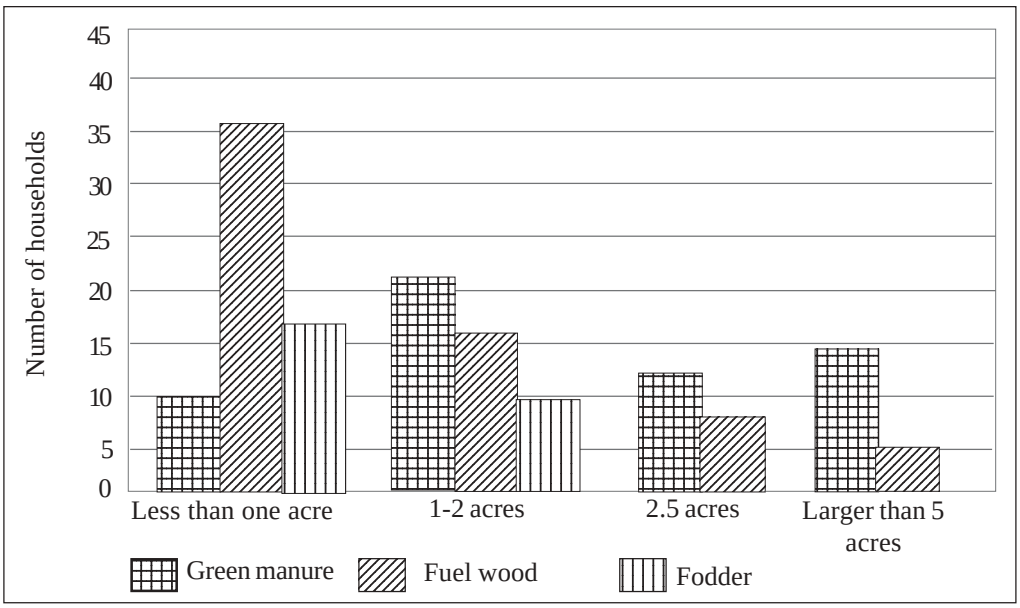


Table 4.12b Relation between Size of Landholding and Non-Dependence on Forests for Biomass Requirement

Forest Produces	Number of households that do not depend on forests for biomass requirement			
	Size classes in land holding			
	Less than one acre	1-2 acres	2-5 acres	Larger than 5 acres
Green manure	-	-	7	23
Fuel wood	-	-	11	27
Fodder	-	4	18	28

As mentioned earlier, the available evidence suggests that dependence on forests by agricultural households had existed even before the advent of Colonial rule in the area. The dependence on forests for biomass resources was deep-rooted here more than in any other region in the Madras Presidency. However, colonial forest rules reserved forests leaving aside only a few concessions and usufruct rights to the farmer. Productivity of farms and gardens was affected and activities of shifting cultivators were restricted. People resorted to every-day forms of resistance by violating and disregarding rules. In many localities in Canara these resistance movements assumed great political significance when they joined hands with national freedom movements.

Figure 4.1b Relation between Size of Landholding and The Non Dependence On Forests For Biomass Requirement

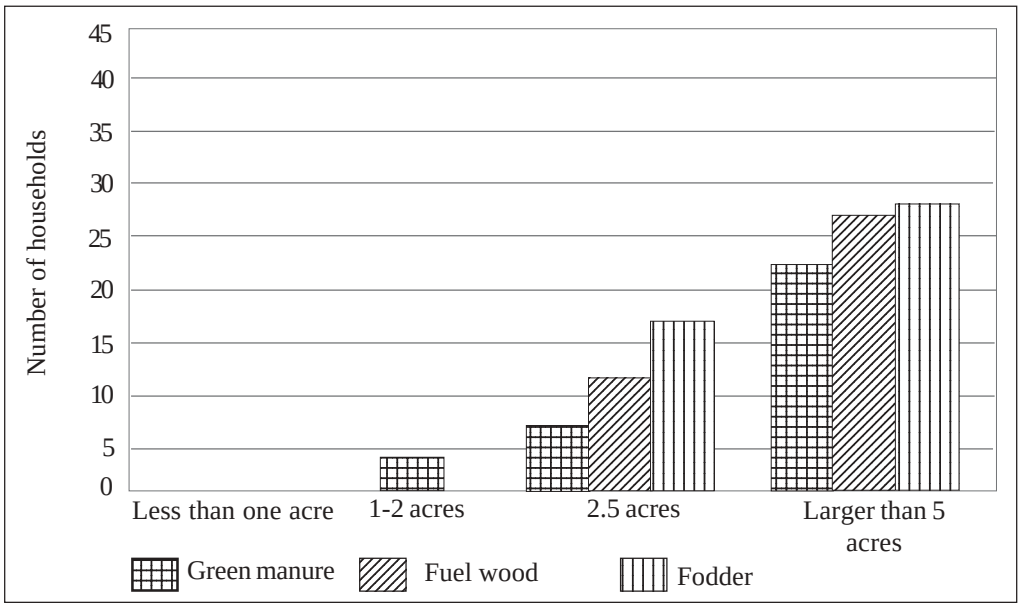


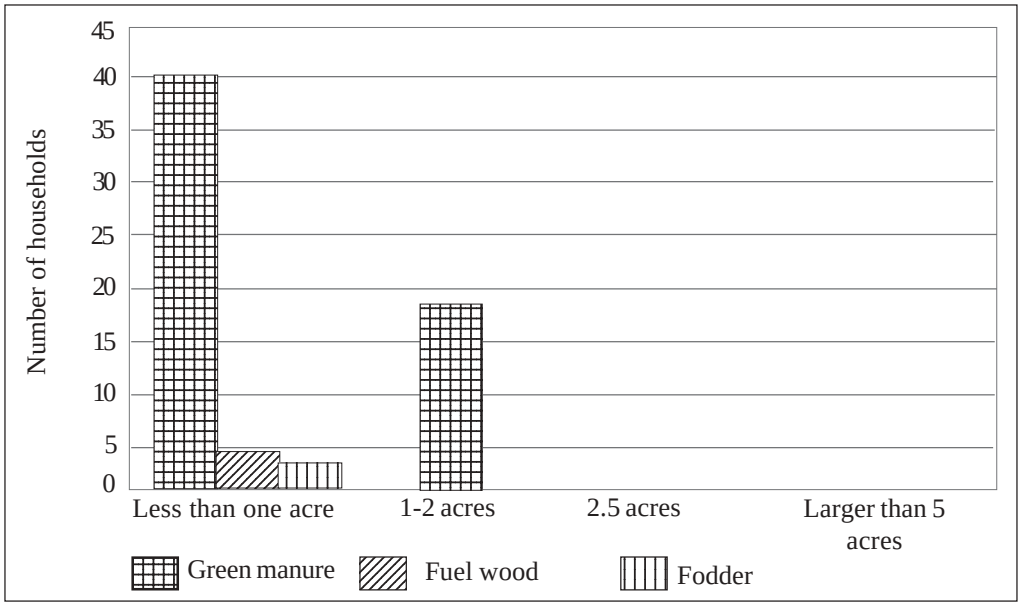
Table 4.12c Relation between Size of Landholding and Dependence on Forests for Collection of Forest Products

Forest Produces	Number of households dependent on the forests for direct income-generation (by collection of forest products for sale or by wage labour			
	Size classes in land holding			
	Less than one acre	1-2 acres	2-5 acres	Larger than 5 acres
Green manure	40	18	-	-
Fuel wood	6	-	-	-
Fodder	3	-	-	-

Tables 4.12a-c show that the size of land holding is an important determinant of the extent of dependence. Among the 117 households, 58 depend on the forests for green manure for their own use in the home gardens. Of these, the maximum number of households are of medium- sized land holdings (between 1 and 2 acres). However the difference is not much pronounced. The dependence on forests for green manure as a source of money or wage, shows a skewed picture as only households belonging to small-sized farms (below 2acres) especially the marginal ones, are engaged in the directly income-generating activities such as collection of green manure, firewood and fodder.

Collection of fuel wood is rarely done as an activity of direct income-generation from forests, through sale in the market. However, dependence on forests is the highest in terms of collection of fire wood mostly for own use. When landless households and small holders do it themselves as a regular activity, larger holders engage labourers for this work on special occasions. Larger holders are capable of reducing the dependence on forest by generating fuel wood from their own land set aside as fuel wood reserves or by purchasing fuel wood from other garden lands. In case of green manure also large holders have made modifications in the cropping pattern and set aside less productive slopes as green manure reserves. Similar patterns are visible in the case of fodder collected from forests. It may be argued that the size of the landholding is a crucial factor in determining the extent of forest dependence. However, it is worth noting that not all larger land holders have ceased to depend on forests for green manure for own use.

Figure 4.1c Relation between Size of Landholding and the Dependence on Forests for Collection of Forest Products



5. The Agro-forestry Argument

Implications of Home Garden Agro-forestry

It is often claimed by agro-foresters that growing woody plants along with arable crops helps maximization of the total biomass produced per unit area of land. The attributed reasons are the following:

1. The tree roots exploit the water and nutrients left unutilised by the crops;
2. A mixed canopy can intercept more solar energy than a camopy of crops alone could;
3. Trees can continue to grow and produce biomass even after the the crops are harvested;
4. Litter produced by trees helps recycling of nutrients from deeper layers of soil

Some experiments conducted in the semi-arid areas of India demonstrated that the inclusion of trees in the cropping system enhance the utilization of rain fall, leading to increased overall productivity[80]. Moreover, the mixed agroforestry practice is more attractive for subsistence farmers because:

1. Mixed crops reduce the risk of crop loss as a result of epidemic-like conditions;
2. Mixed crops also help diversification of crops and reduce risks posed by unstable markets;
3. Cultivation of food crops and cash crops performs the dual function of ensuring both food security and financial liquidity

Home gardens are described differently by authors; most of them describe them as intensive, multistoried combinations of crops, trees and livestock. Most authors observe that these gardens are designed to supply family requirements of food, fodder, fuel and timber and to generate additional income through the sale of surplus produce[81].

In a typical home garden of Kerala, in addition to food crops, cash crops such as coconut, black pepper, cocoa and pineapple, are also grown for sale. Depending on the slope, soil, water availability and other geographical features, the cropping pattern may vary widely from home garden to home garden. There are crop preferences that vary from farmer to farmer owing to differences in perception of risks shaped by multitude of intra-household factors. However, the market has an overpowering influence over the crop choice of farmers;

A survey on the home gardens of Kerala[83] has revealed that 31 species of trees are used as living support to pepper vines grown in home gardens. Most of these 31 tree species had other uses too. The findings throw light on the biodiversity in the homegardens but also the flexibility and adaptability of the traditional agro-forestry system in Kerala.

Agro-Climatology and Its Importance in Shaping the Home Garden Economy

Home gardens of Kerala show a mix of fairly large number of woody and non-woody food and cash crops as their components. An inventory of a typical coconut-based home garden in southern Kerala revealed stocking of 60 species of plants in a plot of 0.4 hectare in area[83]. These include cash and food crops, forestry components, and Ornamental plants. Most of them had multiple uses and are deliberately incorporated in the homestead. Ginger, which is grown as cash crop, occupies nearly 20 percent of the farm area. Multiple values perceived include not only monetary and nutritional values but also religious and ornamental values. Apart from the economic rationale, individual preferences are important in deciding crop compositions in home gardens of Kerala.

Since the definitions of agro-forestry invoke impressions of 'deliberate incorporation of woody perennials with the annual or seasonal crops on the basis of scientific observations and proven results', it is often doubted if traditional home gardens of Kerala can be considered agro-forestry. This is because species choice is not made by conducting any systematic observation on suitability. Here the distinction is made between the conscious and learned intervention of the agro-forestry experts suggesting desired woody components on the basis of systematic observations and experiments and passive or conscious choice of species by peasants based on their experience and personal preferences. Since both are equally important and mutually contributing, both are considered to be part of agro-forestry. Agro-forestry experts often express the following view: "It is worth noting that in some areas of high population density, farmers are ahead of the game [i.e. evolving complex and sustainable agro-forestry systems by the practice of trial and error][84], and are practising this kind of agro-forestry"[85].

International Council for Research in Agro-forestry (ICRAF) defines agroforestry as "collective name for land use systems and practices in which woody perennials are deliberately integrated with crops and / or animals on the same land management unit. The integration can be either in spatial mixture or in temporal sequence."[86] Agro-forestry is practised with the intention of developing a sustainable form of land use that can improve farm productivity and welfare of rural community.

The scope of agro-forestry as a discipline and as an approach to land use was later extended to the range lands also. Agro-forestry as a systematic and settled body of agricultural research emerged as a result of recognition of the importance of ecological diversity and ecological process in maintaining the long-term sustainability of farms at social and ecological levels. Some of the concepts of ecology such as diversity at different levels[87], carrying capacity, niche differentiation, and sustainability were considered rules of thump for tackling issues of pest management, nutrient depletion of soil, etc. Trade-off between sustainability and productivity of farm continues to be the central issue of agro-forestry. Major criticisms on the intensive-external input agricultural methods have been addressed in the agro-forestry approach. It views a farmland more as an ecosystem than as a culture medium. In short agro-forestry embodies the critical consciousness developed by agricultural scientists on the practice of science. They also deny the simplistic solutions which once dominated the

modern agriculture. The paradigm shift that followed the modernist perception of science and society and artificial examination of developmentalism and all the values and value system it promoted. Agro-forestry thus can be viewed as the reflection of this critical consciousness on modern agriculture. For example, an article published in the news letter of ICRAF by a leading figure in agro-forestry has remarked this: "…agroforestry practices can be seen as phases in the development of a productive agro-ecosystem, akin to the normal dynamics of natural ecosystems. Over time, the increasing integration of trees into land-use systems through agroforestry can be seen as the passage towards a mature agroforest of increasing ecological integrity. By the same token, with increasing scale, the integration of various agroforestry practices into landscape is like formation of a complex mosaic of patches in the ecosystem, each of which is composed of many niches. These niches are occupied by different organisms, making the system ecologically stable and biologically diverse. Filling some of these niches with species that provide important environmental services or economically valuable products or both should result in land use that is both sustainable and productive."[88] He suggests that "agro-forestry should be considered as a dynamic, ecologically based, natural resource management system that, through the integration of trees in farm- and range land, diversifies and sustains small holder production for increased social, economic and environmental benefits".

Over time, agro-forestry has assumed a multi-disciplinary disposition, internalising tools and techniques from both social and ecological sciences. One expert points out that "Ecological science can provide the necessary information to assess the *condition* (or state) of an agroforestry system, while social sciences provide the information necessary to make value-based judgments about the *desirability* of that condition"

Emergence of Home Gardens in Kerala

Mercantile relations of the western coast of India (especially Konkan-Malabar coasts) with European countries were instrumental in shaping the socio-economic and agricultural production relations here. The home-garden-based economic system was a result of both these external and a number of internal factors. Home gardens and mixed cultivation of various crops existed right from the time of *Perumals*. The land deeds and documents of *Tharavadus* and *Swaroopams* testify expansion of the mixed crop garden-lands between the sixteenth and the eighteenth centuries. However, it cannot be assumed that crop gardens featured an unbroken stretch of agricultural landscape as of today; instead, forest, fallow blanks, and garden lands formed a mosaic of various landuses. Evidence of forestland being converted into crop gardens can be gathered from place names also.

Major garden crops during this period were coconut and areca palms. Garden crops and products procured by the Dutch and the Portuguese during this period from Kerala included coconut oil, coir, copra, coconut, and areca nut. There exist records of the Portuguese exporting nearly four-and-a-half quintals of dry areca nuts from Kannur. Besides there exist records of observations of the Dutch on the profit prospects of the dry betel nut trade[89].

In the transactions of landed property, productivity of the garden land was also a concern. Pepper was an important crop that escalated the exchange value of cropland. Demand from the Portuguese and the Dutch was a major factor that made pepper an important garden crop.

Ginger, curcuma and tamarind also were cultivated in homesteads. Different kinds of tubers, especially diascorias and colocassia, were also grown in garden lands which were important sources of starch not only for the upper strata of society but also for poor tenants and labourers.

Fruit trees such as anjili, jack and tamarind were common in the crop gardens. Other trees of timber value also were either retained or planted in the garden preferably towards the periphery. Forest or fallow grown woods and scrubs were usually seen amidst crop gardens which constituted important sources of wild tubers, berries, green manure, and fuel wood.

For an owner, crop gardens assumed importance not only because of their subsistence value but also because of their high exchange value compared to that of other types of lands. Growth of land under crop garden had other socio-economic implications too; the most important being the emergence of a class of wage labourers who carried out specialised tasks such as coconut (or arecanut) plucking. These labourers asserted thier labour rights in terms of territory and wages. Collective bargaining by labourers and their specialisation in the skills emerged as a result. Wages were paid either as a share of the crop harvested or as money; in some cases it was paid in a combination of both. Emergence of crop gardens and markets following the rising demand for marketable crop products, for of payment of land tax in cash and for provisions and legitimacy for contracts and mortgages of property, goods and services accelerated the process of monetisation and exchange transactions. Thus, the evolution and emergence of agro-forestry in Kerala owes as much to the external factors as to internal factors.

Table 5.1 Floral Components of a Typical Kerala Home Garden: Species Grown and Their Multiple Uses (Total Area - 0.4 Hectares)

Scientific Name	Common Name	Number of Plants	Uses
I. Crop components			
Amorphophallus companulatus	Elephant foot yam	18	Food
Anacardium occidentale	Cashew	6	Food
Ananas comomsus	Pineapple	25	Food
Areca catechu	Araecanut	3	Masticatory, social, religious
Artocarpus heterophyllus	Jackfruit	6	Food
Carica papaya	Papaya	5	Food
Citrus limon	Lemon	2	Food
Citrus aurantifolia	Lime	1	Food
Cocos nucifera	Coconut	55	Food
Coffea species	Coffee	1	Beverage
Colocasia esculenta	Taro	3	Food
Dioscorea alata	Yam	18	Food
Malpighia punicifolia	West Indian cherry	1	Food
Mangifera indica	Mango	12	Food
Moringa oleifera	drum stick	3	Food
Murraya koneigii	Curry leaves	6	Food
Musa spp.	Plantain	12	Food
Panicum maximum	Guinea grass	90 hills	Fodder
Phyllanthus emblica	Indian gooseberry	2	Food, medicinal
Piper betle	Betel vine	1	Masticatory, social, religious
Piper nigrum	Pepper	23	Spice, medicinal
Psidium guajava	Guava	3	Food
Punica granatum	Pomegranate	1	Food
Saccharam officinarum	Sugarcane	1 clump	Food
Sauropus androgynus	Corneal spinach	1 clump	Food

Syzygium jambos	Jamba	1	Food
Tamarindus indica	Tamarind	2	Food, spice, medicinal, fuel
Theobroma cocao	Cocoa	7	Beverage, Cash
Zingiber officinale	Ginger	500	Cash, spice, medicinal
II Forestry components			
Ailanthus excelsa	Tree of heaven	6	Soft wood
Alstonia scholaris	Devil's tree	2	Fuel, soft
Azadirachta indica	Neem	2	Medicinal
Barringtonia asiatica	Mudilla/pezhu	7	Pepper stakes
Bombax malabaricum	Silk cotton tree	1	Fibre, soft wood
Cassia fistula	Indian laburnum	2	Social, mulch religious
Gliricidia sepium	Madre tree	2	Green manure
Jatropha curcas	Physic nut	4	Stakes
Macaranga peltata	Boddi/vatta	4	Mulch, fuel, stakes
Pajanelia longifoila	Pajanelia/azhantha	6	Stakes
Saraca asoca	Asoka tree	1	Fuel, timber, medicinal plant
Strychnos nux-vomica	Strychnine	1	Poles, medicinal
Tectona grandis	teak	1	Timber, mulch
III Ornamental plants			
Bauhinia spp.	Bauhinia/Madaram	1	Ornamental
Canna indica var. orientalis	Indian shot	3	Ornamental
Codiaem variegatum	Croton	5	Ornamental
Crossandra spp.	Crossandra	1	Ornamental
Euphorbia pulcherrima	Poinsettia	2	Ornamental
Hibiscus rosa-sinensis	Shoe flower	3	Ornamental, cosmetic, medicinal
Ixora coccinea	Ixora	5	Ornamental, medicinal, religious

Jasminum officinale	Jasmine	4	Ornamental
Mussaenda glabrata	Mussaenda	1	Ornamental
Nerium oleander	Oleander	1	Ornamental
Nyctanthus arbour-tristis	Queen of the night	1	Ornamental
Occimum sanctum	Occimum	10	Medicinal, religious
Pedilanthus tithymaloides	Pedilanthus	1	Ornamental
Poliyalthia longifolia	Mast tree	3	Ornamental
Portulaca grandiflora	Portulaca	1 bunch	Ornamental
Rosa spp.	Rose	3	Ornamental
Tabernaemontana divaricata	Crepe jasmine	1 bunch	Ornamental, medicinal
Tradescantia discolour	Tradescantia	1	Ornamental

Source: Babu, et al (1992)

6. Forest Use and its Implications on Management

Insights from present study

Forest administration in the Kasaragod region has emerged out of the colonial interest to enforce control over valuable timber resources by exclusion of the people who appropriated them for a variety of subsistence needs. Forest conservancy was originally seen as opposed to the interests of the land revenue department, the major concern of which was maximisation of land revenue by bringing more land under cultivation. However, the forest department, in order to justify its existence, resorted to revenue generation by intensifying timber extraction.

Among various projects undertaken by the Colonial forest conservancy interests included raising plantations of fine timber, reducing pressure on forest by restricting shifting cultivation and imposing restrictions on the extraction of manure and fire wood by settled cultivators. These policies proved to be crucial interventions inducing social change in the locality.

The British system of land settlement placed local landlords at the hub of economic activity. Land revenue rules introduced by the Colonial administration accelerated transformation into the money economy. Restrictions placed over the use of forest resources prompted the agriculturists to lobby for their rights. Rise of nationalistic and leftist politics were prompted by the farmer's interests. Attempts of Colonial administrators to curb shifting cultivation forced nomadic peasantry to become either plantation labourers or tenants of large landholders.

Lack of assurance for access to forest resources and absence of rights over resources resulted in unrestricted and unsustainable resource extraction and purposeful destruction of forest. Fertile valleys and glens of the region had already been converted into spice gardens; under active encouragement by the British. As a result, the forests were confined only to the higher slopes and unproductive hill tops. Naturally these forests got gradually fragmented into numerous degraded forest patches. Loss of contiguity gradually led to opening up of the canopy due to heavy extraction of biomass by the cultivators. These forest fragments were cleared for raising fine timber plantations during the colonial period and industrial plantations during the post-Colonial period. Alongside, the process of conversion still continues under various schemes.

In the period since independence landless tenants were given land on the higher slopes of hills as the fertile lands had already been appropriated by the socially and economically privileged groups. Being left with small holdings they were left not with many options other than to depend on the forest for all their sustenance.

Areca plantation is a technology perfected through centuries since the dawn of the Colonial period. From the beginning of land settlement and forest reservation, the requirement of

green manure for these plantations became a major concern for the administration and a preoccupation of farmers because forests were the only major source of manure in all these localities.

The present day landholding pattern, in which all the fertile tracts with irrigation potential are occupied by the large land holders (mostly joint families) though the per capita landholding would be quite small less fertile lands on the upper slopes of forest by small holders, do not leave many options to small farmers other than to depend on the forests for green manure and fuel wood.

Though the strict enforcement of forest protection rules has brought down the rate of extraction of forest resources to a great extent, a large proportion of the green manure and fuel wood requirement is still being met from forests. This practice can be curbed effectively by institutionalising the present mode of extraction, by defining the user groups, and by setting boundary rules by engaging in reciprocal commitment of the forest department and the people. The locality presents perhaps the most ideal location for experimenting participatory forest management in Kerala.

Appendix I

This agreement made the third day of May one thousand nine hundred and fifty eight, between the governor of Kerala (here in after referred to as 'The Grantor' of the one part and the Gwalior Rayons Silk Mfg. (Wvg.) Co. Ltd., a company incorporated under the Gwalior Companies Act (1 of Sumvat 1963) and having its registered office at Birla Gram, Nagda (hereinafter referred to as 'he company') of the other part.

Whereas the company intends to set up a Factory for the manufacture of rayon grade wood pulp wood in the Nilambur-Beypur area in the in the district of Kozhikkode;

And whereas the company is desirous of obtaining a grant from the grantor of the exclusive right and licence to fell, cut and remove from certain areas of the Nilambur Valley in the state of Kerala for the purpose of converting the same into rayon grade wood pulp or for purposes connected with its said factory;

And whereas the grantor has agreed to grant the said lease to the company subject to the restrictions, terms and conditions here in after appearing;

Now it is here by agreed and declared as follows:-

1 (a) Period of agreement and exclusive licence: The company shall have the exclusive rights and licence for a term of 20 years reckoned from the date of actual commencement of the regular working of the factory, subject to the restrictions terms and conditions, herein after contained to fell and cut bamboos for the purpose of of connected into ryon grade wood pulp or for the purpose connected with its factory and to remove the same from such areas in the Nilambur valley as are here in after more particularly described. The date of actual commencement of actual regular work of the factory will be determined in accordance with the terms of the licence, issued to the company under the industries (development and regulation)Act (ActXIV of 1951) and as amended from time to time.

(b) It is expressly understood that the bamboo extracted by the company as per this agreement shall not be used for purposes other than theses hereinbefore sanctioned.

2. Areas over which lease extends: The company shall have the exclusive right to extract bamboo as aforesaid from the areas in the Nilambur valley hereinafter referred to as 'Contract areas'. As described in the schedule hitherto and in accordance with such relation as the chief conservator of forests, Kerala may in consultation with the company from time to time decide, and to the intend that the grantor shall at all times give to the company reasonable facilities to enable it to extract its requirements for operating a hundred tonnes per day wood pulp (Rayon grade) plant which requirements are presently estimated at 160000 (one lakh and sixty thousand) tons of bamboo yearly. It is further agreed that if the contract area is not capable of yielding the company the said quantity of bamboos annually, the grantor shall permit the company to fell and remove bamboos from such other areas in

proximity of the contract areas to be specified here in after in the said schedule and described therein as 'additional contract areas', as will enable the company to obtain the above said quantity annually. Should the company within the period of this agreement require and the grantor shall have available within the NIlambur Valley bamboo in excess of the said quantity the company shall, subject to the right of the grantor to make proper arrangements for the requirements of the forest department and of the local market for the bamboo and subject to clause 4 be entitled to obtain and expansion of the plant up to 100 percent, provided that any and every such lease shall terminate on the same day as this agreement and shall be payable at the rates of seigniorage prescribed in clause 8 of this agreement: and further that should till the company require bamboos in excess of the quantity required for a 100 expansion in capacity the lease or the lease for the felling and removal of bamboos in excess of the quantity shall be upon such terms as they be mutually agreed upon.

3. Security Deposit: To secure the performance of the terms and conditions herein provided the company has deposited with the Divisional Forest Officer, Nilambur, the sum of Rs. 5000 (rupees five thousand only) (the receipt of which is hereby acknowledged) and the said sum shall be returned to the company six months after the termination of the agreement. Provided that in the event of the company committing such a breach of the terms of these present as would entitle the grantor to determine the lease hereby granted.

4. The grantor not to make similar lease: The grantor undertake that the contract areas and additional contract areas will be exclusively reserved for the company and he will not during the continuance of this agreement grant any lease or concession within this areas to any other person. The grantor further undertakes not to grant any lease or concession within this areas to any other person. The grantor further undertakes not to grant any lease or concession for cutting and extractions of bamboos in the said Nilambur valley outside the contract and the additional contract areas, if any , for any other industrial purpose from the duty of these presents till the end of a period of three years from the date of commencement of the regular normal working of the factory with a view to enable the company to decide as to whether or not to expand the capacity of the plant up to 200 tones per day. There fore the grantor further undertakes not to grant any such lease of concession has in the first instances been offered to the company and the company shall thereupon be entitled to exercise the option of accepting the lease on payment of such seigniorage as may have been tendered by the applicant or upon such other terms as may be mutually agreed upon. Provided that such option should be exercised within a period of six months from the date of receipt of intimation in writing of the grantor an intention to grant any lease or concession.

5. Restriction and reservations to the exercise of rights and powers in the contract areas and the additional contract areas will be expressly reserved and excepted.

a) The possession and beneficial ownership of the grantor in the soil and minerals upon or in or under the said areas and the right to make such use of the soil to erect such buildings or structures and install such plant upon it and to subject it to such operations for the purpose of minerals or otherwise as to the grantor may seem proper;

b) all grazing, cultivating and other surface rights, other than and except the rights expressly granted to the company by these presents.

c) The right to all trees and other natural products of the soil other than bamboos;

d) The right of the grantor to destroy bamboos in any portion of two areas for sylvicultural purpose including the making of experimental plantations subject in each case to a maximum area limit of one hundred acres per annum. Should the grantor require any areas entered in the schedule for any purposes of development he shall have the right to any reasonable portion of the same provided that he shall make available to the company equal facilities for bamboos extraction in other areas convenient to the company;

e) The right of the grantor to extract bamboos from any portion of the contract area for departmental works in Nilambur forest division subject to a limit of one thousand tones per year;

f)The company undertakes to supply bamboos within the contract areas to the existing local users of bamboos at rates to be fixed by the company in consultation with the Divisional Forest Officer, Nilambur, the quantities to be thus supplied shall not exceed one thousand tones.

g) Felling series: the company shall abide by the rules prescribed by the forest department for felling the bamboos in the area worked by the company and a copy of which rules will be given to the company, and in the event of the company being found to carryon felling in a manner contrary to the aforesaid rules the grantor shall serve a notice on the company drawing attention to this fact and requiring the company to abide by the said rules. The felling rules will be subject to modification by the Chief Conservator of Forests, Kerala State, in consultation and in agreement with company from time to time.

7) Grantor to lease site for erection of store houses etc: The grantor, if so required by the company shall lease to the company a suitable site or sites to be selected by the company out of such sites as are at the disposal of the grantor within the areas for the erection of store houses, sheds, depots, bungalows, staff offices, agencies and other buildings of a like nature *bonafied* required for the purpose of the business connected with theses presents such lease to be rent free for the term of agreement.

8) Seigniorage: No rents or other payments save such as herein with expressly mentioned shall be payable by the company in respect of the contract areas (including additional contract areas) for the period during which the same shall be held, but the company shall have to pay the grantor, a seigniorage of Re 1 (Rupee one only) per ton of the bamboos removed from the contract areas and additional contract areas ascertained as provided by the clause 9 hereof. Provided that in the event of the company exercising the option for renewal of this lease as hereinafter provided the seigniorage payable will be subject to revision at ten year intervals after the first 20 years.

9. Forest depots: For the purpose of ascertaining the quantity of bamboos from time to time reserved by the company so that the seigniorage due may be calculated there on the following provisions shall have effect namely:-

a) All bamboos which the company may remove shall be taken through such depots as may from time to time be agreed between the parties (hereinafter referred to as the "Forest Depot").

b) the forest department shall be in charge of a clerk and one temporary guard at the company shall pay the wage of the such clerk and guard but no further expenses will be payable by the company in respect of the forest depot and no rent will be charged therefore. The salaries of the Forest depot clerk and guards in charge of the forest depot shall be paid by the company annually in advance to the Divisional Forest Officer.

10. For use of a right of way to and over contract areas and additional contract areas subject to restrictions imposed by the Divisional Forest Officer, Nilambur Forest Division, The company shall during the continuance of these of these presents have the right to use any land, roads or streams outside the contract areas, which belonging to are under the control of the grantor, for the purpose of having free ingress and egress also all such land, roads or streams within the areas.

11. Liability to make roads, etc: On request by company, the grantor shall allow the company, subject to such reasonable restrictions as may form, time to time be imposed, to make dames across streams, cut out canals, irrigation works, roads and bridges, railways and ways and any other works useful or necessary, for the purpose of business of the company in or upon the contract areas and additional contract areas and also to widen or deepen existing tracks, channels, or water ways for the purpose of the said business.

12. Assignment: The company shall not (except as part of a general transfer of its undertakings of reconstruction) assign and benefit of this agreement or grant transfer, mortgage or part with any rights or privilege there under granted without the previous permission in writing of the Government of Kerala.

13. Option for renewal: the company will have the option of renewing the lease for further periods of 20 (twenty0 years at a time on the same terms and conditions as these presents, except that the rate seigniorage payable on bamboos will be liable to revision at 10 years.

14. Remedy in the event of lease of the agreement by the company: In the event of the company making any serious breach of the terms of this agreement, the grantor may give the company a notice in writing to certify the breach and allow the company a reasonable time to rectify the same. But if in the opinion of the grantor, the company has failed to do so the grantors shall be entitled to have matter referred to arbitration under close 16 hereof.

15. This agreement shall be subject to the Madras Forest Act and Rules thereunder at the

date of this agreement, copies of which are appended, in so far as they are not modified or superseded by any specific clause in this agreement.

16. Arbitration:- If at any time hereafter of either during the continuance or after the termination of the agreement, any doubt, difference of dispute shall arise between the parties here to touching or concerning their respective rights or privileges hereunder or otherwise arising out of these presents then the same shall be referred to the arbitration of three independent persons as arbitrators, one to be appointed by each party to the reference, and the third, by both the parties, there to, and the unanimous decisions of the said arbitrators or in the event of any deference of opinion amongst them the decision of the majority of them shall be binding and conclusive on the parties to the reference and every such reference shall be deemed to be a reference to arbitration under the Indian Arbitration Act, 1949 and shall be regulated and conducted accordingly.

17. All sums found to the grantor under this agreement shall be recoverable under the provisions of the Revenue recovery Act., for the time being in force as though they were arrears of land revenue due to government.

In witness there of the said persons have hereunto set their hands and seals, the day and year first above written.

Signed by Sri. C. Thomas, I.A.S., Secretary to the Government of Kerala in the Agricultural Department Acting for and on behalf of the Government of the Govt. of Kerala.

In presence of:
1.
2.

The common seal of the above mentioned Gwalior Rayon Silk Mfg. (Wvg.) Co., Ltd., was hereunto affixed and these presents were signed by:
And two of the Directors in the presence of:

1.
2.

SCHEDULE

1. All the Government Forests, which are situate in the Ernad taluk, Kozhikkode district and which are specified in green in sketch appended hereto.

2. All the sixteen unsurveyed forests situated in the Ernad taluk in Kozhikkode district belonging to private parties and the local names of which are mentioned below and the location of which are shown roughly in the sketch here to in red.

a. Nilambur Kovilakam Malavaram
b. Manjeri Kovilakam Malavaram
c. Punchakkolli Malavaram
d. Kookil Nair Malavaram
e. Pozhuthutti Malavaram
f. Vadakkekotta Malavaram
g. Ernakole And Nellikkal Malavaram
h. Kozhippara Malavaram
i. Cherankode Malavaram
j. Cherumpa Malavaram
k. Kannoth Malavaram
l. Urangattiri Malavaram
m. Neduncheri Malavaram
n. Chakkikkuzhi Malavaram
o. Kottachikadum Malavaram
p. Calvary Mount Estate

SUPPLEMENTAL AGREEMENT

This agreement is executed on this the sixth day of August one thousand nine hundred and sixty two between the governor of Kerala (here in after refered to as "the Grantor") of the one part and the Gwalior Ryons Silk Manufacturing (Wvg.)Co. Ltd., a company incorporated under the Gwalioor the Gwalior Companies Act (1 of 8 event, 1963) and having its registered office at Birlagram, Nagda (here in after referred to as "the company") of the other part;

Where as an agreement was entered into on the third day of May, 1958, between the parties here to (hereinafter was given to the exclusive right to extract bamboos from the areas in the Nilambur valley referred to as the contract areas as described in the schedule to the Principle agreement subject to the restrictions and terms contained therein;

Whereas in clause 2 of the principal agreement it was further agreed that if the contract areas are not capable of yielding to the company the quantity of 160000 tonnes of bamboo annually the grantor shall permit the company to fall and remove bamboos from such other areas in proximity of the contract areas to be specified in the schedule to the principal agreement and described as "additional contract areas" as will enable the company to obtain the said quantity of 160000 tonnes annually and whereas it is necessary to specify the 'additional contract areas' as provided for inn clause 2 of the principal agreement;

Now this deed witnesses as follows;-

I. in principal agreement-
(i) In the schedule, the following items shall be deleted and shall be deemed always to have been deleted.

All that sixteen unsurveyed forests situated in the Ernad taluk in Kozhikkode district belonging to private parties and the local name of which are mentioned below:-

a. Nilambur Kovilakam Malavaram
b. Manjeri Kovilakam Malavaram
c. Punchakkolli Malavaram
d. Kookil Nair Malavaram
e. Pozhuthutti Malavaram
f. Vadakkekotta Malavaram
g. Ernakole And Nellikkal Malavaram
h. Kozhippara Malavaram
i. Cherankode Malavaram
j. Cherumpa Malavaram
k. Kannoth Malavaram
l. Urangattiri Malavaram
m. Neduncheri Malavaram
n. Chakkikkuzhi Malavaram
o. Kottachikadum Malavaram
p. Calvary Mount Estate

(ii) in the schedule after the description of the contract areas the following shall be added:-

Additional contract areas

Government reserved forests in the forest division of Wynad, Kozhikkode, Palghat and Nenmara.

2. It is here by further agreed that should the company within the period of the principal agreement require and the grantor , shall have available within the contract ares and the additional contract areas bamboos in excess of the quantity of 160000 tonnes per year as mentioned in cause 2 of the principal agreement, the company shall subject to the right of the grantor to make proper arrangements for the requirements of the forest department and of the local market for the bamboos and subject to the terms and conditions in the principal agreement, be entitled to obtain and the grantor shall allow the company to fell and remove, such quantity of bamboos over and above the said quantity of 160000 tonnes per year up to a maximum limit of 40000 tonnes per year, for the expansion of the companies plant provided that such right shall terminate on the same day as the principal agreement, and seigniorage payable for such bamboos under this clause shall be at the rates of seigniorage prescribed in clause 2 of the principle agreement and the terms and conditions in the said clause 8 shall apply to such bamboos also. For any further expansion up to a capacity of 200 tonnes, the grantor shall permit the company to extract and remove further quantities of bamboos if available in the contract and additional contract areas.

3. Subject to the modifications noted above the principal agreement shall be and remain in full force and effect.

In witness where of Sri. K.C. Sankaranarayanan, secretary to government, Agriculture Department, for and on behalf of of the Governor of Kerala and Sri. K.M.D.Thachersey and Sri. Sri. J.J. Ashar for and on behalf of the Gwalior Ryon silk Manufacturing (Wvg.) Company Ltd., have here unto set theire hands and seals the day and year first above written.

(Sd.)
Secretary to Government,
Agriculture Department.
(On behalf of the Governor of Kerala)

In presence of witnesses:-

1. Sri. M.P. George, Chief Conservator of forests, Kerala.
2. Signed by Sri. M. Abdul Salam, Managing Director, Kerala Industrial Development Corporation
3. Signed by Sri. K.M.D. Thachersey and sri J.J.Ashar for and on behalf of the Gwalior Rayons Silk manufacturing (Wvg.)Company Ltd.

The common seal of the company is hereunto affixed and these presents are signed:

(Sd.)

The directors of the company in presence of witnesses:-

1. (Sd.)

2. (Sd.)

(Sd.)
Accountant,
Forest Conservator's Office, Kozhikkode

Appendix 2

Table 3.1. Races tribes and castes (including sub castes) of South Canara District (as per 1891 census)

Sl. No.	Occupational groups	Total no. of sub castes	Population
1	Agriculturists	23	177975
2	Toddy drawers and distillers	7	173828
3	Field labourers	23	139701
4	Traders	18	98293
5	Priests: a) Brahmins	39	95739
	b)Others	3	305
6	Christian converts	1	70641
7	Agriculturists, formerly military and dominant	17	54243
8	Fishermen, boatmen, Pall bearers	14	39402
9	Potters	2	27556
10	Temple servants	11	26397
11	Artisans	3	22526
12	Forest and hill tribes	8	20375
13	Carpenters, masons and turners	11	13932
14	Non-Indian Asiatic races	8	13826
15	Goldsmiths	4	10730
16	Oil pressers	3	10730
17	Washer men	8	9847
18	Weavers calendars and dyers	9	9495
19	Territorial, linguistic and sectarian names	18	8636
20	Barbers	6	4639
21	Beggars	9	4403
22	Mat makers, basket makers, and cane splitters	7	3254
23	Musicians and Ballard recitters	6	2730
24	Shepherds and wool weavers	4	2510
25	Leather workers	7	2372
26	Blacksmiths	2	2009

27	Personal service	2	1985
28	Gramparchers and confectioners	2	1712
29	Cattle breeders, graziers etc	7	1248
30	Astrologers and physicians	2	1233
31	Glass workers and bangle makers	1	974
32	Unclassified castes	49	740
33	Miscellaneous and dis-reputable vagrants	2	534
34	Castes not returned	1	213
35	Eurasians	1	204
36	Brass and coppersmiths	3	176
37	Salt workers	1	175
38	Tailors	4	174
39	Non-Asiatic races	2	154
40	Dancers and singers	5	123
41	Timbers and acrobats	3	98
42	Earth workers	2	57
43	Titular names	5	49
44	Hunters foulers	1	46
45	Devotees	6	35
46	Carriers	1	26
47	Sorcerers etc.	1	23
48	Jugglers snake charmers and animal exhibiters	1	14
49	Scavengers	1	1
	Total	374	1056081

Appendix 3

Kumri cultivation in Nineteenth-Century Canara[90]

Level ground is not suitable for this kind of cultivation and a hill side is always selected on the slopes of which a space is cleared during November, December and January.

The fallen timber is then left to dry until March and April, by which time the action of the sun and of the dry easterly winds which prevail at that season have rendered the dead branches and brush wood highly combustible.

The largest trees , it must be observed, are usually left standing, their arms and branches only being removed, and this mass of comparatively dry wood generates a fierce fire, the effect of which are visible in the soil to a depth varying from three to six inches.

In most localities, the seed is sown in the ashes on the fall of the first rains, the soil having been left untouched by implements of any kind. In Becul [later Kasaragod) however, the ground is ploughed before the bed is sown.

When the young plants begin to appear. The coomery is fenced in by a kind of wattle where its place is not supplied by fallen trees and the chief labour afterwards is weeding. The whole process, it will, be observed is, is one requiring little skill little skill and less capital, but long continued and hard labour on the part of the cultivator, who must moreover watch his clearing day night until harvest time in order to protect his crop from the ravages of elk, bison and other wild animals with which forests abound.

In the south (Becul) the grain raised in coomries is chiefly paddy but in other parts of the district ragiee takes its place. Share of different cultivators are marked off in the south by cotton and castor oil plants, whilst in the north later only is common. The cotton grown in these clearings is of course small in quantity, but is highly esteemed by the people though its value in the English market as estimated by the Bombay chamber of commerce would be small and much better prices can be obtained for it here than could be obtained in the Bombay market.

In the North the crops are reaped in November and December, and in the South in the October and November, and the produce is said to be at least double that which could be obtained from the same extend of ground under the ordinary mode of culture.

A small crop is taken of the ground in the second year, and in Soopah (North Canara) I have heard that a scanty produce is some times reaped in the third, after which the spot is deserted until the jungle is sufficiently high to tempt the coomery cutter to renew the process.

In the south, were ground suited to regular cultivation is comparatively scarce and the population is more dense than in the other taluks, coomery was long been carried on in a systematic way unknown in the north. The forest is regularly worked and a man goes over his holding once in 12, 10 or 7 years as the case may be, where as in North Canara virgin forest often falls before the coomery knife and the people select at pleasure (or rather have done so) old coomereies or jungles which in the memory of man have never been subjected to the process.

Appendix 4

Kadakam Vana Sathyagraham

The list of individuals who participated in Kadakam *Vana Sathyagraham* held at Kadakam (Karadka) in 1932 is the following:

1 Kandike Shama Bhat
2 Vishnu Kdambalithaya, Bellur
3 N.Raman nair (Gandhi Raman Nair), Kadakam
4 K.N. Krishnan Nambiar (Pulikkoatte Krishnana Nambiar)
5 Nittur Koran Nair, Beypu,Iriyanni
6 Naranthatta Kannan Nambiar
7 Naranthatta Kunhiramamn Nair
8 Chetti Sankaran
9 Kathicheri Charatan Nair
10 N. Chathu nambiar
11 Devappa Alva
12 Krishna Manolithaya
13 V.V. Kunhambu
14 Naranthatta Kunhambu Nambiar
15 Umesh Rao
16 Manjunatha Hegde
17 Lakshmana Hegde
18 A.V. Kunhambu
19 N.Kunhikkannan Nambiar
20 K.N. Kunhikkannan Nair,Thrikkarippur south, Elambachi
21 C.Krishnana nair , Pilikkode, Thrikkaripur
22 K.V. Kuttan Vaidyar, kakkandam, Perumbalam
23 M.krishnana Nair, Karivetakam, Anakkallu

People from the surroundings of the Kadakam (now known as Karadka), Chandanadkam, Karmamthodi, Kottamkuzhi actively participated in the *Vana Sathyagraham.*

Appendix 5

Statement showing areas of vegetational type in Kasaragod range (from old working plan) in acres

Name of reserved foerst	Area	DDF	DDF-Xylia	MDF	Evergreen & sub evergreen		Bamb-oo cum timper	Bam-boo	Degra-ded ti-mber	Scrub	Swa-mp	Grass and rock	Worked for fuel		Under plant-ations		Unstock mapped
					Hopea absent	Hopea absent							felled	prop-osed	Hopea	Teak	
Pumale	4763	-	-	-	-	32	-	1166	3563	-	-	-	-	-	-	-	-
Sampaje and exte-nsion	11853	1520	3884	32	208	43	254	1752	-	333	13	40	-	-	-	-	2484
Todikanna	3001	45	1065	99	-	18	-	-	-	22	-	-	-	-	-	-	-
Adur	4939	-	-	-	-	38	-	-	4277.5	-	-	-	-	-	-	25.3*	-
Aletti west	2878	1075	727	452	205	130	18	628	-	47	-	-	-	-	-	225	-
Aletti east	5748	3919	627	364	-	137	-	-	-	-	-	-	-	-	-	73	-
Bantaje	2246	-	-	-	-	-	-	134	2246	-	-	-	-	-	-	-	-
Kanaka-majlu	1952	-	458	1193	-	88	-	-	-	79	-	-	-	-	-	-	-
Knnadka	1305	-	-	-	-	-	-	-	1305	-	-	-	-	-	-	-	-
Karadka	2920	-	-	-	-	-	-	-	1334	160	-	-	-	1426	-	-	-
Muliar	1999	-	-	-	-	-	-	-	224	661	-	-	1050	64	-	-	-
Manda-kolu5315	3148	586	676	234	50	-	-	-	524	9	67	-	-	-	21	-	
Medinadka east	544	-	85	219	6	-	-	-	-	234	-	-	-	-	-	-	-
Medinadka west	2392	993	-	419	13	-	-	-	-	870	-	-	-	-	-	97	-
Parappa and extension	2285	-	-	-	-	87	-	-	-	-	7	-	-	-	2129	62	-
Total	54140	10700	7432	3454	666	623	472	6458	12949.5	2930	29	107	1050	1490	2129	501.5	2484

Appendix 6

Existing teak kumries with their known history in the range in 1934

Name of plantation	Name of Reserved Forest	Area in acres	Date of formation	Date of tending	Cost of tending Rs. A P
Paimbachal	Aletti West	3.50	From 1904 to 1909	1926	89 3 0
Nanguli I and II	Aletti West	3.98			
Kalangathamale	Aletti West	10.30			
Devakaje	Aletti West	6.80			
Kannadichallu	Aletti West	30.40			
Pallamoola	Aletti West	19.80			
Haspara	Aletti West	5.40			
Adapangaya I and II	Aletti West	6.10			
Sheik Patti I and II	Aletti East	4.90			
Chernur	Aletti East	2.50			
Bettangaya	Aletti East	2.60			
Chandakanna	Medinadka West	4.30	1915	1924 and 1926	50 5 0
Haspara	Medinadka West	11.58	1912		
Theppa Kana	Medinadka West	3.20	1912		
Kudambi	Medinadka West	1.00	1913		
Anakkallu I and II	Medinadka West	3.35	1914		
Yenuvara	Medinadka West	20.00	1914		
Barkaje	Medinadka West	4.20	1913		
Ballakana	Adur	5.40	1909	1927	13 2 0
Ettinadi (Chinnadi)	Adur	52.00	1900		
Mandabetta	Adur	-	1909		
Katapara	Adur	5.00	1907		
Palikochu	Adur	1.85	1913		
Balanthadka	Adur	0.88	1904		
Ballaegaya	Adur	1.35	1907		
Ballarkaje	Adur	2.12	1909		
Kallarimala	Mandekole	8.50	1908	1926	Nil Free by VTS
Papathadka	Mandekole	1.20	1908		
Chirukudal	Mandekole	16.70	1910		
Maruthimalai	Mandekole	3.30	1910		
Chakote	Mandekole	2.40	1911		
Anegudi	Mandekole	2.20	1909		

Appendix 7

Statement of revenue (in Rs.) obtained from Kasaragod range (New working plan)

Year	By government agency			By purchaser s and consumers						Total
	Timber	Firewood charcoal	Other produce	Timber	Firewood charcoal	Bamboo	Grazing	Other produce	All other sources	
1961-62	10334.00	-	-	41716.00	-	-	755.50	17662.00	282.08	466421.97
1962-63	-	-	-	41080.00	-	-	741.25	13134.50	1244.21	943640.02
1963-64	87584.17	-	-	34875.00	166.00	-	760.00	16033.00	318.46	546782.65
1964-65	1767.00	-	-	61916.00	-	58.00	928.75	19133.00	124.66	439886.28
1965-66	109044.85	-	-	-	-	48.00	660.25	18727.00	-	270577.62
1966-67	86902.40	-	-	60999.00	-	18.00	812.75	38727.00	-	472696.78
1967-68	125167.47	-	-	13812.01	-	21.00	196.50	34196.00	-	383949.74
1968-69	65565.17	-	-	-	10333.00	12.00	484.25	26950.00	10.50	222275.45
1969-70	267739.18	-	-	40600.00	-	-	643.00	85657.00	16.80	242850.77
1970-71	192052.99	-	-	-	-	-	624.75	78540.00	4616.26	1279913.85

Appendix 8

Statement of revenue obtained from Kasaragod range from minor forest products

Minor forest Product	1961-62		1962-63		1963-64		1964-65		1965-66		1966-67		1967-68		1968-69		1969-70		1970-71	
	Quantity	Sale value	Quantity	Sale value	Quantity	Sale value	Quantity	Sale value	Quantity	Sale value	Quantity	Sale value	Quantity	Sale value	Quantity	Sale value	Quantity	Sale value	Quantity	Sale value
Cinnamon oil	340	225	-	-	-	-	-	-	50 kg	245	-	-	50 kg	247	-	-	60kg	256	-	-
Keragarabeellu	1000	-	2150 kg	795	-		-	-	5165 lbs	1030	51.6	1030	-	-	-	-	-	-	-	-
Ramapathri	10.25 Mounds	210	-		155.8 kg	761	-	-	2800 kg		2800 kg		-	-	-	-	-	-	-	-
Creapers	-		615 bndls		-		-	-	-		-		-	-	-	-	-	-	-	-
Soupnut	40 Mounds		75 kg		-		15 bags	31	1650 kg		1650		-	-	-	-	-	-	-	-
Shekoy	61 Mounds		175 bags	75	141 kg	485	44 bags		3083.5 kg		2083.5		-	-	-	-	-	-	-	-
Remigota	-	-	-		-	-	-	-	100 kg		-		-	-	-	-	-	-	-	-
Nuxvomica Seeds	-	-	-		-	-	-	-	100 kg		100		-	-	-	-	-	-	-	-
Lankari Bamboo	-	-	-		-	-	-	-	-	-	109700 Nos	2065	88750 Nos.	1050	-	-	-	-	-	
Cane	-	-	-		-	-	-	-	-	-	-	-	-	-	906 Nos	275	-	-	-	-
Cashew	-	-	23200 kg	18575	20360	22105	28741	26140	2189.33 kg	275888	21889.33	27553	21889.55	27553	23620 kg.	75005	23620 kg	75005.05	23620 kg	75005

Appendix 9

Plantations raised as part of the social forestry project inside the forest areas and transferred to the department in Kasaragod range

Year	Species planted	Area	Location	Reserved forest
1986	Casurina Plantation	16.00	Theerthakkara	Adoor R.F.
1986	Casurina Plantation	7.20	Kttippara	Adoor R.F.
1986	Casurina Plantation	20.96	Pullaji	Adoor R.F.
1986	Casurina Plantation	10.48	Kayanni	Adoor R.F.
1986	Casurina Plantation	9.12	Palakkochi	Adoor R.F.
1986	Casurina Plantation	31.15	Karadka	Karadka R.F
1986	Casurina- Acacia plantation	47.8	Kakkum kuzhi	Karadka R.F
1986	Casurina- Acacia plantation	306.0	Kardka at Muliar	Karadka R.F
1986	Casurina- Acacia plantation	32.48	Muliar at kunnathur	Muliar R. F.
1986	Casurina- Acacia plantation	32.72	Karadka at kottamkuzhy	Karadka R.F
1986	Casurina plantation	24.11	Kottimunda	Kanakamajlu R.F
1986	Casurina plantation	8.64	Ambalamotta	Muliar R. F.
1986	Casurina plantation	32.00	Bepu	Muliar R. F.
1986	Casurina plantation	44.64	Mukkuvallikkanam	Muliar R. F.
1987	Casurina Plantation	13.91	Vellakkanam	
1987	Casurina Plantation	8.94	Guddadka	
1987	Casurina Plantation	19.4	Kattikkaje	
1987	Casurina Plantation	8.66	Challathukal	
1987	Casurina Plantation	24.52	Annuppady	
1987	Casurina Plantation	17.59	Annadkam	
1987	Casurina Plantation	1.50	Kattikkaje	
1987	Casurina Plantation	14.99	Chamakkochi	
1987	Casurina plantation	33.15	Pallathupara	Adoor R.F.
1987	Casurina plantation	5.7	Mandabetta	Adoor R.F.
1987	Casurina plantation	5.59	Malangadappu	Adoor R.F.

1987	Casurina plantation	14.86	Kadumandla	Adoor R.F.
1987	Casurina plantation	2.39	Balavanthadka	Adoor R.F.
1987	Casurina plantation	25.2	Adhur pallam	Karadka R.F
1987	Casurina Plantation	24.15	Kottam kuzhy	Karadka R.F
1987	Casurina Plantation	8.78	Paratha kochi	Karadka R.F
1987	Casurina Plantation	15.49	Kottamkuzhy	Karadka R.F
1988	Casurina Plantation	12.50	Karabetta campshed	Adoor R.F.
1996	Casurina Plantation	5.471	Pallanji	Adoor R.F.
1989	Casurina Plantation	4.48	Vellachery	Adoor R.F.
1990	Augmentation of degraded forest area	12.00	Vellachery	Adoor R.F.
1992	Augmentation of degraded forest area	35.58	Velichampadampara	Adoor R.F.
1992	Augmentation of degraded forest area	19.4	Pandy	Adoor R.F.
1998	Casurina Plantation	6.714	Iriyanni	Muliar R. F.
1998	Casurina Plantation	31.002	Thaire	Karadka R.F
1990	Augmentation plantatioon	51.04	Bantage Bantage	Bantage R.F.
1990	Large block augmentation plantatiion	31.112	Karadka	Karadka R.F
1990	Large block area	6.7	Kanathur	Karadka R.F
1990	Large block area	7.76	Poovadka	Karadka R.F
1990	Large block area	7.8	Poovadka	Karadka R.F
1991	Augmentation of degraded forest area	4.5	Thaira	Karadka R.F
1991	Augmentation of degraded forest area	8.2	Poovadka	Karadka R.F
1991	Augmentation of degraded forest area	6.1	Chandram para	Karadka R.F
1991	Augmentation of degraded forest area	18.72	Payaradukkam	Karadka R.F
1991	Augmentation of degraded forest area	39.02	Mallapara	Karadka R.F
1991	Augmentation of degraded forest area	45.28	Pandy	Karadka R.F

1991	Augmentation of degraded forest area	14.00	Kallathukal Moodu	Karadka R.F
1991	Augmentation of degraded forest area	12.00	Kottamkuzhy	Karadka R.F
1992	Augmentation of degraded forest area	11.00	Kayampady	Karadka R.F
1992	Augmentation of degraded forest area	33.04	Kukkenkuzhy	Karadka R.F
1992	Augmentation of degraded forest area	18.00	Chandrampara	Karadka R.F
1992	Augmentation of degraded forest area	16.80	Iriyannni	Muliar R. F.
1992	Augmentation of degraded forest area	7.72	Kayamook	Karadka R.F
1992	Augmentation of degraded forest area	17.88	Majekkal	Muliar R. F.
1992	Augmentation of degraded forest area	26.72	Kundadkam	Karadka R.F
1992	Augmentation of degraded forest area	19.48	Bepu	Muliar R. F.
1992	Augmentation of degraded forest area	5.88	Bellippady	Kanakamajlu
1992	Augmentation of degraded forest area	1.25	Kallulikkal	Kanakamajlu
1994	Compensatory afforestation	20.00	Neyyamkayam	Kanakamajlu
1994	Compensatory afforestation	58.5	Balankayam	Karadka R.F
1994	Compensatory afforestation	34.2	Cheekakkayam	Karadka R.F
1994	Compensatory afforestation	121.2	Palar	Karadka R.F
1994	Compensatory afforestation	39.8	Kottamkuzhy	Karadka R.F
1995	Compensatory afforestation	293.14	Chamakkochi	Karadka R.F
1995	Compensatory afforestation	263.98	Kattikkaje	Karadka R.F

1996	Compensatory afforestation	41.62	Kallade	Karadka R.F
1996	Compensatory afforestation	120.20	Palar	Karadka R.F
1996	Compensatory afforestation	97.62	Chapakkal	Karadka R.F
1996	Compensatory afforestation	96	Kolathilpara	Parappa R.F
1998	Casurina Plantation	5.5	Kottimunda	Kanakamajlu
1998	Casurina Plantation	16.82	Kottippallam	Muliar R. F
1998	Casurina Plantation	6.13	Pallamkode	Parappa R.F.
	Total	2853.147		

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Note

1. Corresponding figures for Dakshina Kannada district show that out of the total land area of 8441 km^2, 2.4 percent is urban, 24.4 percent of the total population 2376724 is also urban.
2. In Kerala forest being confined mostly to the highlands towards Ghats, Alappuzha district, which is predominantly a coastal district, does not have any formally demarcated forestland.
3. Buchanan (1807) after leaving Beacul (Bekal) and on reaching Chandragiri River, records:
   "Beyond this the country rises into open rising lands, all the way to Chandragiri River which is the northern boundary of Malayala". According to him the land beyond Kundapura is part of the tulua, but the language of Karnata (Karnataka) is that in most common use. In the course of his journey through Canara, after passing through Shiraly, Honawera (honavara, Cumty (Kumta), Gaukarna (Gokarna) and Ancola (Ankola), he reaches the place called Deva-kere the valley of which is watered by Bidhali and then enters Karnata (Karnataka). According to Stuart (1895) "The Kasargod taluk originally formed the southern portion of the ancient Tulua kingdom and was separated from the kingdom of Kerala by the Chandragiri river which was formerly called "Perumpula"; the river on which the fort stands is shallow but very wide and formed the southern boundary of the ancient Tulva kingdom. The nayars and the other females of the Kasargod taluk of south Canara, are prohibited from crossing the river"
   These narratives show that though the tulu language is spoken in the area between Brahmavara and Chandragiri only, the area called as tulua kingdom extended beyond Kundapura where Kannada is the mother tongue.
4. Vasudevan (1998).
4. This section of the report is aimed at presenting an overview of major influences that shaped the forest policy in colonial and post colonial period so as to function as a backdrop for the forthcoming section on the history of forest management at the Kasargod region from early 19th century. Here Malabar and Canara refer to the erstwhile provinces of the Madras presidency under British rule which are included in the present-day Kasargod District.
5. Chundamannil (1993) quotes Iyppu (1962) and F.R.I. (1961) as providing information of Diwan Raja Kesava Das opening a timber depot in Aleppey (Alappuzha) towards the end of 18 century. Ward and Conner (1863) report direct involvement of governmental agencies in timber extraction from the river basins.
6. In these princely states, the public works department was formed and most of their road construction endeavours were concentrated in the plantation areas.
7. The region witnessed frequent and strong political and administrative changes. The Raja of Maipady commanded control over most of the area in present Kasargod taluk during the 18th and 19th centuries during the British supremacy. Originally, the Maipady Raja had been under the suzerainty of Alupa Kings of Tulu Nadu. Later the Tulu Nadu came under the Ikkeri dynasty of Mysore, later the region fell under the rule of the Tippu Sultan. The region south of Chandragiri River to Beckal was under the rule of Raja of Kolattiri (who ruled from Chirakkal near Kannur). The Ikkeri Kings captured Bekkal and retained it for quiet a long period.
8. The British East India Company constituted the Canara province in 1799 by consolidating the land it ceased from the Tippu Sultan following his fall at the third Mysore War. The area comprised the present South Kannada and the North Kannada districts of the Karnataka state and the Kasargod district of the Kerala state. In April 1862, the North Canara District was transferred to the Bombay presidency retaining the taluk of Coondapur with the South Canara District, which continued to be part of the Madras Presidency.
9. Buchy (1990)
10. Ribbenthrop (1900) as quoted in Chundamannil (1993)
11. Chundamannil (1993)
12. Hurd (1983) provides an account of the establishment of railways and its economic impact. Tucker (1983) illustrates the ecological cost of railway development.

13. Lord Dalhousie suggested the establishment of a new department. Chundamannil (1993) citing Guha and Gadgil (1988) , reports that '…Dalhousie observed that impending shortages made the subject of forest conservancy an important administrative question"
14. In 1891 D'Arcy's classic treatise on the Working Plans was published.
15. Chundamannil (1993)
16. Puochepadass (1990)
17. This was an all-India project for boosting food production
18. This was a strategy followed in the wake of state reorganisation on linguistic basis. The economically important areas in the High Ranges of Kerala had large number of Tamil plantation workers who formed the majority and the situation could have led to annexation of the area with Tamil Nadu. The Travancore government sponsored a large-scale colonisation programme by encouraging Malayalee peasants of the plains to settle in the High Ranges to counter-balance the linguistic proportion in the region.
19. Viswanathan (1992) quoted in Chundamannil (1993)
20. Kerala Private Forests (Vesting and Assignment) Act and 1971 and Kannan Devan Hills (Resumption of Land) Act, 1971 were landmark Acts in respect of private forest in the State.
21. Only 60 km^2 was from Travancore
22. See appendix (IV) for one of such agreements made with the Gwalior Ryons**.** However the Kerala Forest Produce (Fixation of Selling Price) Act of 1978 was a departure. This Act had provisions for overruling and revision of any earlier agreements on the fixing of prices.
23. As quoted in Chundamannil (1993) the Commission was of the opinion that "production of industrial wood would have to be the *raison d'etre* for the existence of forests"; it also advised that "future production programmes should concentrate on clear-felling of inaccessible hardwood forests, followed by that of the mixed quality forests and valuable forests and planting with fast growing species yielding higher returns per unit area. The resulting produce from clear-felled areas should be utilised in wood-based industries as far as possible"
24. Some of these Corporations are the following: Plantation Corporation of Kerala (formed in 1962), Rehabilitation Plantations Ltd. (formed in 1976), State Farming Corporation of Kerala (formed in 1972), Oil-Palm India Ltd. (formed in 1977), and Kerala Forest Development Corporation (formed in 1975).
25. In Malabar *taungya* was introduced only in 1926 and stump-planting in 1936 (Chundamannil, 1993)
26. See Chundamannil (1993) pages 38-43 for a detailed treatment of these issues.
27. It is well known that in the Western Ghats settlers preferred open forests to evergreen (closed) forests
28. A body under United Nations; now known as World Conservation Union (IUCN)
29. Funds from other plan schemes such as National Rural Employment Scheme, Rural Fuel Wood Scheme, Rural Landless Employment Guarantee Programme, and Drought Relief Scheme were also diverted for Social Forestry works.
30. The basic objective of the Social forestry programme was to satisfy the demand for five 'f's in the rural sector, namely fuel, fodder, fibre, fertilizer and food.
31. Under the World Bank-aided Social Forestry Project 15841 ha. of Large Block Plantations, 2087 ha. of Small Block Plantations, 776 ha. of Stripe and Coastal Plantations, 1592 ha. of Tribal Fuel Wood Plantations and 113 ha. of Tribal Mixed Plantations were raised.
32. Later, rights over the extraction of most of these plantations were furnished to the pulp-based industries
33. One of the most damaging sylvicultural system followed in the natural forest of Kerala was selection felling which was later abandoned due to the widespread public opinion against it. Though the selection felling system was backed by the sustained yield principle the manner in which it was practiced in Kerala was not considered scientific by forestry experts.
34. Chundamannil (1993) quotes from the policy document 'a brilliant document displaying a major understanding of current status of forests and its potential ". The principal aim of the forest policy must be to ensure environment stability and maintenance of ecological balance including atmospheric

equilibrium which are vital for sustenance of all life forms, human animal and plant. The derivation of direct economic benefit must be subordinated to this principal aim".

35. His tenure in office was from 08-07-1799 to 09-12-1800
36. Until 1889, no survey was attempted in the area. The revenue settlement began in 1894 and was continued until 1903. Settlement conformed largely to an almost universal arrangement dating back to the time of *Vijayanagar* in the 14 centaury, known as *warg* tenure.
37. *Mulpatta* is a grant of right over land by the ruler
38. See Syam Bhat (1998)
39. Damle.(2000)
40. Damle (1993)
41. See Michael Tharakan (1984) for factors that governed the immigration of farmers from Central Travancore to Malabar.
42. Sturrock (1894)
43. Buchanan (1807).
44. "Very large numbers of cattle are annually killed by wild animals" Similar other pieces of evidence of forest influences in the every day life of the people are seen in the Manual of South Canara.
45. Sturrock (1894)
46. *Nettikat* is the boundary usually referred to in the *mulpattas* which is usually meant the crest of the hills dividing the cultivated valleys forming the watershed and thus forming the natural boundaries of the holdings.
47. Two British officers, E. Maltby and Blane, questioned the correctness of the view that the foresst and wastelands attached to estates were on proprietary right, and the opinions thus put forward by these gentlemen were acted on, and indeed exceeded in the direction of assertion of the rights of government, by later Collectors, the Board and the Government.
48. These observations support the position of the property rights school in management of Common Pool Resources. Accessibility and assurances are considered important factors among the other things which prompt prudent use of resources. Here, *kumaki* lands whose use rights are clearly spelled out, are seen managed sustainably. This could also be the reason for the existence of numerous patches of forestlands seen scattered in this fairly well populated locality.
49. This was the major source of timber for building sea-going vessels
50. Correspondence of the Collector of Canara to Board of Revenue, Fort St. George dated 31 August 1847, in Madras Board of Revenue Proceedings, 8 November 1847 as Quoted in Pouchepadass (1998)
51. *kumri* is seen spelt as *kumree* and *Cumeri* and *Coomeri* in the Colonial literature. In this report it is spelt - *kumri* uniformly except for the quotes where the original spelling is retained.
52. Burning of slashed vegetation prior to cultivation is a tradition that is shared by shifting cultivators universally. Burning facilitates immediate oxidisation and recycling of nutrients. In oxidised form nutrients left in the ash remain in the most available form. Along with the monsoon rain, if land is so prepared as to prevent soil erosion, these nutrients will become available to the crops.
53. This has to be distinguished from with the nomadic shifting cultivation carried out in revenue land by tribal groups which had very little or no contacts with the outside world.
54. *Theyyam* is a ritual dance in north Malabar associated with mother goddess worship, hero worship etc.
55. *Warg* is the holdings of *wargdars* or local proprietors
56. Pouchepadass (1998)
57. Pouchepadass (1998)
58. Sturrock (1894)
59. Collector South Canara, to Board of Revenue, Fort St. George, 13 July 1860 as Quoted in Puchepadass (1998)
60. Quoted in Davis (1934)
61. Firewood used to be transported on large scale for sale at Kasaragod and Mangalore towns by river

in boats and barges. Large quantities firewood were exported to Mangalore and Bombay markets and this proved to be a major earning to the *wargdars* and the kumri labourers.

62. Pouchepadass (1998)
63. Government Order of 23 May 1860
64. Pouchepadass (1998)
65. Bonded labour was reported from areas near Bekkal where tobacco cultivation is prevalent even now.
66. India Office Library, Board of Revenue, forest proceedings, Government Press Note no. 2699, dated 21/9/1829, "Policy of Government as regards forests in Canara district". As quoted in Buchy (1995)
67. The category Minor Forest Products (MFPs) includes all products and services other than timber derived out of the forests. The colonial attitude towards the usufruct rights of the forest-fringe communities is reflected in the term. Minor Forest Products. MFPs are crucial in sustaining the poor and the week section of the society in their most critical moments.
68. Buchy (1990)
69. Working plans prepared during the Colonial period reflect the policies and the forestland use pattern in the region. A working plan was prepared by the then Dy. Conservator of Forests Mr. P.W. Davis in the year 1934; the information provided in the plan was of the late 1920s and the early 1930s.
70. Davis (1934)
71. Davis (1934)
72. The preparation of the list of forests thus prepared was done under the supervision of Mr. Harris, Collector of Canara about 1823. The list was burned by the Coorgs in 1837
73. This recommendation was approved by the order No. 932, Revenue (Forest No. 124) dated 12 August 1884.
74. Areca was a major cash crop in which export trade existed during this period. Emergence of areca-based agro-forestry system as a dominant land use pattern of the region occurred in the early decades of the 20 century.
75. Davis (1934)
76. permit No. 46 given on 31-3-1976 for 1976-77 financial year at Parappa Reserved Forest
77. According to the 1991 census, the population of the panchayat is 20625 and the population density is 414 individuals per square kilometre. The population of individuals belonging to Scheduled Castes and Tribes totals to 6500 (SC 2348 and ST 4119) nearly 32 percent of the total population. The number of settlements of Scheduled Castes and Scheduled Tribes were 83 (SC 44 and ST 39). The census estimate of the literacy rate was 71 percent.
78. Sturrock (1894)
79. Detailed account of the *kumaki* rights was provided in the previous chapter.
80. Ong.C.K.*et al* (1991)
81. Salam, and Sreekumar (1991)
82. See Salam*et al* (1991)
83. Babu *et al* (1992)
84. comment in the parenthesis are not in the original
85. Leakey (1996)
86. Leakey (1996)
87. at genetic, species, habitat, and landscape levels
88. Leakey (1996)
89. Raghava Varrier and Rajan Gurukkal.(1995)
90. Quoted from Pucheppadass (1998) This is part of the report sent by W.Fisher, collector of Canara, to the board of revenue, fort St. George, 30 August 1858