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FARM FORESTRY SURVEY REPORT NO. 4.

GOVERNMENT OF KERALA

**Report of Farm Forestry Survey
(Social Forestry) Kerala 1991.**

DEPARTMENT OF ECONOMICS AND STATISTICS

1992.

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Table 3.11
Specific requirements of seedlings

No. of Beneficiaries
Additional No. of seed-
lings
Percentage
to total
requirements

GOVERNMENT OF KERALA

REPORT OF THE FARM
FORESTRY SURVEY IN
KERALA 1991

DEPARTMENT OF ECONOMICS AND STATISTICS - 1992

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GOVERNMENT OF KENTUCKY

REPORT OF THE BARN
FOREST SERVICE
KENTUCKY 1901

DEPARTMENT OF AGRICULTURE AND STATISTICS - 1901

PREFACE

The importance of Social Forestry as a measure to meet the growing demand for fuelwood, timber, fodder, green manure etc. and also to avert further deterioration in the forest resources is now accepted by the Central and State Governments and also by the general public. The most important component of Social Forestry is the farm forestry i.e. tree planting in individual land holdings for which seedlings are supplied by the Social Forestry Department. The progress of farm forestry is generally measured in terms of the number of seedlings distributed. But what is more important is the survival of the seedlings and their growth.

The Government of Kerala vide G.O.(Rt)No.54/91/F&WLD dated 14-2-91 have accorded sanction to the Department of Economics and Statistics to conduct a Farm Forestry Survey in order to ascertain the survival percentage of the seedlings distributed to the public free of cost during 1987. The results of the survey are presented in this report.

This report was prepared by Dr.M. Kuttappa, Additional Director with the assistance of Smt.T. Bhavana, Research Officer. Smt.R. Orana Amma, Confidential Assistant typed the entire manuscript. The sincere services rendered by the investigators appointed for this survey and the District level officers of this Department for field supervision and tabulation are acknowledged. I am also thankful to Mr.K.P. Mathava Kurup, now Additional Director and the officers of Social Forestry wing of the Forest Department for their unstinted co-operation for the conduct of this survey.

It is hoped that the findings of this survey will be useful to the planners and those interested in the Social Forestry Programme in Kerala. Suggestions for improvement are most welcome.

Thiruvananthapuram,
29-2-1992.

S. Retna Bai Ammal,
Director of Economics and Statistics

FOREWORD

The Department of Social Forestry is a branch of the forestry
department of the United States Forest Service and also to carry
out the policies of the Forest Service in the forest resources as now accepted by the
United States Government and also by the general public. The most important
contribution of Social Forestry to the forest industry is that leading to industrial
and forestry for which seedlings are supplied by the Social Forestry
plant. The progress of Social Forestry is generally measured in terms of the
number of seedlings distributed, but what is more important is the survival
of the seedlings and their growth.

The Department of Social Forestry was established in 1942 and
has since that time been a part of the Department of Forestry and
Game. The Social Forestry Survey is being conducted in several parts
of the country and the results of the survey are being reported
to the public from time to time.

The survey was prepared by Carl Peterson, Assistant Director
with the assistance of Carl L. Johnson, Research Officer, Social Forestry
Branch, Department of Forestry and Game. The survey was
conducted by the Department of Forestry and Game and the
results of the survey are being reported to the public from time to time.
A list of the names of the Social Forestry Branch, Department
of Forestry and Game, is given at the end of this report.

It is hoped that the findings of this survey will be useful to the
public and that the results of the survey will be used in the
development of the Social Forestry program in the United States.

Director, Department of Forestry and Game
Washington, D. C.

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CHAPTER - I

INTRODUCTION

The National Forest Policy of India (1952) has prescribed that forest area should be one-third of the geographical area. As against this the area under forest in India is only 66.86 million hectares which constitute only 22% of the geographical area of the country. But even the available forest resources is under the threat of degradation and depletion which is causing considerable harm to environment. Forests have been diminished through illegal encroachment for cultivation, lopping and felling of trees for fuel and fodder. Similarly overgrazing has taken its toll on young trees and grasslands, further removing the ground cover necessary to hold and replenish the top soil. Realising the ecological disasters due to over exploitation of forest resources and the increasing demand for fuelwood, timber and fodder, the Government of India and State Governments have recently initiated massive social forestry programme. According to the National Commission on Agriculture (1976) the scope for social forestry programme was defined to include farm forestry, extension forestry, reforestation into degraded forests and recreation forests.

The principal objective of social forestry programme is to increase the production of fuelwood, fodder and small timber, poles etc. from readily accessible areas and thereby to reduce the pressure on existing forest resources. To improve environmental quality by tree planting and also to generate employment opportunities are also other objectives of social forestry programme. The following are three basic components of social forestry programme.

(1) Farm Forestry ie. encouraging the private people to plant trees in their individual land holdings by the supply of nursery plants either free or at subsidised rates. This component has been called farm forestry and also agroforestry, as planting is done in and around farm lands in combination with agricultural crops.

(2) Extension Forestry

Planting trees on road, rail, canal and river sides. This along with planting of trees in Government waste lands, village common lands, and panchayat lands and other community lands has also been called as extension forestry as this results in extending forests beyond the existing boundaries.

(3) Afforestation of degraded government forests

In the close vicinity of centres of habitation, which have suffered from unauthorised removal of forest produce by the villagers. Out of the three principal components of social forestry, farm forestry is the most important component as it accounts for 50 percent of the annual planting of 2 billion seedlings under the social forestry schemes in India.

Social Forestry Programme in Kerala

Till recently Kerala was the most densely populated State in India with a density of three times that of the All-India average. But according to the provisional population figures of 1991 census, the State with a density of population of 747 persons per sq.km as against the all-India average of 267 is pushed back to the second place next only to West Bengal which has 766 persons per sq.kms. Kerala enjoys good sunlight, plentiful network of water resources and a good rainfall from both south-west and north-east monsoons. The climate in Kerala is sub-tropical with the annual temperature varying from 20 to 35 celsius. In view of the above favourable climatic conditions the State has a luxuriant growth of forests and its productivity is much higher than the all-India average. The area under forests in Kerala as per official records is 10.81 lakh hectares (1989-90) which constituted 27.8 percent of the total geographical area of the State as against the all India average of 21.9%. But the actual area under forests is likely to be less than the official figure, as a portion of forest land has been converted to other land uses during the last five decades. Individual conversion of forests to farm land, often through illegal encroachment, illegal lopping and felling of trees from reserved forests, construction of hydro-electric and irrigation schemes, the establishment of wild life sanctuaries and national parks etc. have reduced the actual area under forests. Further under the Grow More Food campaign, large tracts of forest land were taken over for the cultivation of food crops. The forests in Kerala can be broadly grouped under (1) tropical evergreen or rain forests, (2) mixed deciduous or monsoon forests and (3) sub-tropical or temperate ever green forests.

Even though forests in Kerala cover 27.8% of the geographical area the per capita forest area in the State is only 0.04 ha. as against the all-India average of 0.11 ha.

The Government of Kerala having concerned over the growing pressure on wood products and the need for preserving at least the existing forests for ecological reasons initiated a massive social forestry programme. The social forestry wing of the Forest Department has been implementing the social forestry programmes throughout the State under different schemes including the World Bank aided Kerala Social Forestry Project 1984.

Scope for Farm Forestry in Kerala

As pointed out earlier farm forestry is the most important component of social forestry programmes as it is a people's programme. It consists of mainly tree planting undertaken in the individual land holdings of the farmers to meet their own needs of fuelwood, fodder and small timbers. Since the scope for farm forestry depends mainly on the availability of land to grow trees, it is important to have a brief discussion on the land utilisation pattern in Kerala. It could be seen from the table 1.1 that the land use pattern in Kerala has witnessed only a marginal changes during the last 15 years. Owing to the acute scarcity of land (the per capita land availability in Kerala is only 0.13 hectare as against the all-India average of 0.39) most of the cultivable land has already been brought under cultivation and the crop intensity i.e. proportion of gross cropped area to net area sown, is 135 as against 127 in India. A significant point to be noted from the table is the reduction in the proportion of land under miscellaneous tree crops from 2.2 in 1975-76 to hardly 1.0% in 1989-90 indicating a substantial reduction in the tree population meant primarily for firewood and timber. A comparison of land use data of Kerala with that of all-India data presented in Table 1.2 also gives an impression that there is only very limited scope for devoting more land for farm forestry.

(2) Extension Forestry

Planting trees in road, rail, canal and river side, planting of trees in Government waste lands, along Government and other lands and other community lands, etc. are also called as extension forestry as this results in extending forests beyond the limits of the

Table - 1.1

Land utilization pattern in Kerala 1975-76 & 1989-90

| Sl.No. | Land use | 1975-76 | | 1989-90 | |
|--------|--|-------------------|------------|-------------------|------------|
| | | Area (000 ha.) | % to total | Area (000 ha.) | % to total |
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | Total area | 3885 | 100 | 3885 | 100 |
| 2 | Forest | 1081 | 27.8 | 1081 | 27.8 |
| 3 | Land put to non-agricultural uses | 259 | 6.8 | 285 | 7.3 |
| 4 | Barren and uncultivable land | 78 | 2.1 | 66 | 1.7 |
| 5 | Permanent pastures & other grazing land | 20 | 0.5 | 3 | 0.1 |
| 6 | Land under miscellaneous tree crops not included in net area | 84 | 2.2 | 38 | 1.0 |
| 7 | Cultivable waste | 113 | 2.9 | 107 | 2.7 |
| 8 | Fallow other than current fallow | 23 | 0.6 | 27 | 0.7 |
| 9 | Current fallow | 37 | 1.0 | 46 | 1.2 |
| 10 | Net area sown | 2189 | 56.0 | 2232 | 57.5 |
| 11 | Area sown more than once | 792 | - | 787 | - |
| 12 | Total cropped area | 2981 | - | 3019 | - |

Table 1.2

Land Utilisation pattern in Kerala & India (1987 88)

(Area in million ha.)

| Sl.No. | Head of classification | (Area in million ha.) | | | |
|--------|---|-----------------------|-------|--------|-------|
| | | India | % | Kerala | % |
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | Total geographical area | 304.85 | 100.0 | 3.89 | 100.0 |
| 2 | Forests | 66.86 | 21.9 | 1.08 | 27.8 |
| 3 | Land put to non-agri-cultural uses | 20.81 | 6.8 | 0.28 | 7.2 |
| 4 | Barren and uncultivable land | 20.39 | 6.7 | 0.07 | 1.8 |
| 5 | Permanent pastures and other grazing lands | 11.85 | 3.9 | 0.03 | 0.8 |
| 6 | Land under miscellaneous tree crops not included in net area sown | 3.53 | 1.2 | 0.04 | 1.0 |
| 7 | Cultivable waste | 15.63 | 5.1 | 0.11 | 2.8 |
| 8 | Fallow land other than current fallow | 11.13 | 3.7 | 0.02 | 0.5 |
| 9 | Current Fallow | 18.47 | 6.0 | 0.05 | 1.3 |
| 10 | Net area sown | 136.18 | 44.7 | 2.21 | 56.8 |

However the steady increase in the price of timber and firewood and the certain advantages of growing trees under farm forestry is becoming more attractive to a good section of land holders. Therefore a brief discussion on the distribution of land holdings in Kerala is attempted below. The data on land holdings are collected in the quinquennium Agricultural Census carried out throughout India as a centrally sponsored scheme. The latest Agricultural Census was conducted in Kerala during 1985-86 and according to this census there were 48.87 lakh holdings in the State with an average size of 0.36 hectares. The distribution of operational holdings according to various size classes presented in table 1.3 shows that 91.5% of the holdings is having less than one hectare of land and 82.0% have only less than 0.50 hectare. Holdings with 4 hectares and above constitute only 0.5% and those with 10 hectare and above constitute only 0.01%.

A brief discussion on the cropping pattern is necessary to examine the scope for farm forestry in the State. The cropping pattern indicating the proportion of cropped area under each crop given in table 1.4 shows not only the dominance of perennial tree crops but also the increasing share of perennial crops like coconut, rubber, cashew in the cropping pattern. The most important factor attributed to the change in the cropping pattern in favour of perennial crops is their higher profitability in comparison with seasonal and annual crops like paddy, tapioca etc. All these perennial crops yield timber and fuelwood as by products. They also meet the demands of wood based industry. Thus these perennial crops of Kerala serve the purpose of forestry even in their subsidiary role.

Tabl - 1.3

Number of Operational Holdings and area operated by size class 1985-86

| Size of Holding (ha.) | No. of operational holdings | | | Area operated (ha.) | |
|--------------------------|--------------------------------|--------|---------|---------------------|--|
| | No. | % | Total | % | |
| 1 | 2 | 3 | 4 | 5 | |
| 1. Below 0.02 | 487492 | 9.98 | 6223 | 0.36 | |
| 2. 0.02 - 0.5 | 3519570 | 72.01 | 477335 | 27.23 | |
| 3. 0.5 - 1.0 | 466374 | 9.54 | 324488 | 18.51 | |
| 4. 1.0 - 2.0 | 281507 | 5.76 | 377664 | 21.55 | |
| 5. 2.0 - 4.0 | 103766 | 2.12 | 267755 | 15.28 | |
| 6. 4.0 - 10.0 | 24558 | 0.51 | 129778 | 7.40 | |
| 7. 10.0 and above | 4048 | 0.08 | 169524 | 9.67 | |
| All sizes | 4987015 | 100.00 | 1752767 | 100.00 | |

Source: Agricultural Census 1985-86 DES

Tabl. - 1.4

Cropping pattern of Kerala - 1957-58 & 1989-90

(000 ha.)

| Crops | 1957-58 | | 1989-90 | |
|--------------------------|---------|--------|---------|--------|
| | Area | % | Area | % |
| 2 | 3 | 4 | 5 | 6 |
| Rice | 766.76 | 34.68 | 583.38 | 19.32 |
| Other cereals and pulses | 57.65 | 2.61 | 34.44 | 1.14 |
| Banana & Plantains | 40.57 | 1.83 | 60.76 | 2.01 |
| Tapioca | 213.96 | 9.68 | 160.14 | 5.30 |
| Coconut | 463.27 | 20.95 | 832.17 | 27.56 |
| Arecanut | 49.71 | 2.25 | 63.17 | 2.09 |
| Cashewnut | 44.04 | 1.99 | 123.66 | 4.10 |
| Tea | 39.92 | 1.81 | 34.60 | 1.15 |
| Coffee | 16.64 | 0.75 | 75.06 | 2.49 |
| Rubber | 99.87 | 4.52 | 396.47 | 13.13 |
| Other crops | 418.61 | 18.93 | 655.15 | 21.71 |
| Total cropped area | 2211.00 | 100.00 | 3019.00 | 100.00 |

The discussion on the land use pattern and cropping pattern raises the question "Is there any scope for farm forestry in Kerala? It is to find out an answer to this question that the Kerala Forest Department conducted a social forestry land use survey in 1982, to ascertain from the land holders whether they really need trees and forests.* The survey revealed that there is good scope for social forestry in Kerala and people with large and small holdings are anxious to reap the benefit of social forestry programmes. Their willingness to participate in the programme is a result of not only a better awareness among the public on the value of tree wealth but also better economic considerations. Trees can be grown in all types of lands if suitable species are available and they will not only yield timber and firewood but also provide valuable green manure and fodder for the farmer. The costs and input in growing trees are low compared to other forms of land use and the output is high compared to the input.

It is on the basis of the findings of the above survey that an ambitious farm forestry programme was launched in Kerala under the World Bank aided Social Forestry Project.

* "Social Forestry Land Use Survey for Kerala, Kerala Forest Department 1982".

CHAPTER - II

THE PRESENT SURVEY

1. Background of the Survey

In the World Bank Scheme the target under farm forestry is to distribute 340 million tree saplings covering 81% of total physical target of Social Forestry Programme of the World Bank. Under this scheme farmers are supplied with seedlings free of cost (now it is priced for persons requiring large number of seedlings) to be planted in their farms. The social forestry wing of the Forest Department is the implementing agency of the seedlings of Kerala State Social Forestry Programmes in the State. Every district has Social Forestry Office headed by an Assistant Conservator of Forests under whom two or more ranges are functioning each under the control of a Range Officer. The Department raises the nurseries and the seedlings are distributed by involving voluntary agencies like Mahila Samajams, forestry clubs, school clubs, arts and sports clubs, trade unions, National Service Scheme (NSS), local libraries etc. These organisations are given Distribution Registers to record the name and address of beneficiaries and also the specie-wise number of seedlings distributed to each beneficiary. Every year lakhs of seedlings are distributed and it is necessary to know whether the seedlings distributed are planted and looked after properly. This feed back information is necessary to rectify the defects if any in the system and further improve the distribution system. The World Bank and the Government of India wanted the Social Forestry Programmes to be evaluated regularly and prescribed an 'Operational Guide' popularly known as "Red Book". A detailed questionnaire was designed as per the guideline to collect data for the purpose of evaluation.

In the past, evaluation studies to assess the survival rate of seedlings distributed and to find out the reasons for the mortality of seedlings were conducted by different agencies based on small samples. The first State-wide sample survey to assess the survival rate of seedlings distributed under the farm forestry was carried out by this department in 1988 with respect to seedlings distributed in 1986. But the sample size was only 0.2% of the total beneficiaries listed in the Distribution Registers. The present survey relates to the seedlings distributed during 1987 and the sample size has been enhanced to 1% of the beneficiaries.

ii. Objectives of the survey

The important objectives of the present Farm Forestry Survey are

(i) to assess the survival rate of seedlings distributed under farm forestry during 1987

(ii) to find out the reasons for mortality of seedlings distributed

(iii) to find out the adequacy of extension activities and

(iv) to assess the specie-wise future requirements of seedlings.

(*) Besides Collecting relevant data for the above objectives, data relating to main occupation of beneficiaries of seedling, possession of land and cattle, species-wise number of seedlings planted, cultural practices followed, extension services availed etc. were also collected.

iii. Coverage and sample design

It is a State-wide Survey covering all the 14 districts of Kerala. Multi-stage systematic sampling method is used for the selection of beneficiaries. First stage of selection is the Seedling Distribution Register (SDR). The S.D.R.'s in each district were arranged in ascending order on the basis of the number of beneficiaries. The total number of recipients of seedlings as per the Distribution Registers during 1987 was 962654 and the sample size for this survey was 1%. Each district has two or more Forest Ranges. The sample size in each district was divided by the number of ranges in each district so as to get the number of registers from each district. The number of beneficiaries from each selected registers were obtained by dividing the total sample size by the number of selected registers.

iv. Method of Enquiry and the field work

Data for the survey were collected in a schedule specially designed for this survey by interviewing the household members and by enumerating the seedlings planted. The field work was carried out by the investigators selected for this survey from persons registered in the Employment Exchanges under the supervision of one of the District level officers of the Department of Economics and Statistics. The field work was carried out in August and September 1991 and district level tabulation in October 1991. The State level tabulation and report writing was done in the Directorate of Economics and Statistics during the succeeding three months.

v. Limitations of Survey

Name and address of the beneficiaries were not properly recorded in many distribution registers. Even if the name is recorded, it was not supported by house number or ward number of panchayat or municipality. In some panchayats, house numbers given are old numbers which had changed subsequently. In view of the above reasons the investigators found it difficult to locate the beneficiaries. Since some of the voluntary agencies involved in the distribution of seedlings have no proper identity it was difficult to check with them the correct address of beneficiaries.

It was also difficult to identify the seedlings planted in 1987 from those planted earlier or after that year even from household members due to memory lapse. As such the survival rates for basketted and bare rooted seedlings could not be worked out separately. The various limitations mentioned above have to be borne in mind while using the results of this survey.

CHAPTER - III
RESULTS OF THE SURVEY

Type of Beneficiaries

As pointed out earlier the survey covered all the 14 districts and the district-wise number of beneficiaries are furnished in Table 3.1. It could be seen from the table that Alappuzha district with the highest density of population and with no forest area accounts for 22.5% of the beneficiaries followed by Thrissur and Ernakulam districts. Idukki which is the biggest district with the largest area under forest and with the lowest density of population account for only 3.14 percent of the beneficiaries.

An attempt was made in this survey to identify the beneficiaries of seedlings according to their main occupation. The distribution of beneficiaries according to the main occupation reveals that cultivators constitute hardly 25% of the total beneficiaries whereas 37% of the beneficiaries are casual workers (Table 3.2). The progressive land reform measures implemented in the State since 1970 conferred ownership of land to large number of landless casual workers and it is quite possible that they availed the benefit of the free distribution of seedlings from the forest department. This may also be the reason for the dominance of small holders with less than 0.20 hectare of area in the total number of beneficiaries (Table 3.3).

The possession of cattle in the households have a direct bearing on the survival and growth of seedlings. It is possible that mortality rate is high in households having cattle. But at the same time if the seedlings are protected from the attack of cattle they will have a luxiant growth in view of the availability of farm yard manure in the households. It could be seen from the table that nearly 54 percent of the surveyed households have no cattle and households with more than 3 cattle constitute only 7.5 per cent.

Number of seedlings distributed

A total of 2.24 lakh seedlings were received by the surveyed beneficiaries and the average number of seedlings per beneficiary is worked out at 24. When we examine the district-wise number of seedlings distributed, it could

Table - 3.1

District-wise distribution of beneficiaries

| Sl.No. | District | No. of benefi- ciaries | % | density of popu- lation | percentage of forest area 1991 to total area |
|--------------|--------------------|---------------------------|---------------|-------------------------------|--|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | Thiruvananthapuram | 822 | 8.97 | 1341 | 22.80 |
| 2 | Kollam | 516 | 5.63 | 963 | 32.33 |
| 3 | Alappuzha | 2062 | 22.51 | 1408 | - |
| 4 | Pathanamthitta | 588 | 6.42 | 449 | 57.75 |
| 5 | Kottayam | 535 | 5.84 | 826 | 3.71 |
| 6 | Idukki | 288 | 3.14 | 214 | 50.67 |
| 7 | Ernakulam | 1029 | 11.23 | 1162 | 3.45 |
| 8 | Thrissur | 1101 | 12.02 | 902 | 34.62 |
| 9 | Palakkad | 243 | 2.65 | 530 | 31.03 |
| 10 | Malappuram | 552 | 6.03 | 871 | 28.48 |
| 11 | Kozhikode | 430 | 4.69 | 1115 | 17.74 |
| 12 | Wayanad | 289 | 3.15 | 315 | 37.06 |
| 13 | Kannur | 580 | 6.33 | 757 | 16.42 |
| 14 | Kasaragode | 127 | 1.39 | 537 | 2.87 |
| State | | 9162 | 100.00 | 747 | 27.83 |

Table - 3.2

Distribution of beneficiaries according to main source of income

| Sl.No. | Category | Number | Percentage to total |
|--------|----------------------|--------|---------------------|
| 1 | 2 | 3 | 4 |
| 1 | Cultivators | 2280 | 24.89 |
| 2 | Government employees | 724 | 7.90 |
| 3 | Private employees | 842 | 9.19 |
| 4 | Casual Labourers | 3361 | 36.68 |
| 5 | Others | 1955 | 21.34 |
| | Total | 9162 | 100.00 |

be seen that (Table 3.5) as in the case of number of beneficiaries Alappuzha district received the largest number of seedlings followed by Thrissur and Ernakulam districts. But the proportion of seedlings received in Alappuzha district is only 14.0% as against 22.5% of the beneficiaries and this can be attributed to the dominance of extremely small size of holdings in this district and as such the average number of seedlings received in this district is only 15 as against the State average of 24. There is considerable inter-district variations in the average number of seedlings received per household. While it is the highest in Kasaragode (97) district followed by Idukki (71) it is the lowest in Alappuzha (15) and Kollam (16). It may also be pointed out that the average size of holding in Kasaragode district is 0.57 hectare as against the State average of 0.34 hectare according to the Agricultural Census 1985-86.

Purpose of planting

The selection of appropriate species for planting at a locality depends on the purpose for which the tree is required to serve and the physical and climatic characteristics of the site. The main objective of farm forestry programme is to encourage the land holders to grow trees so as to enable them to meet their

Table - 3.3

Distribution of beneficiaries according to operational holdings

(Area in ha.)

| Sl.No. | Size of holding | Number | Percentage to total |
|--------|-----------------|--------|---------------------|
| 1 | 2 | 3 | 4 |
| 1 | Less than 0.04 | 1649 | 17.99 |
| 2 | 0.04 - 0.20 | 4398 | 48.00 |
| 3 | 0.20 - 0.40 | 1484 | 16.19 |
| 4 | 0.40 - 1.00 | 1152 | 12.58 |
| 5 | 1.00 - 4.00 | 458 | 5.01 |
| 6 | 4.00 and above | 21 | 0.23 |
| | Total | 9162 | 100.00 |

Table - 3.4

Distribution of beneficiaries according to number of cattle

| Sl.No. | No. of Cattle | Number | Percentage to total |
|--------|--------------------------------|--------|---------------------|
| 1 | 2 | 3 | 4 |
| 1 | No. of families with no cattle | 4951 | 54.03 |
| 2 | No. of families with 1 cattle | 1650 | 18.01 |
| 3 | " 2 " | 1366 | 14.91 |
| 4 | " 3 " | 509 | 5.56 |
| 5 | More than 3 cattle | 686 | 7.49 |
| | Total | 9162 | 100.00 |

Table - 3.5

District wise distribution of seedlings distributed during 1987

| Sl.No. | District | Seedlings distributed | | Average No. of seedling per beneficiary |
|--------|--------------------|-----------------------|------------|---|
| | | Number | % to total | |
| 1 | 2 | 3 | 4 | 5 |
| 1 | Thiruvananthapuram | 18064 | 8.07 | 22 |
| 2 | Kollam | 8652 | 3.86 | 16 |
| 3 | Alappuzha | 31443 | 14.04 | 15 |
| 4 | Pathanamthitta | 9922 | 4.43 | 17 |
| 5 | Kottayam | 13811 | 6.17 | 26 |
| 6 | Idukki | 20388 | 9.11 | 71 |
| 7 | Ernakulam | 22210 | 9.92 | 22 |
| 8 | Thrissur | 26964 | 12.04 | 25 |
| 9 | Palakkad | 9488 | 4.24 | 39 |
| 10 | Malappuram | 19760 | 8.82 | 33 |
| 11 | Kozhikode | 5294 | 2.36 | 12 |
| 12 | Wayanad | 13096 | 5.85 | 45 |
| 13 | Kannur | 12518 | 5.59 | 22 |
| 14 | Kasaragode | 12311 | 5.50 | 97 |
| | State | 223921 | 100.00 | 24 |

own requirement of fuelwood, fodder, green manure and small timber. In the present survey, the recipients of seedlings were asked to explain the purposes for which seedlings were planted and their views are presented in Table 3.6. Most of the beneficiaries planted trees with more than one purpose in mind. As one species will not meet all their requirements, more than one species are planted depending upon the availability of land and seedlings. An analysis of purpose-wise distribution of beneficiaries reveals that tree planting is done mainly for sale and to meet their own timber requirements. In view of the very high prices of timber used for building construction and furnishing, planting of teakwood trees, Mahagony etc. are becoming very attractive to a large number of households with financial capacity to wait for a return after many years. Planting of trees mainly as a source of firewood is very rare in Kerala as firewood requirements are met largely from coconut and other tree crops and also from trees planted mainly for timber, fruits fodder and manure. Cultivators have a preference for trees which provide wood for sale and at the same time provides fuel from part of the tree.

Planted area

An attempt was made in this survey to find out the area covered by seedlings distributed in 1987 in the sampled households. As the seedlings were planted in places already under the cultivation of some crops it is difficult to calculate the actual area covered by the seedlings. According to rough estimate the seedlings in the surveyed households covered an area of 778 hectares out of which nearly 60 per cent were in homesteads (Table 3.37) It is very common in Kerala that homesteads are very intensively cultivated with atleast few coconut, jack, mango or some other crops and as such seedlings planted in homesteads can be treated as under planting. Seedlings were also planted in bunds and fences separating the land of one cultivator from another and such area covered 21.6% of the estimated area. Only in 6% of the estimated planted area that there was no crop before 1987 and only in 0.5% of the area that seedlings were planted by substituting some other crop. On the whole it can be seen that the seedlings obtained under farm forestry programme were largely inter cropped or under planted and most of them do not get proper sunlight, manure, water and other plant requirements leading to slow and stunted growth.

Table 3.6

Main purpose of planting

| Sl.No. | Purpose | Number of beneficiaries |
|--------|--------------------------------------|-------------------------|
| 1 | 2 | 3 |
| 1. | Fuel wood | 2589 |
| 2. | Fodder | 635 |
| 3. | For sales | 5493 |
| 4. | Ornamental purpose | 1793 |
| 5. | Timber for own use | 5856 |
| 6. | Fruits | 3149 |
| 7. | Other uses | 2097 |
| 8. | Not with any other specific purposes | 1187 |

Table 3.7

Planted area according to land use (before planting)

| Sl.No. | Land Use | Area (in hect) | Percentage to total |
|--------|---------------------|-------------------|------------------------|
| 1 | 2 | 3 | 4 |
| 1. | Fallow | 47 | 6.06 |
| 2. | Under planted | 97 | 12.46 |
| 3. | Substituted | 4 | 0.51 |
| 4. | Bunds, Fences, etc. | 168 | 21.59 |
| 5. | Homesteads | 462 | 59.38 |
| | Total | 778 | 100.00 |

Important species

An important consideration while selecting a species for planting under farm forestry programme is that it should be quick growing and give high financial returns to the land owner. Seedlings of both indigenous and exotic species are grown and distributed under the farm forestry scheme in Kerala. The important species distributed in Kerala are Ailanthur (Perumaram or Matti) Casaurina, Mahogany, Teak, Acacia auriculiformis, cashew. The selection of a particular species depends mainly on the purpose for which it is required to serve and the suitability of the land for its cultivation. The Forest Department raises seedlings suitable to the general soil and climate conditions of Kerala. But there is considerable variations in soil conditions even within a village. Most of the species grow well wherever soil has proper aeration, is well drained and moisture is available from rainfall or irrigation whereas some species grow well even in hard and dry soils. It is for the land owner to decide which are the species most suitable to his land ~~the land owner to decide which are the~~ for which he should have a prior idea about the seedlings distributed by the Forest Department and their specific requirements for growth. But most of the recipients of seedlings planted seedlings without any proper assessment of the suitability of seedlings to the soil conditions of their land leading to high rate of mortality and stunted growth.

Survival rate of seedlings

The most important objective of this survey is to ascertain the percentage of survival of seedlings. For working out the survival rate, the number of seedlings planted in 1987 were ascertained from the households and the actual number of seedlings survived at the time of enumeration were counted. The survival rate is the percentage of standing trees counted to the total seedlings planted in 1987. The survival rate for the State is worked out at 38.47%. The district-wise survival rates given in Table reveal considerable variations from 64.93% in Idukki district to 13.38% in Kasaragod district.

Species-wise survival rates of important items reveal that the percentage of survival is the highest for the seedling of teak (55.06%) followed by *Ailanthus* (Perumaram or Matti). Teakwood is the most valued timber item and as such its seedlings are well cared by the land owners leading to high survival rate. *Ailanthus* is very popular item as it is a very fast growing item and can attain utilisable size in 10 years. This species is an important industrial raw material and is used for the manufacture of match splints and plywood veneers. In some parts of Kerala this species is cultivated as a supporting tree for pepper. Among important species grown in Kerala, the survival rate is the lowest in casaurina which is mainly cultivated for fuelwood and poles. In the social forestry programme of Kerala one exotic species which received much attention and criticism is *Acacia Auriculiformis*. It is a native of Australia and the wood is good as small timber, fuelwood and for pulp. It is grown even in dry, poor and murramy soils. The ease with which it can be grown and the fast rate of growth have made the species very popular in the social forestry programme on road sides, rail lines, community lands etc. But it is not very popular among individual land holders who want to maximise the return from their land. As such land owners do not take much interest in this specie leading to low survival rate of 25 per cent. During the course of field work of this survey it was found that the seedlings of this species was planted without knowing its name and some have cut down the seedlings once it is known that the species is *Acacia auriculiformis*. Cashew is cultivated mainly for its fruit cashewnut which is mainly an export oriented ^{item} crop. As the price of cashewnut is increasing steadily in recent years and the crop requires less of input, cashewnut cultivation is becoming more popular among cultivators and as such the survival rate of this species is more than the average rate of all species.

Reasons for mortality

An attempt was made in this study to identify the important reasons for the mortality of seedlings. The important reasons for mortality as furnished by the household members are presented in Table 3.10. However it may

Table 3.8

District-wise distribution of seedlings planted and survived

| Sl.No. | District | Planted | Survived | |
|--------|--------------------|---------|----------|------------|
| | | | Number | Percentage |
| 1 | 2 | 3 | 4 | 5 |
| 1. | Thiruvananthapuram | 18054 | 5733 | 31.75 |
| 2. | Kollam | 8990 | 4357 | 48.47 |
| 3. | Alappuzha | 31510 | 13734 | 43.59 |
| 4. | Pathanamthitta | 9942 | 5404 | 54.36 |
| 5. | Kottayam | 13778 | 6755 | 49.03 |
| 6. | Idukki | 21065 | 13677 | 64.93 |
| 7. | Eranakulam | 21821 | 8632 | 39.56 |
| 8. | Thrissur | 37454 | 8112 | 21.66 |
| 9. | Palakkad | 9118 | 4164 | 45.67 |
| 10. | Malappuram | 19285 | 3801 | 19.71 |
| 11. | Kozhikode | 5404 | 1873 | 34.66 |
| 12. | Wayanad | 13368 | 6076 | 45.45 |
| 13. | Kannur | 12367 | 6169 | 49.88 |
| 14. | Kasaragod | 12036 | 1610 | 13.38 |
| | State | 234192 | 90097 | 38.47 |

Table 3.9

Specie-wise distribution of important seedlings planted and survived during 1987

| Sl.No. | Specie | Planted | Survived | |
|--------|----------------------------------|---------|----------|------------|
| | | | Number | Percentage |
| 1 | 2 | 3 | 4 | 5 |
| 1. | Ailanthus (Perumaram or Matt) | 84999 | 38517 | 45.31 |
| 2. | Casaurina | 39571 | 3882 | 9.81 |
| 3. | Swietenia Macrophylla (Mahagony) | 18456 | 6976 | 37.80 |
| 4. | Teak | 10800 | 5946 | 55.06 |
| 5. | Acacia | 9844 | 2455 | 24.94 |
| 6. | Casiew | 5341 | 2335 | 43.72 |
| 7. | Others | 65181 | 29986 | 46.00 |
| | Total | 234192 | 90097 | 38.47 |

be remembered that mortality is caused by more than one reason but only the most important reason is ascertained from the household. It can be seen from the table that 58 per cent of the mortality is attributed to drought. The seedlings requires irrigation during the first few months after planting but very few irrigate during this period. Poor soil condition and the attack of animals and insects are other important reasons for the mortality of seedlings.

Table 3.10
Reasons for Mortality

| Sl.No. | Reason | Numbers | Percentage |
|--------|-----------------|--------------|---------------|
| 1 | 2 | 3 | 4 |
| 1. | Animals | 4423 | 7.19 |
| 2. | Insects | 4350 | 7.07 |
| 3. | Heavy rain | 2888 | 4.69 |
| 4. | Weeds | 1098 | 1.79 |
| 5. | Soil corditions | 5954 | 9.68 |
| 6. | Drought | 35691 | 58.03 |
| 7. | Pest | 1266 | 2.06 |
| 8. | Fire | 502 | 0.82 |
| 9. | Other reasons | 5334 | 8.67 |
| | Total | 61506 | 100.00 |

Cultural practices

Seedlings of both indogenous and exotic species were distributed to the land holders but some species grow only if proper irrigation, manuring weeding and other cultural practices are done. The various cultural practices followed in farm forestry presented in Table 3.11 reveal that only one third of the beneficiaries irrigated the seedlings and only 13.5% manured them. While nearly 14% have resorted to weeding, plant protection measures were

resorted to only by 3.5%. There is a general opinion among the public that seedlings are distributed not according to the requirements of land owners and as such they are not properly cared leading to high mortality rate.

Table 3.11

Distribution of beneficiaries resorting to cultural practices

| Sl.No. | Cultural practices | Number | Percentage |
|--------|---------------------------|--------|------------|
| 1 | 2 | 3 | 4 |
| 1. | Irrigation | 3011 | 32.86 |
| 2. | Manuring | 1238 | 13.51 |
| 3. | Plant protection measures | 321 | 3.50 |
| 4. | Weeding | 1282 | 13.99 |

Extension

The term extension refers to a kind of educational process through which information and new ideas (innovations) are conveyed to the target group with a view to create awareness among them so that new ideas could be adopted. The success of farm forestry programme depends on the extension services available to the farmers in respect of choice of species, technique of planting, manuring and other cultural practices. The data collected from this survey point out the gross inadequacy of the extension service. Even though 75 per cent of the beneficiaries needed advice only very few got advice on various aspects of farm forestry as detailed in Table 3.12.

Table 3.12

Distribution of beneficiaries according to advice on tree husbandry

| Sl.No. | Items | Number | Percentage to total beneficiaries |
|--------|---------------------------|--------|-----------------------------------|
| 1 | 2 | 3 | 4 |
| 1. | Farmers who needed advice | 6885 | 75.14 |
| 2. | Farmers who got advice on | | |
| | i. choice of species | 320 | 3.49 |
| | ii. Planting technique | 710 | 7.74 |
| | iii. Manuring | 184 | 2.00 |
| | iv. Espacement | 95 | 1.03 |
| | v. Irrigation | 59 | 0.64 |
| | vi. Disease control | 65 | 0.70 |
| | vii. Plant protection | 87 | 0.94 |

Future demand for seedlings

One of the objectives of the survey is to assess the species-wise future requirements of seedlings and the willingness of farmers for planting more trees. Species-wise number of beneficiaries requiring additional seedlings and the quantum of seedlings required given in Table 3.13 reveals that there is more demand for the seedlings of teak from the maximum number of beneficiaries, Ailanthur, Swietenia Macrophylla (Mahogany), Cashew are other important species demanded by the farmers. These species are required mainly for sale purpose and not to meet their family requirements of fuel fodder, or small timber and as such farm forestry can be treated as a commercial proposition for maximising the income of the farmer.

Table 3.13

Specie-wise requirements of seedlings

| Sl. No. | Species | No. of beneficiaries requiring additional seedlings | No. of seedlings required | Percentage to total requirements |
|---------|-------------------------------------|---|---------------------------|----------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| 1. | Teak | 3587 | 30365 | 33.41 |
| 2. | Ailanthus (Perumaram or Matti) | 1973 | 13452 | 14.80 |
| 3. | Swietenia Macrophylla (Mahagony) | 2216 | 10325 | 11.36 |
| 4. | Cashew | 844 | 4008 | 4.41 |
| 5. | Ucalyptus | 371 | 2135 | 2.35 |
| 6. | Casuarina | 459 | 2085 | 2.29 |
| 7. | Almond (Badam) | 151 | 592 | 0.65 |
| 8. | Acacia Auriculiformis | 352 | 472 | 0.52 |
| 9. | Sibabul | 75 | 229 | 0.25 |
| 10. | Vaka (Albezia Faleataria) | 25 | 168 | 0.18 |
| 11. | Others | 6324 | 27065 | 29.78 |
| | Total | | 90896 | 100.00 |

Reasons for not planting

Nearly 27% of the surveyed beneficiaries have informed that they do not intend to plant more seedlings in the near future and the reasons attributed are furnished in Table 3.14. Lack of space to plant more seedlings is found to be the most important reason for deciding against any further planting programme. Non-availability of required species is the other important reason.

Table 3.14

Reasons for not planting trees

| Sl.No. | Reason | Number of beneficiaries | Percentage to total |
|--------|------------------------------------|-------------------------|---------------------|
| 1 | 2 | 3 | 4 |
| 1. | No space | 1645 | 66.01 |
| 2. | Poor growth | 207 | 8.31 |
| 3. | High Mortality of seedlings | 148 | 5.94 |
| 4. | Required species are not available | 137 | 5.50 |
| 5. | Other species are more profitable | 318 | 12.76 |
| 6. | Others | 37 | 1.48 |
| | Total | 2492 | 100.00 |

Chapter 4

SUMMARY OF FINDINGS

The results of the present Farm Forestry Survey is based on data collected from 9162 households constituting 1% of total beneficiaries of seedlings distributed during 1987. The survey revealed that 66% of the beneficiaries possess only less than 0.20 hectare of land and those with more than one hect. of land constitute only 5.25%.

Eventhough the main purpose of farm forestry is to produce firewood, small timber and fodder for the family requirements of cultivators the survey revealed that the main purpose is for sale either as timber for building construction or as softwood for industrial purposes.

The survey results showed that only 38.47% of the seedlings distributed were survived with considerable inter-district variations. It was also found that seedlings were planted in areas already over crowded with many tree crops leading to stunted growth which, in turn, lengthens the period of rotation. Species-wise, the survival rate is very high in the case of seedlings of teak and Ailanthus which are grown mainly for sales where as it is very low in the case of seedlings meant for firewood and small timber. The survival rate can be enhanced considerably if the seedlings are distributed after ascertaining the requirements of the land owners.

There are several reasons for mortality of seedlings but the most important reason is drought. If the seedlings are irrigated atleast for a few months after planting the survival rate can be enhanced considerably.

The data collected from the survey point out the gross inadequacy of the extension service and that is also an important reason for the high rate of mortality of seedlings.

Regarding the future demand for seedlings land owners preference is more in favour of teak, Ailanthus (Matti) Swietenia Macrophylla (Mahagonny) and cashewnut.

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