

**AN ECONOMIC EVALUATION OF FOREST DEVELOPMENT IN KARNATAKA  
WITH SPECIAL REFERENCE TO SOCIAL FORESTRY PROGRAMME**

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**JUNE, 1993**

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WITH SPECIAL REFERENCE TO SOCIAL FORESTRY PROGRAMME**

**Thesis Submitted to the  
University of Agricultural Sciences, Dharwad  
in partial fulfilment of the requirements for the  
Degree of**

**Doctor of Philosophy  
in  
AGRICULTURAL ECONOMICS**

**By  
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**JUNE, 1993**

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CERTIFICATE

This is to certify that the thesis entitled "AN ECONOMIC EVALUATION OF FOREST DEVELOPMENT IN KARNATAKA WITH SPECIAL REFERENCE TO SOCIAL FORESTRY PROGRAMME", submitted by Mr. MAHANTPRASAD B. PATTANASHETTI for the degree of DOCTOR OF PHILOSOPHY in AGRICULTURAL ECONOMICS, to the University of Agricultural Sciences, Dharwad is a record of research work done by him during the period of his study in this University, under my guidance and supervision and the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

Dharwad  
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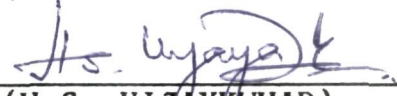
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*DEDICATED TO  
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**CHAPTER - I**

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**INTRODUCTION**

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## I INTRODUCTION

The dependence of Indian economy on natural resources cannot be over emphasised. The dominance of agrarian structure with majority of the poorer section, being part of the eco-system, has rendered 'status to natural resources' as the deciding factor for economic development and its sustenance. Over time, due to increasing population, the natural resources are being depleted at alarming pace. Global warming (or anthropogenic green house effect), ozone depletion, acid rains are some of the symptoms of the deteriorating global climate. The deteriorating natural resources have made their adverse impact in many more ways in India involving even basic needs.

By the turn of the century, the country has to satisfy various needs of over one billion people and 0.6 billion cattle. There is already heavy pressure on land resources. The total geographical area is about 325m.ha. The cropped area is the order of 145 m.ha., 70 percent of which totally dependant on rainfall and contribute about 45 percent to the nation's food production. Arid and Semi-arid regions occupy 54% of the total land area and more than 70% of the total cultivated area. As such a detailed examination into the

land use system in this fragile eco-system is of utmost importance.

Because of the pressure of the population more and more of marginal, sub-marginal and degraded lands are put under cultivation, resulting in further land degradation. Cultivation of these lands, instead of benefitting the farmers is doing harm to them, resulting in an annual loss of about 600 million tonnes of top fertile soil along with nutrients. Soil erosion is causing heavy siltation of dams and other water storage structures leading to floods, loss of human and animal lives and loss of agricultural production in some of the fertile areas.

Some portion of the forest area has been converted to crop cultivation and even in the balance area the vegetative cover is fast dwindling. During the early 1970s 69 to 75 m.ha. area was reported to have been under the control of forest department. The recent satellite imageries have clearly indicated the poor vegetative coverage of forest lands. The forest area is estimated to be around 15% of the land area during 1984-85. Even the recorded area is far less than the recommended 33% for an ideal eco-system. Degradation of forests is most alarming in the arid and semi-arid regions where ecological fragility does not allow quick restoration.

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The severity of biotic pressure in India is evident by the fact that it supports more than 50% of buffaloes, 15% of the cattle, 15% of goats and 4% of sheep population of the world with only 2.5% of land area.

Acute shortage and the resultant high price of fuel wood has led to the burning of 90 to 100 million tonnes of dry cow dung cake annually, representing 400 to 500 million tonnes of wet dung, which otherwise could have increased our agricultural production and also production of biogas substantially in addition to ensuring more hygienic conditions. Fuel wood shortage is also causing considerable damage to the productive forest area through illicit cutting of trees, including timber trees.

By the end of the century, our deficit of food, fuel wood and fodder (green and dry) has been worked out at 75;140 and 110.04 million tonnes, respectively (Deb Roy, 1991). The requirement of timber will be of the order of 65 million cubic meters. The above demands can be met of about one third of the total land area under forest cover. We have to put a third of the total land area is put under forest cover.

Karnataka, one of the southern States of India, is situated in the southwest of the country, with the total geographical area of 19.2 m.ha. and with a population of 44

million. The forest area in the State is 3.86 million ha. (1990) accounting to 20% of the total geographical area of the State, as against 23% of All India average and 33.33% as envisaged in the National Forest Policy. Thus, Karnataka represents 5.51% of the country's population occupying 5.85% of the country's area. The per capita forest area in the State is 0.10 ha.

Apart from the direct benefits from the forests by way of supply of timber and fuel, and annual revenue from the sale of the forest products, the indirect benefits from the forests to the State and the Country, are enormous. The forests in the state help to maintain the ecological balance in the region and also to protect the environment. They form the catchment of rivers on which, much of our prosperity depends. In the plains it acts as shelter belts and wind breaks, ameliorating the climatic conditions in the dry area, checking dessication to a great extent and thereby increasing the yields from agricultural lands. To derive these benefits there is need to manage the forest lands on the principle of sustained yield and maintaining a balance between demand and supply.

In ancient India, the tradition of veneration of the forests and trees in the social set up, provided the



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protection to forests, such as tree groves locally designated as Devar Kadus, Gundutopas, Nagarbanas and trees along the roadsides. In the earlier days, in the rural areas, there was also a moral compulsion on the part of the people to maintain woodlots and, whenever called for, to take up planting with community effort. However, in the few decades, with the ever increasing biotic pressure on the forests, all these social restraints and participations have been declining causing immense damage to the reserve forests. During the periods of wars the better forests were overworked to meet the defense needs for the production of charcoal to substitute petroleum products. Due to paucity of investments in the forestry sector, these overworked areas could not be restored with the desired species and in many an area the scar is still seen.

Karnataka, perhaps was one of the first States which realised the importance of conserving forests and improving the growing stock it had. Thus, in 1973 the Government in appreciation of the fact that pressures built up for release of forest land for agriculture was getting to be insurmountable, surrendered its powers of dereserving the forest area to the legislature. Thereafter several measures were brought in the interest of ecology and environment of which, creation of Forest Development Fund for increasing the

investment in the Reserve Forests, is to be highlighted among others.

While the State forests are mainly managed to produce timber (hardwood and softwood) to meet the demand from defense, railways, ship building industries, and individuals for private uses, they also cater to the needs of the people in respect of their requirements of firewood, small timber, fodder and many minor products. There is a general shortage of both major and minor forest products in the State and fodder, firewood are in severe scarcity.

The demand projections on the requirement of wood by 2000 A.D. for the State, is estimated at 50 million cubic meters. Whereas, the present production including from man-made forests is assessed at 1.5 m.cu.mt. i.e. from known sources and 26 million cu.mt. from unrecorded and private sources.

Out of the 44 million population (1991 Census) in the State, 30 million live in rural areas and catering to all the needs of this population and the cattle, in respect of the above mentioned requirements, is a problem the State Forest Department is faced with. The revenue and community lands, set aside for free exercise of privileges, being bereft of trees due to over exploitation, people depend heavily on the

State forests for their day-to-day requirements. The National Commission on Agriculture, which examined this question, has recommended for concerted efforts to raise fast growing species in community lands and in farmers' lands to meet the ever increasing demand.

Unless the villager is self sufficient in respect of his requirements of forest produce, the state forests cannot be saved and allowed to serve the national objectives. It is in this context that the Government have embarked upon a massive programme of Social Forestry in the State. The main afforestation activity of the department is therefore mainly confined outside the Reserved forests of the state.

Social Forestry and Wasteland Development form a major component in India's strategy to deal with ecological balance and socio-economic crisis. More than half of the population of India, the poor half, for their sustenance, depend upon fuelwood, fodder and small timber, on the forests and other common lands which have become increasingly denuded and degraded over the years. It would thus be seen that the requirements of fuelwood, timber and bamboo are so great that their scarcity coupled with high prices is undiscerning village economy and is lowering the quality of life (shah, 1988).

The concept of Social Forestry was enunciated in a comprehensive manner for the first time by Mahatma Gandhi, the Father of the Nation. Pragmatic and down-to-earth as he was, he stated in clear terms without coining any new phrases, "An ideal village should be conditioned such that the villagers could procure all their daily needs and requirements of materials of thatch, bamboos, fuelwood, grazing etc from within a radius of five miles".

The National commission on Agriculture (NCA) coined the phrase "Social Forestry". The term Social Forestry is difficult to define precisely, but is generally understood to mean tree-growing (including associated products like bamboos, grasses, legumes) for the purpose of rural development. As social forestry has a rural development focus and is heavily dependent on the active participation of people, it is also known as "forestry for local community development" or "participatory forestry" (F.A.O., 1986, Paper No.75).

Social Forestry Programmes in India have grown in importance and scale, and now constitute a major element in India's overall rural development programme. From modest beginning over a decade ago, there has been almost an exponential growth in the human and financial resources devoted to Social Forestry.

Social Forestry project (S.F.P) in Karnataka is under implementation since the year 1983-84. The project is implemented with the financial assistance of the World Bank and Overseas Development Agency in the proportion of 50% and 45% respectively. The balance 5% is invested by the Government of Karnataka and the Government of India.

The primary objective of the 5 year (1983-88) World Bank/British Overseas Development Agency aided Karnataka Social Forestry Project, which has been extended further (up to 1992), was to increase supplies of fuelwood to rural and semi-urban areas through the establishment of 1.5 lakh ha of plantations located throughout the State. The secondary objective was to provide small timber, fodder, fruit, bamboo and other minor forest products for cottage industry (Report on the W.B./O.D.A. aided social forestry project, 1983-84).

The Social Forestry Project was implemented on a priority basis in 15 districts which fulfilled at least two of the following three conditions:

- i) mean annual rainfall below 800 mms,
- ii) designated forest area less than 15% of the total geographical area and
- iii) more than 9 rural based persons per ha of presently designated forest area.

The 15 priority districts for implementation are Bangalore Rural, Belgaum, Bidar, Bijapur, Chitradurga, Dharwad, Gulbarga, Kolar, Mysore, Mandya, Raichur, Tumkur and Chickmagalur. However, the Farm Forestry component of the project is being implemented in all the 20 districts of the state.

Apart from this the State Forest Department is also implementing many Forest Development programmes/schemes in Natural forests to improve forest wealth.

The other schemes being implemented are to increase timber match wood and pulpwood for meeting the present and future demands; soil conservation in the catchment areas of the river valley projects and in vulnerable areas in the dry belt; reforestation of degraded forests, establishment of sandal estates; creation of infrastructure facilities such as roads, buildings, communication network and training of personnel.

Government have been tilting their development strategies in favour of better utilization of forests, both for the production of goods and for various environmental and protection services. With this increasing interest in the forests, it has come to a greater awareness that the potentials are limited in terms of satisfying all demands on

the forests at one time. Increased utilization of existing forests and establishment of new forests require new investments of a nation's otherwise limited resources, land, managerial and technical skills and capital. India is not an exception to this. There are a number of competing uses for these resources, both within the forest sector and in other sectors of the economy. Thus, governments have to develop some means of choosing between alternative uses for the same limited resources.

The usual approach involves setting up some criteria for choice and then appraising or evaluating each proposed alternative use of resources in terms of these criteria. To aid in this process, a whole body of concepts and techniques has been evolved under the heading of "Project Planning, Evaluation and Analysis", where the term "project" refers to a particular use of resources that is to be evaluated. A project involves inputs (costs) and outputs (benefits), and the measures and activities which transform the inputs into outputs.

Forestry presents some unusual and difficult, but not totally insurmountable problems for an economic analyst. There are special problems because, some of the outputs of the forest are generally not traded in commercial markets, hence

it is imperative to estimate their prices through other means. The markets for all forest products including wood, are often imperfect in the economists' sense of the term. There are many problems of individual and social attitudes, not based upon economics and sometimes not based on any factual foundation, that nevertheless may greatly affect management decisions. There are especially difficult problems of time dimensions such as costs incurred at one time or by one generation, values obtained at another time or by another generation, one could add to this a list of other problems which the economic analyst must face in forestry.

Coming to the Economic Evaluation of Forestry projects, Forestry Projects vary widely in nature, scope and size from a small fuelwood plantation to a large integrated forestry and forest industry complex including wood production, harvesting, transport, processing and marketing, and from an industry project to a national park or a watershed protection project.

The objectives associated with Forestry Projects will vary with the type of project, the nature and purpose of the institution which will carry out the project, the point of view adopted, and of course, the broader political, cultural and economic environment within which the project will



function. For a private entrepreneur or corporation, a forestry project is generally undertaken to make a profit or increase the chances for making future profits, or to reduce the danger that, the expected profits will not be forthcoming. By definition, most private projects are associated mainly with some aspect of the profit motive. In contrast to this, the public sector is interested in undertaking forestry projects, or supporting them in the private sector, for a variety of reasons associated with basic societal objectives. They can be many and varied, and seldom is a public Forestry Project associated with only one of them.

Some of the objectives of various Forestry Projects are to :

- improve economic efficiency, i.e., increase the aggregate benefits (goods and services available for society) derived from the use of the nation's limited resources,
- improve conditions for the poorer members of the society,
- increase social, political and economic stability,
- improve environmental conditions and land use,
- generate increased revenues for government which can be used for various social needs.

Most of the public forestry projects involve a combination of these objectives and some may include all of

them. Similarly, public support for forestry projects is generally based on the belief that, such projects will contribute to a number of social objectives. How such multiple objectives are handled in practice in project planning and decision-making varies with the situation. Most commonly, some of them are put in the form of constraints on the project. A plantation project may be contemplated to provide fuelwood for consumption and to protect steep hillsides from erosion. Increased consumption may be taken as the main objective, with the environmental improvement objective expressed as a constraint on the way in which the project will be undertaken. Ultimately, public administrators or decision-makers have to provide the basis for weighing different objectives and setting constraints. These concepts might seem foreign to foresters used to sthinking in physical terms of growing trees, producing wood, protecting soil etc. However, there is a direct link between these types of physical activities and the objectives mentioned. Forestry activities are not financed and carried out for the benefit of the forest, but are carried out to satisfy human wants, whether there be more housing or paper, greater enjoyment from looking at better forests, or protection of soils and watersheds to prevent decline in production of food, fibre or deterioration of water quality. The stated objectives reflect

that the forestry investments are ultimately made to increase human satisfaction

Thus, the above discussion on Economic Analysis/Economic Evaluation of Forestry Projects, clearly emphasises the importance of studies on implementation of various forestry projects, especially of participatory forestry projects. A detailed study of "Social Forestry Projects", at the present context, in the state, is much meaningful and beneficial, because the project is about to be concluded. Hitherto, no such comprehensive and in depth study has been made for Karnataka state. This study mainly attempts to find answer to the basic question of whether the forest projects with special reference to social forestry project have achieved this objective or not. Therefore the present study would be an attempt to take up Economic Evaluation/appraisal of Forestry Projects with special reference to the Social Forestry Project in Karnataka, with the following broad objectives.

- 1) to identify and quantify the different components/factors of Forest Development programmes,
- 2) to evaluate the impact of the Social Forestry on income and employment of beneficiaries,
- 3) to evaluate the Forest Development Programmes with special reference to Social Forestry Project,

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- 4) to evaluate the Forest Development Programmes through opinions of the policy makers, officials and beneficiaries.
- 5) to suggest the policy measures based on the findings of the study.

#### CHAPTER OUTLINE

CHAPTER I Highlights the importance of preservation, conservation and development of the forest wealth of the country in general and of the State in particular, along with the implementation of various Forest Development Programmes for the above mentioned purpose with special reference to the Social Forestry Project.

CHAPTER II Presents the findings of the previous research works, relevant to the present study, in brief.

CHAPTER III Consists of brief explanation on the physio-geographical features of the study area and puts forth the reasons for purposeful selection of the study area. Highlights the sampling procedure adopted, analytical tools and techniques employed and assumptions made to arrive at the results.

CHAPTER IV Provides results of the study in brief.

CHAPTER V Discusses the results of the study in detail, with the logical support of the findings of the previous studies.

CHAPTER VI Summarises the results and discussions of the study in brief and gives the policy implications of the study.

**CHAPTER-II**

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**REVIEW OF LITERATURE**

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## II REVIEW OF LITERATURE

In this chapter the previous research studies, relevant to the present study are reviewed and the same are presented in brief.

The findings of these research studies have been presented under the following sub-headings ;

- 2.1. Performance and impacts of Forest Development Programmes with special reference to the Social Forestry programme.
- 2.2. Economic and financial viability of the Social Forestry Project.
- 2.3. Methodological aspects.
- 2.4. Opinions about the Social Forestry Project and suggestions to improve its performance.

- 2.1. Performance and impacts of Forest Development Programmes with special reference to the Social Forestry programme

Ajit Bharthuar (1991), while suggesting measures for making people's participation in social forestry meaningful, observed that, even though benefits from these plantations had not gone largely to the weaker sections as envisaged in the appraised project document, and there had been significant changes in the way of living and attitude of the villagers.

Involvement of women in the project, activities had been substantial and encouraging. The freedom to collect dry leaves and twigs and pruned material and the opening of joint accounts for depositing the sale proceeds from village wood lots for the community use, had acted as positive incentives for the villagers. The villagers were sceptic about marketing the produce outside and await liberalization of the existing timber transit rules. The author concluded that coalescence of the three elements viz., effective government workers, active village leaders and people's active co-operation contributed to the success of the programme.

Angsuman Basu and Ghose (1990), after investigating into the performance of Social forestry project and participation of people, revealed that, in spite of so much loud claims about the success of the programme, it was yet to make discernible impact on the life pattern of the poorer segment of rural population and on the maintenance of ecological balance. He pointed out that, landless people were distrustful of social forestry programme since the produce from such community efforts seldom reached them.

Arnold et al (1987), reviewed the objectives, performance, achievements and assumptions underlying the



forestry project for poor, in relation to sericulture, ecology, economics, sociology and project management. They lamented that although 1,58000 ha. of plantations were established on community lands (71% of target), survival rates and yields had been very poor. So far, as it was mentioned, the project had had little effect on the target groups of village communities (landless, small and marginal farmers, women and children).

Bhattacharya (1986), studied the performance, viability and acceptance of the social forestry in Haryana and implications of large scale planting of eucalyptus trees in the State. The reference years of the study were 1982-83 and 1983-84. He concluded that following observations :the number of workers per family, education, Fuel and fodder needs, financial position, and land to spare by way of waste land had positive effects on the participation of farmers in the Social Forestry Programme.

Chauhan and Ingle ( 1986 )observed that, per day per head consumption of fuel of the villagers was about one k.g., which included firewood, agricultural waste and cow dung cake. The average consumption poor family was 6.5 k.g. of fuel per day. The villagers depended on farm forests for fuelwood and

government forests, as these were major sources of fuelwood. The share of farm forestry in meeting the fuelwood requirement was 38% of the total requirement of the villagers under study. However, availability of fuel was not sufficient from farm forests. Farm forestry, therefore, seemed to be inadequate in meeting the fuelwood needs of the people. It was also found that majority of the villagers had to spend substantial time ranging from 1 month to 3 months per annum, in collecting fuelwood, which costs more than actual fuelwood collected. It could be concluded that, in view of the present situation, there was considerable scope for expansion of farm forestry.

Chandrashekhar et al (1987), concluded that, forest based industries had played a significant role in the destruction of the forests. The Karnataka government have under taken a systematic programme of reforestation with single-stand eucalyptus plantation in these areas which have been cleared of natural forests.

This article examined the Social Forestry Programme of the State, which was introduced at about the same time as the land reforms were being implemented, and drew attention to the fact that the programme had resulted in small and marginal farmers abandoning food grain cultivation not out of choice,

but out of the inability to grow these crops in lands surrounded by eucalyptus plantations.

Chambers et al (1989), observed that lift irrigation and trees fitted the livelihood priorities of the poor. Trees could provide subsistence and income through minor forest products like firewood, fodder and seasonal crops. Where they could be cut and sold freely. Trees owned by poor people could enhance their security as savings banks, which were cashable to meet contingencies and avoid debt. Farmers favoured abolition of all restrictions in harvesting trees on private lands and of transit and sale restrictions.

Dalvi and Shukla (1988), assembled information on the extent to which the Gujarat Social Forestry Programme had achieved its targets, analysed the reasons for its success and for any short fall in its performance, in order to improve the impact and efficiency of the programme. The programme components evaluated were village woodlots, strip plantations, farm forestry and reforestation.

It was found out that, the roadside plantations had provided shade to road users. About 70% of the expenditure incurred in the plantation activity of the social forestry programme was composed of wages of unskilled labourers.

Although the message of planting trees had been received by all categories of farmers, performance of small farmers was poor.

Helin (1989), conducted a study in Somalia, where, as part of a larger resources programme, multipurpose tree species were planted in 1982 in a small scale species trial on a narrow band of alluvial along the river of Jubba in South West Somalia.

The researcher opined that the scheme progressed well. Beginning in 1988 the incentives were discontinued, apart from provision of free seedlings to those who had raised trees successfully. Some 50 to 75 of the original farmers continued the scheme. Some 55% of the farmers sold poles and leaves, and 36% had raised trees as wind breaks. In 1989 the respective figures were 38% and 23%, respectively. Most of the farmers planted trees in otherwise unused areas. Costs were low and returns good-mostly from the sale of construction materials (rather than fuelwood). Soil protection was also a factor in the decision to grow trees, 15% of the farmers giving this as the main reason. Fodder products were also important. More farmers were then willing to pay for tree seedlings and some raised their own.

Kumar (1990), gave an brief account of the intensive afforestation programmes in China since the formation of the people's Republic, which had led to the increase in forest coverage of 8.6 to 14%. About 7.2 billion trees were planted in the plains (including homesteads and villages). Community initiations and involvement has been encouraged. There were about 1,75000 co-operative forest farms with a total managed area of 16.67 million hectares and about 4065 state owned forest farms (46 m.ha.).

Melkania (1990), made an effort to document the role of Social Forestry in environmental conservation, taking Uttar Pradesh Social Forestry Project as an example. The author could observe that, as a result of implementation of the project from 5th year and onwards, approximately 17 lakh tones of firewood would be available for consumption in the rural areas. Due to this it was estimated, that nearly 80 lakh tones of fresh dung would be used as manure in the fields, which would materially increase the production of the crops. Besides firewood, approximately 2 lakh tones of grass and leaves would be available annually as cattle feed. From 3rd year onwards, rural cottage industries like production of tassar from Arjun plantation, silk production from leaves of mulberry trees, scale making, leather tanning from bark of

Babul and Arjun, oil extraction from seeds of Kanji, Neem and Mahua, household furniture making from the timber of Sissoo, Sirsa etc. would be established.

The author could further add that, apart from the indirect benefits like control of soil and water losses, the direct impact on important environmental components of even a small programme of afforestation would be far reaching, when the programme was completed approximately 50000ha. of such land as it did not contain trees would have been covered with trees. Obviously the entire human-use system could be regenerated holistically through forestry based recovery process.

Mercado (1990), surveyed the project for evaluation, which was launched in 1982, and also which was the largest tree planting project implemented by the Bangladesh government, covering 23 of the 61 districts of the country. The socio-economic evaluation of the project indicated that the majority of the 780 randomly selected beneficiaries interviewed believed it to be a success, only 4% considered it a failure and 45% were non committal. There were apparently no physical impacts of the project.

Malmer (1987), pointed out that many people, from the poor sectors of the community, were not aware of the benefits they were entitled to receive through the programme. Seedlings that should have been distributed to the economically weaker sections of the population had instead been distributed to the affluent farmers. The programme, it was argued, had also been a cause of dispute among the betteroff people in the village, since some had received benefits from the programme and others not. It was intended gradually to shift the responsibility of the plantations on the panchayat and bring about greater popular participation in the programme.

Patel (1983), while explaining why the Gujarat Energy Development Agency was investing huge sum of money in a five year Energy Plantation Project, found out that, the Energy Plantation being labour intensive in nature would provide scope for large scale employment, particularly for rural poor, with a minimum of education and training, and that could reduce their migration to the cities.

Rahman (1987), mentioned that community forestry project in Bangladesh resulted in a general increase in living standard and socio-economic status of the people.

Verma (1987), worked out the flow of benefits from a village woodlot and noticed that the trees provided fuelwood small timber for house construction and repairs, and employment. Internal rate of returns was observed to be 38%. It was opined that the poor would have been benefited in a greater way if they had a greater say in the decisions of the village panchayat.

## 2.2. Economic and Financial viability of the Social Forestry Projects

Dhanasekaran (1990), opined that to make the S.F.P. more viable both economically and financially in Tamilnadu, farmers should be encouraged to plant eucalyptus along field boundaries, which would result in additional income to the farmers. The author also suggested that establishment of an extension agency and creation of marketing infrastructure in collaboration of the State Forest Department to make Social Forestry Programme popular and viable.

Sudha and Reddy (1990), carried out a study in Prakasam district of Andhra Pradesh to know the economics of casurina and cashew vis-a-vis groundnut crop in dry lands. It was found that, casurina was more profitable even at higher discounting rates compared to the groundnut crop and Cashew



was less profitable compared to ground nut. However, Cashew provided assured and stabilised income in dry lands.

Nadkarni et al (1992), proved the economic as well as financial worth whileness of S.F.P. in Karnataka even under fairly rigorous assumptions. This was so under all the three measures-N.P.V., B.C.R. and I.R.R.. They further opined that higher rates of discount would be improper when the flows of benefits and costs were in constant prices as in their case. They concluded that, the fairly high economic and financial viability of social forestry would show that was a sector very much worth investing in what was more, the investment need not be considered as a charity. It needed no subsidisation, as it pays for itself even after meeting the bio-mass needs of locals in respect of fuelwood and fodder free of cost.

Shaik Haffis et al (1992), while judging the economic viability and studying the comparative advantage between the two alternative systems, viz., annual arable crops and trees species (agro-forestry) in desert areas of Rajasthan, reported that the B.C. ratio as well as net returns per ha. associated with each of the tree species under study, was higher as compared to annual arable crops. Thus, it was inferred that raising trees in the marginal agricultural lands

of the desert areas of Rajasthan not only generated higher employment through better livestock management and sheep and or goat rearing, and income to the people but also halted the process of deterioration in land quality to a greater extent.

### 2.3. Methodological Aspects

Marion Clawson and Roger A Sedjo(1982), argued that economic anyalysis could be fully aplicable to forestry, which posed some specific problems, and it was necessary to estimate shadow prices for forest products which were not traded in commercial markets. Measure of economic efficiency was considered as one of the major economic considerations in forestry. Further, it was suggested that economic efficiency as applied to forests, clearly, should be for the whole forest cycle or longer not merely for harvest of existing stands. It was computed that economic analysis as applied to forestry must consider the costs borne and the advantages gained by the decision maker, private or public.

Harou (1983), concluded that agro-forestry projects have existed since ancient times, and basic economic principles and the classical project evaluation technique can be used to help solve investment decisions for agro-forestry projects. Some of the recommendations for this type of

project appraisal are to: focus on the small farm participants, study the forestry component and the risk diversification, detail the description of the externalities and consider the cultural environment in which the project is to be implemented.

Joshi and Agnihotri (1983), collected cross sectional data on existing energy use pattern fuelwood requirements, farm and nonfarm income availability of labour, capital, preferences for tree species etc. to develop a multi-period afforestation plan to meet the fuelwood demand for a village in Haryana, the technological coefficients for different tree species were estimated from various secondary sources, and by personal discussion with scientists, foresters and other experienced persons.

To develop a long term afforestation plan for fuelwood, multi objective linear programming technique was used. The social benefits of afforestation plan for fuelwood were projected in ex-ante frame work. The benefits considered were saving of macro soil nutrients through animal dung, enhancement of agricultural production and generation of employment opportunities. An attempt was also made to measure the extent of income inequalities before and after the

afforestation plan. The inequalities were measured in terms of Gini Concentration ratio (G.C.R.) computed with the help of New Coordinate System Approach (N.C.S.A.).

Hamilton (1985), presented the evaluation of the 3rd phase of the Nepal-Australia S.F.P.. The researcher observed that the project was viewed both as one which provided direct material benefits (principally in the form of firewood, fodder, timber and erosion control) to the residents of the project area, and as one which aimed at in providing research information on improved methods of community reforestation in the hills of Nepal. These latter benefits were assumed to spill over into other forestry projects in the hills. Shadow pricing of costs and quantifiable benefits generates rates of return of 10% when only benefits internal to the projects were taken into account and 20% when external benefits were added. The project appeared justified when other quantifiable benefits (including increased soil fertility and cleaner water supplies) were considered. Finally the financial implications of the project from the view points of the Central Government and local communities were considered.

Hoekstra (1985), argued that the discount rate selected for the analysis of agro-forestry systems needed

careful consideration, especially when dealing with subsistence oriented farmers. Adopting the borrowing or savings rate, or investment rate, common in most analyses from the economic view point, will not do since there were reasons to believe that in many cases the consumption rate of interest would in fact be lower. Further more, it was argued that farmers who were relatively well fed, but face sustainability problems on their farms would have lower discount rate than farmers who were less well fed but expect an upward trend in their production with their present activities. Applying the same discount rate for all farms should therefore be avoided if there were clear indications that there were differences in the relative wealth and future prospects, it was suggested.

Bhattacharya (1986), made an attempt to assess the performances of S.F.P.in Haryana. The study was limited to two forest divisions, which represented two extreme conditions-one favourable and other one unfavourable, under which the programme was being implemented. The criteria for deciding the extreme conditions prevailing in a division were 1. Maximum and minimum rainfall and 2. Maximum and minimum area under forests. Three ranges each from the two divisions were purposively selected on the basis of their relative performance shown in the implementation of the programme.

Both beneficiaries and non beneficiaries were considered for the study. An attempt was also made to analyse the targets and achievements, and to calculate expected returns per Rupee invested for all the components of social forestry.

Fox (1986), described a field method developed in Java, for working with villagers and forestry officials and arriving at consensus about actual land use patterns in an area. A map was drawn collaboratively and worked upon until it is ready to be used as the basis for a formal agreement about rights between parties previously in conflict.

Chopra (1987), considered explicit distribution, management and design in the analysis for evaluation of social forestry. For the specific project analysed, rates of return to the project authority and to society were calculated. It was found that a divergence of interests between the two might exist. This could be minimised by correct selection of design and a system of cost sharing based on people's participation.

Grut (1987), worked out cost-benefit analysis of fuelwood and forest protection projects in developing countries. Benefits were estimated in terms of the value of alternative fuels that people would probably use if fuelwood and charcoal were not available.

Shukla and Balvia (1988), considered for evaluation of Gujarat S.F.P. all aspects of the programme, viz., technical, social, economic, financial and administrative. The study was divided into following six components :1. Technical forestry study, 2. Forestry field study, 3. Village social sciences survey, 4. Public administration and rural development study, 5. Extension and communication study and 6. Study of the role of non government organisations.

Duchhart et al (1989), reviewed the planning methods used in agro-forestry in the tropics, with suggestions for their improvement. Selected existing methods, with an emphasis on those being used in Kenya, were analysed in terms of goals, community needs, site assessment, opinions for action, implementation, management and evaluation.

Hosier (1989), opined that agro-forestry must be economically attractive to farmers if they were to be successful. In addressing the economics of an agro-forestry system it was suggested, planners must pay attention to input and output mixes and attitudes towards risk as components of small holder profitability. From the small holders' perspective, local market conditions and existing practices might provide a greater indicator of project success or

failure than environmental benefits, which might be nearly impossible to quantify. A positive on farm economic analysis, as it was observed, provided a necessary but not sufficient indication of the successful implementation of an agro-forestry project. This paper made use of two case studies to demonstrate the need for and short comings of economic analysis as applied to agro-forestry projects. It represented an attempt to understand the economic impact of the project after 5 years of agro-forestry extension work.

Patnaik (1990), made an attempt to make benefit-cost analysis of Orissa Social Forestry Project. The benefits in monetary terms were included in the revenue stream of the project. Project costs included values of all goods and services (land, labour, capital and managerial skills) used for establishing, maintaining and operating the project. Time and economic life of the project was considered as major parameters in calculating benefit-cost ratio.

The cost, yield and price factors were analysed on the lines of recommendations made in "Social Forestry Project in Orissa for World Bank Assistance".

Dhanasekaran (1990), selected Gobichettipalyam forestry range in Tamilnadu through multi stage sampling, to study the performance of Social Forestry programme. In the second stage of sampling one village was selected randomly.



In the third stage a random sample of 34 adopters made available for the social forestry range office. Detailed information from each of the adopter was collected by direct interview method. The researcher employed tabular analysis technique for the above mentioned purpose.

Sudha and Reddy (1990), used discounting and compounding technique to evaluate the tree plantations of casurina and cashew. Different discount rates viz., 12, 18 and 24 percent were used to test the degree of profitability of cultivating these tree crops. The economic indicators like pay back period, N.P.V., B.C. ratio, annuity value and internal rate of return (I.R.R.) were calculated using different discount rates. Sensitivity analysis for these plantations were also worked out by estimating net present value, B.C. ratio with variations in costs as well as returns.

Nadakarni et al (1992), worked out net present value (N.P.V.), B.C.R.(Benefit-cost ratio) and I.R.R. to establish the economic and financial viability of social forestry projects in Karnataka. For this purpose they randomly selected five social forestry projects. They tried three rates of discount : 3, 5 and 8 per cent, the last used only for the period beyond 20 years. They also used sensitivity analysis of economic viability, to try out the robustness of their results.

Shaik Haffis et al (1992), worked out B.C. ratios to judge the economic viability and to know comparative advantage between the two alternative systems, viz., annual arable crops and tree species (agro-forestry).

#### 2.4. Opinions about the Social Forestry Project and suggestions to improve its performance

Wirsum (1984), outlined some of the key factors in the formulation of social forestry strategies in developing countries, based on the personal experience as follows:  
1. land, 2. labour, 3. capital and 4. technical knowledge.

Site and species selection, site and seedling preparation, tree planting, weeding and plant protection and inter cropping, were considered as other important activities in social forestry.

Kowero and Temu (1985), identified the following four limiting factors for implementation of village forestry programmes in Tanzania, 1. Inadequate planning, 2. Poor follow up, 3. Lack of sufficient seedlings and 4. Lack of transportation.

It was suggested that overall responsibility of programmes be given to forest division and that programmes become an integral part of village development plans.

Nair and Krishnamurthy (1985), opined that social forestry was expected to preserve and improve the home garden system by protecting it from the instable market process. It was felt that the current S.F.P. which sees trees in isolation from the whole system, was not geared to achieve that goal. To formulate ecologically sound, economically viable and socially relevant farm forestry programmes, better ~~under~~standings of home garden system was recommended.

Noronha and Spears (1985), were of the opinion that social forestry, which involved the direct participation of beneficiaries, consequently required entirely different skills and attitudes from the forester, including socially sensitive analysis of forest related human population, uses of forest products etc. It was revealed that the design of projects with and for people implied and understanding of group process and socio-economic and cultural patterns. Four main areas, identified by the authors for sociological enquiry, which were almost invariably necessary in the design of forestry projects were 1. Population, 2. Land, 3. Labour and 4. Social organisation.

Reddy (1985), pointed out that critics of social forestry had maintained that the dominance of eucalyptus over

the rest of species was a deliberate plan to meet the needs of the pulp wood based industries in Karnataka. The author argued that the main problem involved was not eucalyptus and its effects on the soil and environment in general, but the efforts made by vested interests to use every scheme to keep themselves in power. It was further noticed that eucalyptus had become the main stay of farm forestry not only because financial incentives were offered, but also and more importantly in order to circumvent the land reform legislation in Karnataka.

Tewari (1985), made an attempt to identify the constraints in S.F.P. in Uttar Pradesh and to suggest remedies. The study focused on households selected from villages. It was observed that the survival rate of saplings in individual households was found to be significantly lower than that of the area as a whole. The author revealed that plant mortality was due to browsing by cattle, lopping of branches and accidental fires. The study recommended the establishment of an extension wing in the area and that in particular, farmers should be educated about the advantages of having plantations on their farms.

Vergara (1985), observed that forest based development schemes such as social forestry should be

considered as Rural Development Programmes, their proximity to the large masses of rural poor and their goals of uplifting their social and economic status, make them a potential tool for rural development. The researcher drew up a research agenda to serve as a guide for a tree project research in social forestry listing the following items : diagnostic research, validation research, dissemination research and policy research. It was concluded that a S.F.P. formulated to uplift the rural sector of the Asia-Pacific countries could have much greater chance for success if designed, tested, modified and disseminated on the basis of these five items.

Bhattacharya (1986), after assessing the performance of social forestry in Haryana concluded that the fuelwood needs of the rural population could be effectively met if the S.F.P. in the state was nursed properly. It was also pointed out that the programme which was in operation for the last two and half years was not only economically viable but also ecologically useful.

Casey and Muir (1986), could attribute the low success of S.F.P.s in developing countries to the isolation or non integration of the projects within the field of rural development and the failure to seek the active participation

and involvement of the local people. They suggested a holistic approach to agriculture, livestock, land settlement, forestry and energy policies. Suggestions were also made for setting up a multi disciplinary research team to investigate and establish the basis for a national forestry programme.

Datta and Singh (1986), suggested 3 policy measures to extend the scope of the S.F.P. in Bihar. Firstly, raising the confidence of people through suitable government subsidy measures from time to time. Secondly, necessity of strong extension and publicity work especially among the weaker sections of the population, to make them aware of the programme's huge potentialities. Thirdly, necessity of improving the resource position of the economically weaker sections of the community not only prior to their participation in the programme through suitable land reform measures and credit policy, but also after their participation through providing alternative sources of earning during the early phase of the programme, when the land under social forestry does not yield any direct and substantial returns to its participants. The authors also opined that social forestry alone cannot meet all the energy needs of the rural population. Therefore, alternative energy sources should be explored.

Harry Blair (1986), author with special reference to S.F.P. in Maharashtra opined that, like so many initiatives in rural development, social forestry had undoubtedly been over sold as an easy panacea for dealing with a host of problems. Achieving the goals of social forestry in a reality had not proved so simple and straight forward.

The author observed that social forestry rarely failed however, some readjustments of programme goals would get a better match between the macro level needs perceived by planners and household needs perceived by those growing trees, which could, as it was felt would help farmers to raise more combustible income and in the process produce more bio-mass that would help meet the goals of planners as well. And in the bargain, it would provide something for poor households with degraded and otherwise unviable land, as it was felt by the author.

Shiva et al (1986), examined the experience of an early social forestry initiative in Karnataka. It was mentioned that the programme encouraged private land owners to plant tree crops with stated expectations that, this would make fuelwood more readily available to the poor. But it was lamented that unfortunately key issues of asset control and

market incentives were neglected, leading to what, in hindsight, would appear to have been predictable outcomes quite contrary to those by which the project was justified.

Swarup and Chand (1986), reviewed the performance and constraints in social forestry in Himachal Pradesh, and opined that people had not shown enthusiasm for social forestry because of the non availability of the seedlings at the right time and lack of choice and of no other support.

Hegde (1987), after assessing the scope for increasing the profitability of social forestry programme, observed that the farmers were keen to establish plantations only for commercial purposes and not for fuelwood. To change that attitude he suggested to take up several measures such as reduction in the cost of production, increasing the biomass yield and establishment of marketing network to fetch better price for the produce.

He also opined that a shift in the emphasis from community plantation to tree tenure scheme could attract small and marginal farmers to establish tree plantations on community and government land. This would cut down the cost of production and conserve government resources to cover ten times more area under afforestation. The cost of tree



planting could be brought down further by modifying the methods of raising nursery and planting.

Khosla (1987), highlighted the causes of denudations in the Himachal Himalaya. The author felt that for greening the region there is a need to enhance the biomass productivity by raising new plantations under Social Forestry Project along with the management of existing stands. The latter being the catchment of important rivers cannot be left unattended. Accordingly, research challenges are delineated into tree husbandry and optimum land use system. Highly denuded regions demand area and problem specific research.

Achaya (1989), while discussing priorities in agro-forestry pointed out that, the forest department had traditionally fulfilled the roles of policing the forests and collecting revenue. The general public, particularly villagers, do not get along with forest officials. It is therefore, as the author suggested, imperative that there was a need for a change of implementing agency in lands outside reserved forests. A part of the work in the agro and farm forestry sectors must be carried out by the panchayats, which would motivate villagers and ensure that their fuel and fodder needs are met. The forest department can play the role of an advisor.

Mishra (1989), discussed the role of voluntary organisation in rural development and the need for a social forestry programme in Bihar. Eighteen Voluntary organisations in Bihar which could play a role in the implementation of the S.F.P. were listed and the necessary steps for linking two were discussed. These involved the voluntary organisations in building social awareness about the programme, so as to promote participation, raising and distributing seedlings and with particular reference to the social forestry department of Birsa Agricultural University, carrying out research on suitable species establishing seed orchards, under taking socio-economic studies, conducting training and education and playing a role in extension activity for technology transfer.

Sharma (1989), examined i. the achievements of different schemes within the social forestry programme in terms of their objectives, ii. the extent and type of involvement of beneficiaries in the programme, and iii. administrative and financial problems arising due to multiplicity of agencies involved in programme implementation in Rajasthan. It was mentioned that farm forestry in Rajasthan, had strayed from its initial objective of meeting rural fuel and fodder needs and had used the state's scarce financial resources to benefit the rich. Further it was

pointed out that community forestry had also failed to achieve the objectives of providing sustainable sources of domestic fuelwood as well as generation of waged employment.

Elz (1990), while discussing the role and problems of social forestry in a developing countries could reveal that, deforestation in developing countries reached alarming proportions and afforestation and reafforestation were not compensating for the decline in the forests. The author observed that even though trees benefited the agriculture through many ways, were incorporated in the agricultural system. Long gestation period of trees and profitable field crops were the reasons for the lack liquidity for investment in farm forestry. Subsidies and or credit on generous terms to farmers to encourage tree planting was suggested. It was felt that better employment opportunities in agricultural sector discouraged participation in social forestry.

Hafner and Apichatvullop (1990), argued that various problems in managing people and trees in reserved forests in Thailand, were caused by government failures correctly to assess population pressures on land in the north east and to modify programme design better to fit community needs, capabilities and ensure equitability in the distribution of benefits.

Patnaik (1990), opined that apart from the free distribution and enjoyment of some forest produce, there were several factors in the S.F.P. which were highly productive from socio-economic point of view, which were not assessed in monetary terms in the benefit-cost analysis, by giving instances of environmental benefits. The author concluded that employment generating capacity of social forestry was a positive factor of the project.

Prasad (1990), felt that S.F.P.s were based on the use of public or communal lands for tree growing. Though generally designed to meet community needs, programmes could involve very different levels of community involvement and participation. Tree resources were under greatest pressure in such areas where they had been grown on communal lands. The author observed that it was virtually impossible without effective community collaboration, to devise schemes by which the wood resources on these lands could be managed and renewed. It was suggested that S.F.P.s must be related to local needs. In all rural development as it was concluded, the poor were the least viable, the least accessible and the most easily over looked sector of society, and forestry projects aimed at reaching them must be specifically designed to overcome these constraints.

Satish Dhawan et al (1990), revealed that S.F.P. helped to generate employment for the rural poor. They noticed that unskilled or semi skilled labourers could be employed in nursery works, sowing, preparation of beds, weeding, watering, hoeing and plantation works like pit digging, fencing and planting etc. Besides this, they further added, that the S.F.P. also generated employment in indirect manner, by providing raw materials for cottage and wood based industries. By generating employment, social forestry checked migration of rural people to the towns, by providing additional income to the village population.

Satyasundaram (1990), while discussing about the revamping social forestry programme stressed the need for follow up action. Quoting a report of the Programme Evaluation Organisation of the planning commission, the researcher pointed out that in some states no follow up action or after care measures were taken by the implementing agencies at the grass roots levels after.. seedlings were distributed, resulting in higher plant mortality rate. It was observed that the size of some of the nurseries coming under the farm forestry programme was quite small. Following suggestions were made for successful implementation of the S.F.P., i. S.F.P.s should involve local people at block and

villages level actively, ii. afforestation should be an integral part of rural development, involving the women to the maximum possible extent, since women have a special liking for tree plantations and iii. there was a need for state level coordination committee consisting of all forestry related people for effective working and integrated approach.

Sagwal (1991), made an indepth study on the perspectives of agro-forestry in a rural development and suggested following measures for its success; i. a package of technology had to be developed for adoption in various agro-climatic zones after taking into account the needs, customs and traditions of the local population, ii. training the ultimate users of technology should be tailored around the broad guidelines and iii. training and visit should also be adopted in popularising the concept of agro-forestry. The author could convincingly conclude that agro-forestry had potential of atleast meeting the challenges of present scarcity partially, losses and unemployment as it had a vital role to play in the rural development.

Rita Brara (1992), juxtaposed the state's view (incorporating the scientists' definition ) of waste lands to the villagers' perception of the commons, which drew its

characteristics and validity from the shade content of local inhabitants, in the Sikar district of Rajasthan. The author also contrasted the residents' approach to afforestation and the state's efforts. The lack of correspondence between the two, led the villagers to conclude that the government was not acting in their interests despite claims to the contrary. The appropriate technology for the use of the commons, as author pointed out, on other hand, could meet the needs of employment, maximise on what the marginalise sections had in plenty-time and labour, cut costs on sheets, fencing and samplings, be oriented to the self provisioning of those who derived a living from grazing lands, had to vision extending beyond two or three generations, like the native Kherji tree, countering the mobile scientists' tendency to research on short duration projects or the Forest Departments' occupational, prompting towards fast growing trees and draw, in addition, upon the scientific resources of the community of users.

Saikia and Goswami<sup>(1986)</sup>, after evaluating the performance and management of S.F.P. in Assam made the following observations: i., awareness of S.F.P. in interior areas was not satisfactory and hence intense effort should be made to involve the rural mass especially of interior areas, ii.

students and teachers showed good participation when plantations were raised by their own institutions, than in case of plantations raised by forest department, iii. forest personnel connected with social forestry should be trained specially to deal with people for successful implementation of the programme, making use of audio-visual and other extension measures, among other observations.

Coleman (1988), suggested for effective Monitoring and Evaluation unit right from the beginning of the project with sufficient funds, trained personnel and appropriate status in the organisational hierarchy. Despite problems, the author has opined that the Monitoring and Evaluation units in some projects have made earnest contributions.

Crabtree and Macmillan (1988), considered changes in United Kingdom government support for forestry announced in April 1988, as a response both to pressure by the environmental lobby and to public concern about the use of forestry as a tax avoidance measure by high income individuals, in United Kingdom.



**CHAPTER - III**

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**MATERIAL AND METHODS**

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### III METHODOLOGY

The present study, which is in the form of an appraisal, is an attempt to evaluate the performance of Forest Development Programmes in Karnataka, with special reference to the Social Forestry Project.

In this chapter the methodological details are presented under the following headings :

- 3.1 Description of the study area,
- 3.2 Nature and sources of data,
- 3.3 Sampling procedure.
- 3.4 Analytical tools and techniques and
- 3.5 Background information about Forests, Forest management and Social Forestry Programme.

#### 3.1 Description of the study Area

##### Karnataka State

The study is conducted in Karnataka State which forms the South-Western part of Deccan Peninsula and is laying between 11.5 and 16.5 latitudes and 74.2 and 78.4 longitudes, with an area of about 1.92 lakh sq. kms. Karnataka is the eighth largest State in India both in area and population<sup>1</sup>.

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<sup>1</sup>1. Manorama year book, 1992, Monorama Publishing House Kottayam, 686001, Kerala, India.

Physiographically the State can be divided into four regions, 1) the Costal Region, 2) the Malnad, 3) the Northern plains and 4) the Southern plains. The costal region, consisting of the western portions of North Kanara and South Kanara districts, is about 240 kms. wide between the Arabian sea and the Western Ghats.

The annual rainfall is more than 250 cm in Western Ghat region. The costal plateau is covered with alluvium deposited by the short, turbulent rivers. The Malnad is the area lying east of the Western Ghats. It is about 150 meters above the sea level and consists of ranges of hills with an average height of 900 meters. The climate is generally hot and wet. The area is practically covered with rich evergreen forests.

The Northern plains consist of the districts of Bidar, Bijapur, Raichur, Gulbarga and the Eastern portions of Dharwad and Belgaum. The range of annual rainfall here is between 50 to 75 cm. The Southern plains cover Bangalore, Kolar, Mandya, Tumukar and the Eastern portion of the Mysore district.

The two important river systems of Karnataka State are the Krishna and its tributaries (Bhima, Ghataprabha,

Malaprabha, Tungabhadra and Vedavati) in the north, and the Kaveri and its tributaries (Hemavati, Shimsha, Arkavati, Lakshaman Thirtha and Kabini) in the south. These rivers flow eastward and fall into the Bay of Bengal, the Krishna passing through Andhra Pradesh and the Kaveri traversing through Tamil Nadu.

A number of smaller rivers flow westward into the Arabian sea, of these Sharavati, Kalinadi and Netravati are important to Karnataka.

The economic structure of Karnataka is predominantly rural and agrarian. About 72 per cent of its population lives in rural areas, which is about 71 per cent of its working force, is engaged in agriculture and allied activities, which generate about 49 per cent of the State's income.

Total population of the State is 44.82 million, with a decade population growth (1981-91) of 20.69 per thousand, with a population density of 234 persons per sq. kms.

Karnataka's share is 6.3 per cent of total reporting area of the country, covering an area of 19.05 million hectares.

Forests occupy 16 per cent, net sown area 53.4 per cent, Fallow land 9.9 per cent, land not available for cultivation 10.3 per cent and other uncultivable lands 10.4 per cent of the total reporting area.

#### Bijapur District

Areawise, out of the 20 districts in Karnataka Bijapur is the largest district, comprising of 11 talukas with 1281 villages, with a total population of 2.4 millions (1981 census). The population density is 141 persons per sq. kms. Nearly 76 per cent of the total population is living in rural areas.

The district covers an area of 1706900 ha. Forests occupy 4.87 per cent (83103 ha.), net sown area 77.91 per cent (1329937 ha.), fallow land 10.25 per cent (175036 ha.) and other uncultivated area occupy 1.3 per cent of the total geographical area of the district. Normal rainfall is 553 mm. annually. Net irrigated area covers about 13 per cent of the net sown area in the district. The district is a drought prone, parts of which often experience moderate to severe droughts. Thus, the district creates an ideal condition for implementation of Social Forestry Project, in which drought prone areas are given more importance. Therefore, the district was selected for the study.

### Dharwad District

Dharwad comes under transitional zone with an annual rainfall of 691 mm. The district comprising of 17 talukas with 1362 villages. The total population of the district is 2.94 millions (1981), 65 per cent and 35 per cent of which live in rural and urban areas respectively, with a population density of 214 persons per sq. km. Forests occupy 8.36 per cent (114854 ha), net sown area 80.79 per cent (1109891 ha.), fallow land 2.76 per cent (37988 ha.) and other uncultivated land occupy 2.66 per cent of the total geographical area. Net irrigated area forms 9 per cent of total net sown area in the district.

### North Kanara

The district is mainly covered by Western Ghats with an annual rainfall of 2565 mm. Nearly 81 per cent of the total geographical area (1029100 ha.) is covered by evergreen tropical forests. Net sown area forms 10.81 per cent (111206 ha.), fallow land 1.2 per cent (12324 ha.) and other uncultivated area forms 3.4 per cent of the total geographical area in the district. Only 2.12 per cent of the net sown area is irrigated. The total population of the district (1981) was 1.07 million, with a population density of 104 persons per sq.

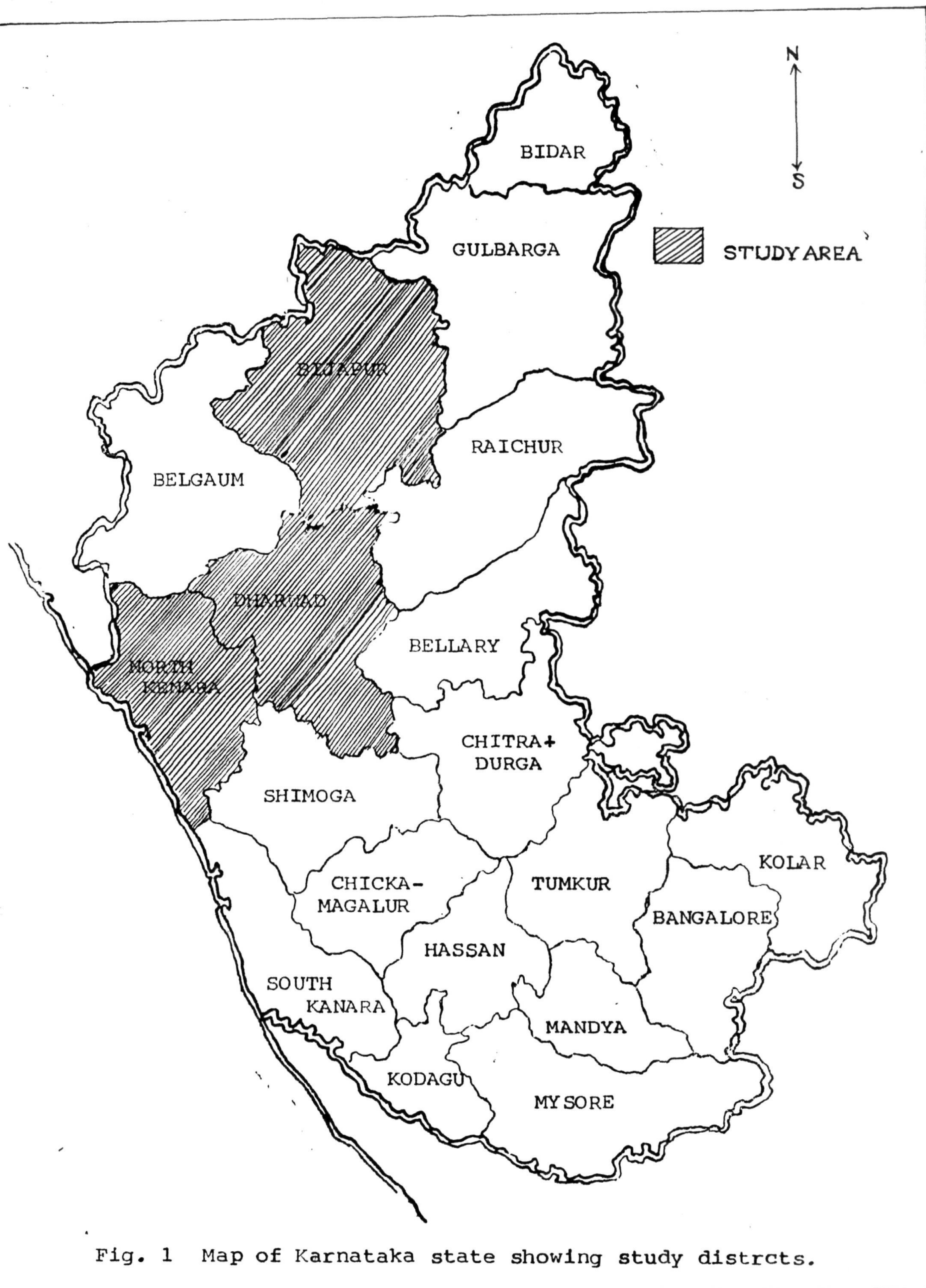


Table 3.1. Physio-geographical features of the three divisions seleted for the study

| Sl. No. | Item                                                | N. Kanara (Malnad) | Dharwad (Transitional belt) | Bi japur (Northern dry belt) |
|---------|-----------------------------------------------------|--------------------|-----------------------------|------------------------------|
| 1.      | Total geographical area (ha)                        | 1024679            | 1378200                     | 1712348                      |
| 2.      | Land use pattern                                    |                    |                             |                              |
|         | a. Net sown area                                    | 111206             | 1109891                     | 1329937                      |
|         | b. Fallow land                                      | 12324              | 37988                       | 175036                       |
|         | c. Other uncultivated land (excludning fallow land) | 35001              | 36499                       | 22206                        |
|         | d. Forest area                                      | 829605             | 114854                      | 83103                        |
|         | e. Land not available for cultivation               | 36483              | 78968                       | 102066                       |
|         | f. Net irrigated area                               | 21833              | 998941                      | 166646                       |
| 3.      | Human population                                    | 1072034            | 2945487                     | 2401782                      |
|         | a. Male                                             | 547413             | 1511688                     | 1211536                      |
|         | b. Female                                           | 524621             | 1433799                     | 1190246                      |
|         | c. Rural                                            | 800241             | 1907229                     | 1823154                      |
|         | d. Urban                                            | 271793             | 1038258                     | 578628                       |
| 4.      | Population density (Per Sq. Km.)                    | 104                | 214                         | 141                          |
| 5.      | Population growth rate (1971-81 per 1000)           | 26.25              | 25.76                       | 20.96                        |
| 6.      | Bovine population                                   |                    |                             |                              |
|         | a. Cattle                                           | 392730             | 745783                      | 576811                       |
|         | b. Buffaloes                                        | 100786             | 299404                      | 256421                       |
|         | c. Sheep                                            | 4997               | 205641                      | 351276                       |
|         | d. Goat                                             | 18853              | 311779                      | 578160                       |
| 7.      | Annual normal rainfall (mm)                         | 2764.1             | 691.1                       | 552.8                        |
| 8.      | Length of railway line (Kms.)                       | 46                 | 321                         | 202                          |
| 9.      | Road length (Kms)                                   | 5930               | 6926                        | 6770                         |



kms, which is lowest in the State. About 75 per cent of the total population lives in rural areas.

Thus, the three districts coming under different distinct climatic conditions and geographical features, formed best combination for evaluating the performance of the Social Forestry Project in the State. Table 3.1 gives the detailed information about these above mentioned three districts (Social Forestry Divisions).

#### Canara Circle

This forest circle is selected only for the purpose of evaluation of Forest Development Programmes through proxy variables.

The Canara Forest Circle which is one of the nine forest circles in the State, comprises the entire North Kanara district and seven talukas of Dharwad district (viz; Dharwad, Kalaghatagi, Hangal, Hubli, Shiggaon, Kundgol and Savanoor). The total geographical area of the circle is 15339 sq. kms. with 57.6 per cent covered by forests (8835.12 sq. kms.).

For administrative purpose the circle has been divided into six divisions viz; Haliyal, Yellapur, Honnavar, Karwar, Sirsi and Dharwad, which are further divided into 43

Ranges. Detailed information about the circle is given in the appendix.

The detailed information about the Canara Forest Circle has been provided in the appendix.

### 3.2 Nature and Sources of data

Secondary data on physical and Financial targets and achievements for Social Forestry and other Forest Development Programmes were collected from the State Forest Department and from the respective Social Forestry Divisions.

The impact of the Social Forestry Project on the beneficiaries was assessed with the help of primary data and information collected from the kisan nursery holders and the farmers who obtained seedlings from the Forest Department freely, (whose addresses were collected from the respective Social Forestry Divisions). Detailed data and information from each of the respondents (beneficiaries) were collected by direct interview method. For this purpose a pretested and stratified questionnaire was employed.

For the purpose of evaluation of the various Forest Development Programmes through proxy variables, opinions of the officials, policy makers and beneficiaries were collected

using a pretested and stratified questionnaire. Thirty three variables were identified and made use of for this purpose. Proper scores were assigned to all these variables, with the help of extension specialists, Forest Department officials and such other experts in the field.

### 3.3 Sampling procedure

#### 3.3.1 Selection of Forest Divisions, Ranges and Circle

A multistage sampling procedure was adopted for the purpose of selection of Social Forestry Divisions, Ranges and a Forest Circle.

Three Social Forestry Divisions viz; Bijapur, Dharwad and North Kanara with distinct agro-climatic conditions, were selected. Here, in the State, revenue districts coincide with the Social Forestry Divisions. Therefore, each district represents a Social Forestry Division, under respective Zilla Parishads. Each taluka represents a Social Forestry Range. Two ranges, having heighest number of kissan nurseries were selected for the study purpose from each divisions. Bijapur and Hungund ranges from Bijapur division, Dharwad and Savanur ranges from Dharwad division and Sirsi and Siddapur ranges from North Kanara division were selected.

To study the economic viability of the village woodlots, ~~two~~ village woodlots (from five and more years ones) were selected from each division i.e., one from each range. Different assumptions are made for this purpose, which are presented in the later part of this chapter.

These above mentioned Social Forestry divisions differed substantially in forest area, land available for tree cultivation, population density, bovine population etc, representing three sets of different geographical features. Bijapur, a drought prone district represents the Northern dry zone, Dharwad transitional belt and North Kanara heavy rainfall area. Therefore, three Social Forestry Divisions viz; Bijapur Dharwad and North Kanara were purposefully selected for the study.

For evaluation of Forest Development Programmes implemented in Territorial (Regular) Forestry wing, through proxy variables Kanara circle was selected purposefully, because of the fact that among the nine Forest circles in the state, Kanara circle has maximum forest area, contributing nearly 80 per cent of the total timber production in the State. Apart from this, the Kanara circle covers all types of Forests right from evergreen forests to the thorny scrubs forests, with varied climatic conditions.

### 3.3.2 Selection of respondents

From the lists of beneficiaries under Social Forestry provided by the State Forest Department, totally 180 respondents were selected. From each division 20 small farmer beneficiaries, 20 medium farmer beneficiaries and 20 large farmer beneficiaries were selected randomly to get primary data and information. However, to know the impact of Social Forestry in the respective divisions, 60 non-beneficiaries were also selected i.e., 20 from each category of small, medium and large farmers from each division randomly.

Number of respondents (kissan nursery holders) for the study of the kissan nursery scheme, was restricted to ten, only to avoid biasness in the results because, only ten kissan nursery holders were available in Bijapur Social Forestry Range during the study period (1991), which was second highest in the Bijapur Social Forestry Division. Therefore, totally 60 kissan nursery holders were selected from all the three divisions.

For the purpose of evaluation of the various Forest Development Programmes with the help of proxy variables, opinions of officials, policy makers and beneficiaries were elucidated 15 respondents under each category were selected

Table : 3.2 Sample source

| Sl.No.                           | Item                                                                                          | Bijapur | Dharwad | N. Kanara | Total |
|----------------------------------|-----------------------------------------------------------------------------------------------|---------|---------|-----------|-------|
| 1. Beneficiaries (farm forestry) |                                                                                               |         |         |           |       |
|                                  | a. Small farmers                                                                              | 20      | 20      | 20        | 60    |
|                                  | b. Medium farmers                                                                             | 20      | 20      | 20        | 60    |
|                                  | c. Large farmers                                                                              | 20      | 20      | 20        | 60    |
|                                  | Total (1)                                                                                     | 60      | 60      | 60        | 180   |
| 2. Non-beneficiaries             |                                                                                               |         |         |           |       |
|                                  | a. Small farmers                                                                              | 20      | 20      | 20        | 60    |
|                                  | b. Medium farmers                                                                             | 20      | 20      | 20        | 60    |
|                                  | c. Large farmers                                                                              | 20      | 20      | 20        | 60    |
|                                  | Total (2)                                                                                     | 60      | 60      | 60        | 180   |
|                                  | Total (1+2)                                                                                   | 120     | 120     | 120       | 320   |
| 3.                               | Kissan nursery scheme                                                                         | 20      | 20      | 20        | 60    |
| 4.                               | Respondents contacted for evaluation of forest development programmes through proxy variables |         |         |           |       |
|                                  | a. Officials                                                                                  | 15      | 15      | 15        | 45    |
|                                  | b. Policy makers                                                                              | 15      | 15      | 15        | 45    |
|                                  | c. Beneficiaries                                                                              | 15      | 15      | 15        | 45    |
|                                  | Total                                                                                         | 45      | 45      | 45        | 135   |
| 5.                               | Village woodlots                                                                              | 2       | 2       | 2         | 6     |

from all the three Social Forestry Divisions. That is 45 respondents from each division were selected for the above mentioned purpose taking care that officials/personnel working at different levels of official hierarchy are included in the sample. the levels of official hierarchy considered for the study are viz; higher level officials (D.C.Fs and above), middle level officials (ACF and RFOs) and field level personnel (Foresters, Forest guards, Forest extension workers, Motivators etc).

#### **Policy makers**

As such no policy makers with definite roles were available in the case of Forest Development programmes implemented in the Territorial Forests. But, in case of Social Forestry Project members of local elected bodies (mandal panchyats, taluka panchyat samities, Zilla Parishad and Village Forest Committees) are involved in making policy decisions to some extent. Therefore, in this study policy makers mean only those who are involved in the Social Forestry Project.

#### **Beneficiaries**

Kissan nursery holders (raisers) and other farmers, to whom the Forest Department distributed seedlings freely, are considered as beneficiaries for the study.

### 3.4 Analytical tools and Techniques

In this study, based on the nature and extent of availability of data the evaluation methods and analytical tools and techniques have been adopted.

For evaluation of forest development programmes implemented in the Regular Forestry (Territorial), in the absence of continuous time series data for a long period and non-availability of field level data (Madhav Gadgil, 1992), apart from Tabular Analysis, a technique of evaluation which uses proxy variables developed for the present study, is employed mainly (Hoseir, 1989 and Shukla and Dalvia, 1988).

For evaluation of Social Forestry Programme, targets and achievements under different components of the programme have been analysed (Bhattacharya, 1990) employing Tabular analysis technique and fitting the polynomial trend function.

For the specific project analysed (village woodlots) Benefit-Cost ratios and sensitivity analysis to know their economic viability, are worked out (Grut, 1987; Shaik Haffis et al 1992; Nadakarni et al 1992; Marion Clawson and Roger 1982, and Patnaik, 1990). Tabular analysis technique is employed for evaluation of field level (primary) data. Apart from evaluating the Social Forestry Programme based on the



secondary and primary data, all other aspects of the programme viz., technical, socio-economic, planning and implementation, management (administrative) etc. are considered for evaluation purpose (Chopra 1987; Hosier 1989 and Shukla and Dalvia 1988).

There was almost regular pattern observed in the total revenue and expenditure of the State Forest Department therefore, polynomial regression analysis is tried upto 5th degree. The functions which are exhibited are best fits, and are used for discussion. As regards the area brought under plantations through various forest development programmes over the period from 1976-77 to 1990-91 did not exhibit a clear pattern and therefore Orthogonal polynomial regression analysis is fitted. Here also, the most appropriate functional form is selected.

#### 3.4.1 Trend Analysis

Polynomial Regression analysis and Orthogonal polynomial Regression analysis, were employed to study the trends in specieswise plantations raised by the State Forest Department under various Forest Development Programmes and Revenue and expenditure of the State Forest Department.

The trend function of the following form is employed :

$$Y = a + bZ_1 + cZ_2 + dZ_3 + \text{-----}$$

Where,  $Y$  = the predicted area of specieswise plantations /  
Revenue / expenditure.

$a$  = area of specieswise plantations / Revenue /  
expenditure, for any specific year 'X' via  $Z$ .

$Z_i$ s = are the Orthogonal polynomials.

$b, c, d$ , etc., in the model, in terms of equally spaced  $X$ , are the regression coefficients, whose values are to be determined from data-points.

The main advantage of Orthogonal polynomials is that the fitting can be carried through conveniently in successive stages, the success of fitting terms of higher and higher degree being observed and tested for significance at each stage, by the adjusted  $R^2$  (Snedecor and Cochran, 1957).

The analysis is appropriate for the present study in the absence of prior knowledge regarding the particular computational form of the trend functions of specieswise plantations raised, Revenue and expenditure, and computational ease with which stepwise forward polynomial regression analysis is facilitated.

#### 3.4.2 Cluster Analysis

A simple form of correlation analysis, where, each variable as a unit is usually placed in a cluster, which

places each variable in only one category. A matrix of inter-correlations is used for the purpose.

Several methods of cluster analysis have been suggested. the method adopted here uses Tryon's modification of Holzinger and Harmon's B-coefficient (coefficient of belonging). The B-coefficient gives the ratio of the average inter-correlations of the variables not included in the cluster. A B-coefficient of 1.00 would indicate that, the variables in the cluster correlate no more highly among themselves than they do with the variables outside of the cluster.

A cluster is started with the two variables which correlate highest and keep adding variables until the B-coefficient shows a marked drop.

The process of describing or naming the clusters in one of the logical inferences and is in the nature of an interpretation or of hypothesis, which is subjected to verification by further investigation. The null hypothesis ( $H_0$ ) developed here is that, the Targets under Social Forestry Components are in similar proportions to the total area available for raising plantations (strip/block) in each district, in the State.

### 3.4.3 Criteria for studying Economic viability of the village woodlots

For calculating the Benefit - Cost (B-C) Ratio time and economic life of the project are considered as major parameters. The economic life of each species has been accepted as recommended by the State Forest Department for different regions. The method followed for calculating B - C Ratio relates to the Net Present Value (N.P.C.) criterion, which requires the use of some predetermined discount rate to discount future benefit and costs. This predetermined discount rate has been accepted as 10% for the present study (Patnaik, 1990). However, 'sensitivity analysis', with different discount rates has been employed to test robustness of the results. (Nadkarni et al., 1992).

It is presumed that (as it is being followed under Social Forestry Project) no cost is incurred except watch and ward, after four years of establishing the plantation (village woodlot). Therefore, the total projected cost of the project is computed till the life span of the project (plantation). Total projected revenue is calculated up to or for the final year of harvesting, as it may require.

This projection is done by taking respective projected price and expected out-turn of each species into consideration.

The computational model for calculating N.P.V. is,

$$P_o = \frac{P_t}{(1+r)^n}$$

Where,  $P_o$  = present value of the cost / benefit.

$P_t$  = future value of the cost / benefit.

$r$  = discount rate.

$n$  = number of times compounded in 't' years.

$t$  = time period in years.

and  $t \leq n$ .

The forest species chosen for plantation under the project (village woodlot) are fuelwood, timber and fruit yielding. Hence, for the purpose of estimating the expected benefits of the plantation, these species are grouped into fuelwood, timber and fruit yielding ones.

It is assumed, based on the local conditions that fast growing species like Eucalyptus and casurina attain first harvesting (felling) stage at 7th year in N.Kanara division, 8th year in Dharwad and 10th year in Bijapur division, of planting with yield levels of 35, 30 and 20 tonnes per acre,

respectively. It is also assumed that the above mentioned species attain second harvesting stage (coppice) after 6 years, 7 years and 8 years of first harvesting in N. Kanara, in Dharwad and in Bijapur divisions, with yield levels of 40 tonnes, 35 tonnes and 25 tonnes respectively. All types of species were planted simultaneously but in the same plantations, and hence there was the necessity of uprooting the fast growing species to facilitate growth of timber yielding and fruit yielding species. Therefore, here in this study, only one ratoon crop (one coppice) of Eucalyptus, casurina and other fast growing species is taken into consideration for the purpose of calculating the benefits.

The average Economic life span of tamarind tree was considered as 50 years, and 25 years for sissoo, sirsal and Acacia spp.

#### 3.4.4 The Kruskal-Wallis one-way analysis of variance by ranks

The Kruskal-Wallis one-way analysis of variance by ranks is employed for deciding whether 'K' independent samples are from different populations. That is, to decide whether the opinions of the officials, policy makers and the beneficiaries differed significantly for evaluation purpose from each other, or they nearly represented the kind of

variations that are to be expected among random samples from the same population. The Kruskal-Wallis technique tests the null hypothesis ( $H_0$ ) that there is no difference in the evaluation done by the respondents 'K' samples come from the sample population or from the identical populations with the same median. The functional form of the Kruskal-Wallis test and the terms used are as follows :

$$KW = \left[ \frac{12}{N(N+1)} \sum_{j=1}^k n_j \bar{R}_j^2 \right] - 3(N+1)$$

Where,  $k$  = number of samples or groups

$n_j$  = number of cases in the  $j^{th}$  sample

$N$  = number of cases in the combined sample (the sum of the  $n_j$ 's)

$R_j$  = sum of the ranks in the  $j^{th}$  sample or group

$\bar{R}_j$  = average of the ranks in the  $j^{th}$  sample or group

$\bar{R} = (N+1)/2$  = the average of the ranks in the combined sample (the grand mean) and the summation is across the 'K' samples

\* Null hypothesis ( $H_0$ ) : There is no difference in the evaluation done by the three different groups.

\* Alternative hypothesis ( $H_1$ ) : The evaluation done by the three groups differs.

\* Significance level :  $\alpha = 0.05$

\* Rejection region : The region of rejection consists of all values of KW, which are so large that the probability associated with their occurrence is equal to or less than  $\alpha = 0.05$ , when  $H_0$  is true.

Tied observations : When ties occur between two or more scores (regardless of group), each score is given the mean of the ranks for which it is tied.

Since the variance of the sampling distribution of KW is influenced by ties, to correct which, KW is computed by using the earlier equation and then divided by

$$\frac{1 - \sum_{i=1}^g \left( t_i^3 - t_i \right)}{N^3 - N}$$

Where,  $g$  = Number of groupings of different tied ranks

$t_i$  = Number of tied ranks in the  $i^{\text{th}}$  grouping

$N$  = Total number of observations across all samples.

Thus, a general expression for KW corrected for ties, used in the study is

$$KW = \frac{\left[ \frac{12}{N(N+1)} \sum_{j=1}^k n_j \bar{R}_j^2 \right] - 3(N+1)}{1 - \sum_{i=1}^g \left( t_i^3 - t_i \right) / (N^3 - N)}$$



### For multiple comparisons between treatments

When the obtained value of KW is significant, it indicates that atleast one of the groups is different from atleast one of the others. But it does not tell which ones are different nor does it tell how many of the groups are different from each other. To know this, the differences  $|\bar{R}_u - \bar{R}_v|$  for all pairs of groups are obtained. Then significance of individual pairs of differences was tested using the following inequality :

$$|\bar{R}_u - \bar{R}_v| \geq Z\alpha / k(k-1) \sqrt{\frac{N(N+1)}{12} \left( \frac{1}{n_u} + \frac{1}{n_v} \right)}$$

The value  $Z\alpha / k(k-1)$  is the abscissa value from the unit normal distribution above which lies  $\alpha/k(k-1)$  per cent of the distribution.

If the probability associated with the observed value of KW is equal to or less than the previously set level of significance  $\alpha$ , reject  $H_0$  in favour of  $H_1$ .

#### 3.4.5 Cost functions used

Cost  $A_1$  included :

1. Hired human labour charges
2. Farm and hired draft animal labour charges
3. Value of seed and manure (both purchased and farm grown)

4. Value of the fertilizers and chemicals
5. Irrigation charges
6. Depreciation of owned agricultural implements and farm buildings
7. Hire charges for agricultural implements and machinery
8. Interest on circulating capital
9. Land revenue and other taxes on owned land under self cultivation and other miscellaneous cash expenses.

$\text{Cost } A_2 = \text{Cost } A_1 + \text{Rent paid on leased-in land.}$

$\text{Cost } B = \text{Cost } A_2 + \text{interest on owned capital invested.}$

$\text{Cost } C = \text{Cost } B + \text{imputed value of family labour.}$

### 3.5 Background information about Forests, Forest management and Social Forestry Project :

#### 3.5.1 Forests and Forest management

In terms of land ecology, India's forest cover is inadequate. Most of the States have less than 30 per cent of their total area under forest while Punjab, Haryana, Rajasthan and Gujarat have even less than 10 per cent each.

The reasons for lack of forest cover in many parts of the country are several. the major cause of depletion is, biotic pressure which are beyond the carrying capacity of our forests. With only two per cent of the total forest land in

the world, India supports 15 per cent of the world's population and 13 per cent of the total bovine population of the world. Deforestation in India has chiefly occurred due to felling of trees for fuel wood, grazing in excess of carrying capacity, encroachment in forest area, shifting cultivation, illicit felling for timber, submergence of millions of hectares of forest land due to many development project, diversion of forest land for non-forest purposes, forest fires etc.

As tropical climate covers most of the area in the country, over 93 per cent of India's forests are of broad leaved type, with Sal, teak and gurjan occupying an important place in it. Only six per cent is under coniferous forests. Most of the sal forest is found in the eastern parts of the peninsula, Madhya Pradesh contributing 33 per cent of it. Teak is concentrated in the western half of the peninsula. Most of the remaining teak area is in Karnataka, Tamil Nadu and Andhra Pradesh.

A variety of major and minor Forest products are obtained from forests. Timber, firewood, charcoal wood, pulp and match wood and round wood are the major products obtained from forests. One of the problems of Indian forestry is of

low productivity. On an average, the growing stock per hectare, is only 28cu. mt. against the world average of 110 cu. mt., and the average annual increment is only 0.5 cu. mt. per hectare against the world average of 2.0 cu. mt. Over two thirds of the timber production is raised in Madhya Pradesh, Uttar Pradesh, Orissa, Karnataka, Jammu and Kashmir and Assam, whereas Madhya Pradesh, Maharashtra, Karnataka and Uttar Pradesh contribute over two thirds of the total output of firewood.

### 3.5.2 Management of Forests in India

In recent years, a Forest Development Plan has been adopted by the country. The chief objective of this plan are, 1. to increase the productivity of forests by creating man made forests, 2. to link up Forest Development with forest based industries, and 3. to develop forests as support to rural economy.

As per this plan, from a modest afforestation programme of 847 million seedlings being planted in 1980-81, afforestation has steadily increased to 2533 million seedlings planted in 1984-85, i.e. a 200 per cent growth in just four years. Further, 150 per cent growth was expected by 1986-87. Equally good progress has been made in the Social Forestry,

with 153000 hectares being planted in 1986-87. A preinvestment survey has been carried in the 75098 sq.km. of forest area in Andhra Pradesh, Bihar, Jammu and Kashmir, Madhya Pradesh, Maharashtra and Uttar Pradesh. The Forest Research Institute, Dehradun and its regional centres at Coimbatore, Jabalpur and Bangalore are actively carrying out research on feasibility of the various forest products.

A number of Forest Development Programmes and Projects have been initiated for implementation at various levels Afforestation under Social Forestry and Farm Forestry are among the significant components of the new 20 points programme.

### 3.5.3 Forest Management and Development in Karnataka

As it has already been mentioned, Karnataka has 16 per cent of its total geographical area under forests. Totally the State Forest Department is in the control of 38,64,424 ha. area (about 20% of the geographical area) of the land area. The forest area is classified as reserved, protected, unclassed areas including C and D class lands transferred from the State Revenue Department, which are mostly barren.

#### 3.5.4 Organisation of the State Forest Department

The Department has been reorganised with the Principal Chief Conservator of Forests (P.C.C.F) at the apex and the Chief Conservator of Forests (General) and Chief Conservator of Forests (Development) at the next level. The Principal chief conservator of Forests is in charge of the General Administration of the Gazetted establishment, policy making, planning, Budget and Finance, co-ordination with the corporations and industrial supplies. The Chief Conservator of Forests (General) is in charge of non-gazetted establishment, extraction of forest produce, Western Ghat Development, Forest Protection, Sales and Supplies, Working plans, Wildlife and other allied matters. The Chief Conservator of Forests (Development) is in charge of Developmental works, including implementation of plan schemes, National Rural Employment Programme (NREP), Rural Landless Employment Guarantee Programme (RLEGP), Waste Land Development and Co-ordination of all developmental programmes. He is also in charge of scarcity relief. There are additional chief Conservators of Forests (ACCFs) in charge of working plans, wildlife and Social Forestry, to assist the respective Chief Conservators of Forests.

### 3.5.5 Developmental Activities of the State Forest Department

About 50 per cent of the Forests in the State is situated in the dry zone. Due to heavy pressure of human and cattle population, they have been subject to continuous degradation. Thus, these forests need to be rehabilitated immediately, to make them productive again.

The main Forest Developmental Activities of the Forest Department are confined to the raising of plantations under production forestry and Social Forestry Projects/schemes. The other important schemes are wild life conservation, Minimum Needs Programme, schemes of development of Scheduled Caste (S.C) people and tribes, soil conservation, rehabilitation of degraded forest lands, etc.

The developmental activities of the Department are financed under the following schemes/projects/programmes :

1. Forest Development Funds (FDF),
2. District Sector Schemes (DSS),
3. State Sector Schemes (SSS),
4. Centrally Sponsored Schemes (CSS),
5. Drought Prone Area Programme (DPAP),
6. World Bank Aided Schemes/projects (WBAS),
7. Danida Aided Schemes/projects,

8. Western Ghats Development Schemes/projects,
9. National Rural Employment Programmes (NREP),
10. Rural Landless Employment Guarantee Programme (RLEGP), and
11. Jawahar Rojgar Yojana, etc.

### 3.5.6 Forest Development Programmes in Karnataka

The following programmes / projects / schemes were implemented in Karnataka for the development of State's Forest wealth during 1990-91,

1. Karnataka Forest Development Fund (KFDF) - Tending in logged area.
2. KFDF - Teak plantations.
3. KFDF - Matchwood plantations.
4. KFDF - Other plantations.
5. KFDF - School Forestry.
6. Soil conservation and afforestation (plan).
7. Sandal Regeneration.
8. (a). Special components plan for S.C. (State).
8. (b). Special component plan for S.C. (Central).
9. Centrally sponsored scheme for development of infrastructure for protection of forests from Biotic interference.
10. (a). World Bank Aided Social Forestry (Dist. sector) (ZP).



10. (b). World Bank Aided Social Forestry Project (State sector).
11. National Wastelands Development Board - Decentralised Nurseries.
12. Education and Training.
13. Buildings.
14. Danida aided school nursery.
15. National Rural Employment Programme (N.R.E.P.).
16. Rural Landless Employment Guarantee Programme (R.L.E.G.P.).
17. Drought Prone Area Programmes (D.P.A.P.).
18. Western Ghat Development Scheme.
19. Centrally Sponsored Scheme (C.S.S.) - Rural Firewood plantation.
20. Raising of compensatory plantation.
21. Cashew plantation.
22. Soil conservation.

### 3.5.7 Social Forestry in India

The term Social Forestry is generally understood to mean tree growing (including associated products eg. bamboo, grasses, legumes etc.) for the purpose of rural development. As Social Forestry has a rural development focus and is heavily dependent on the active participation of people, it is

also known as "forestry for local community development" or "participatory forestry". Although a wide range of activities are included in Social Forestry, five main components can be distinguished in India. With variation they are :

- I. Farm Forestry (tree growing on private lands),
  - II. Farmer lease hold or tree patta,
  - III. Village woodlots or community forestry,
  - IV. Strip plantations along roads, canals, railway lines  
etc. and
  - V. Reforestation or rehabilitation of degraded forest areas.
- Social Forestry Programmes usually include one or more of these components.

Social Forestry Programmes in India have grown in importance and scale and now constitute a major element in India's overall programme of rural development. From modest beginnings over a decade ago, there has been almost an exponential growth in the human and financial resources devoted to Social Forestry. All forms of Social Forestry are differentiated from commercial or Territorial Forestry by the involvement of the rural population in decision-making, management and as beneficiaries.

The massive Social Forestry Programme being carried out in India is at present spearheaded by the National Wastelands Development Board, specially created by the Indian Government. While the principal implementing agencies for this programmes in each State are the respective State Forest Departments, other Government Departments, and private and Voluntary agencies which are increasingly being mobilized to meet national objectives. State Forest Departments have typically introduced new organizational structure to plan and implement Social Forestry activities and have appointed separate staff in the field and at Head Quarters. For Forestry Departments as much as for other departments and agencies, Social Forestry represents a departure from traditional activities and styles of working.

#### 3.5.7 Karnataka Social Forestry Project

The broad objectives of the project are to create tree consciousness and self sustaining base of forest products under both individual and community ownership and management, to meet the needs of the rural and urban population of forest products such as fuel, fodder, timber, bamboo, poles and other usufructs and to supply them with indirect benefits such as shelter, water catchment protection, improving the employment

potential and incidentally some additional income with the active participation of the people.

The above mentioned broad objectives of the Social Forestry Project, are achieved by involving various sections of community. More emphasis was laid on meeting the needs of the poor and landless, Scheduled Castes and tribes who should be the principal beneficiaries of the subsidies and resource distribution of the project. Care was taken to adopt technical systems which could give early and optimum returns for meeting the needs of the people.

The Social Forestry Project commenced in 1983 and was concluded in March 1992. The first phase was over by March 1988. A total allocation of 55.23 lakhs was provided for implementation of the project for the first Five Year (1983-84 to 1988-89) period. The allocation was through loan assistance from the World Bank and Overseas Development Agency to the extent of 50 per cent and 45 per cent respectively. The rest of the expenditure was borne jointly by Government of Karnataka and Government of India.

The project aimed at establishing 1,50,000 ha. of plantation during the project period of five years (1983-84 to 1988-89). The details of the project's plantation targets were as under :

- a) 8,000 ha. of Government Owned Gomal lands,
- b) 12,000 ha. of Revenue Waste lands (C and D) and public waste lands,
- c) 3,000 ha. of fore shores of Irrigation tanks,
- d) 2,000 ha. of Bamboo plantations in forest areas as a source of material for cottage industry,
- e) 1,000 kms. of Canal Bank plantations,
- f) 3,000 kms. of roadside plantations, and
- g) 1,20,000 ha. of forestry on private farm lands through free distribution of 6,000 lakh seedlings.

For efficient management and execution of the project, a separate wing headed by the Additional Chief Conservator of Forests (Social Forestry), was created within the department. The staff details are indicated in the Appendix. Earlier it was intended that the Social Forestry wing would function independently but, for some administrative reasons and executive convenience, this could not be done. As a result, apart from the Social Forestry staff, the Territorial staff was also involved in the execution and implementation of the project. After the project period of five years, the Social Forestry wing was detached from the Territorial wing of the Forest Department.

To implement the project, separate Social Forestry wings were established in 15 priority districts viz; 1. Bangalore, 2. Bijapur, 3. Bellary, 4. Belagum, 5. Bidar, 6. Chitradurga, 7. Dharwad, 8. Mandya, 9. Gulbarga, 10. Hassan, 11. Kolar, 12. Mysore, 13. Raichur, 14. Tumkur and 15. Chickmagalore, covering 19,550 villages in 130 talukas with a rural population of 20 millions. In other districts, the Social Forestry Programmes were implemented by the Territorial Deputy Conservators of Forests (DCFs), up to the end of the project period. However, after the end of the five year project, in all districts, separate Social Forestry wings have been functioning under respective Zilla Parishads. In addition to these units the headquarter of the Project was provided with the assistance by Territorial staff in Monitoring and Evaluation, Training, Publicity, Research and Utilization.

## EVALUATION OF FOREST DEVELOPMENT PROGRAMMES THROUGH

## PROXY VARIABLES

Table 3.3 List of proxy variables :

| Variable<br>No.   | Variable                                                                | To great<br>extent<br>2* | To some<br>extent<br>1* | Not<br>at all<br>0* |
|-------------------|-------------------------------------------------------------------------|--------------------------|-------------------------|---------------------|
| V <sub>1</sub> .  | Impact of Regular Forest Development programmes                         |                          |                         |                     |
| V <sub>2</sub> .  | Impact of Social Forestry Programme.                                    |                          |                         |                     |
| V <sub>3</sub> .  | Impact of village woodlots.                                             |                          |                         |                     |
| V <sub>4</sub> .  | Kissan nursery Vs Employment and Income.                                |                          |                         |                     |
| V <sub>5</sub> .  | Free distribution of seedlings.                                         |                          |                         |                     |
| V <sub>6</sub> .  | Adoption of Farm Forestry :                                             |                          |                         |                     |
| V <sub>7</sub> .  | Development of Infrastructural facilities Vs employment opportunities : |                          |                         |                     |
| V <sub>8</sub> .  | Technical feasibility of Regular forest development programmes :        |                          |                         |                     |
| V <sub>9</sub> .  | Technical feasibility of Social Forestry Programme.                     |                          |                         |                     |
| Variable<br>No.   | Variable                                                                | Strongly<br>agree<br>2*  | Agree<br>1*             | Dis-<br>agree<br>0* |
| V <sub>10</sub> . | Problems in promotion of Decentralised nursery scheme.                  |                          |                         |                     |
| V <sub>11</sub> . | Problems in adoption of farm forestry.                                  |                          |                         |                     |

V<sub>12</sub>. Problems in establishment of village woodlots :

V<sub>13</sub>. Problems in establishment of plantations in C and D lands :

V<sub>14</sub>. Reasons for high mortality rate of seedlings :

V<sub>15</sub>. Problems in raising kissan nursery :

V<sub>16</sub>. Problems in distribution of seedlings :

V<sub>17</sub>. Problems in lifting the freely distributed seedlings :

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| Variable No. | Variable | Always | Some times | Not atall |
|--------------|----------|--------|------------|-----------|
|              |          | 2*     | 1*         | 0*        |

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V<sub>18</sub>. Involvement in selection of kissan nursery beneficiaries :

V<sub>19</sub>. Involvement in management of local kissan nursery :

V<sub>20</sub>. Involvement in selection and establishment of village woodlots:

V<sub>21</sub>. Involvement in Road side plantations, Tank fore shore plantations, etc :

V<sub>22</sub>. Involvement in management and distribution of benefits of village woodlots :



| Variable<br>No. | Variable                                                                          | Communication  |              |     | Coordination |              |     |
|-----------------|-----------------------------------------------------------------------------------|----------------|--------------|-----|--------------|--------------|-----|
|                 |                                                                                   | Good           | Some<br>what | Bad | Good         | Some<br>what | Bad |
|                 |                                                                                   | 1*             | 0.5*         | 0*  | 1*           | 0.5*         | 0*  |
| V <sub>23</sub> | Communication within the Social Forestry Project                                  |                |              |     |              |              |     |
| V <sub>24</sub> | Coordination within the Social Forestry Project                                   |                |              |     |              |              |     |
| V <sub>25</sub> | Communication between Social Forestry Project and other Departments/organisations |                |              |     |              |              |     |
| V <sub>26</sub> | Coordination of Social Forestry Project with other departments/organisation       |                |              |     |              |              |     |
| V <sub>27</sub> | Communication within the Regular Forest Department                                |                |              |     |              |              |     |
| V <sub>28</sub> | Coordination within the Regular Forest Department                                 |                |              |     |              |              |     |
| V <sub>29</sub> | Communication with other Departments/Organisations                                |                |              |     |              |              |     |
| V <sub>30</sub> | Coordination with other Departments/Organisations                                 |                |              |     |              |              |     |
| Variable<br>No. | Variable                                                                          | Strongly Agree |              |     | Dis-agree    |              |     |
|                 |                                                                                   | 2              | 1*           | 0   |              |              |     |
| V <sub>31</sub> | Problems in implementation of programmes                                          |                |              |     |              |              |     |
| V <sub>32</sub> | Rendering technical guidance and service (Kissan Nursery)                         |                |              |     |              |              |     |
| V <sub>33</sub> | Education and training to officials and policy makers :                           |                |              |     |              |              |     |

\* Scores assigned to respective variable.

**CHAPTER - IV**

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**RESULTS**

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## IV RESULTS

The data available from secondary sources and generated by personal survey have been subjected to various analyses. The results are presented in this chapter under the following sections.

### 4.1 Forest Development Programmes in Karnataka

### 4.2 Species wise plantations raised by the Karnataka State Forest Department

### 4.3 Revenue and expenditure of Karnataka State Forest Department

### 4.4 Karnataka State Social Forestry Project

### 4.5 Evaluation of the forest development programmes through proxy variables

### 4.1 Forest Development Programmes in Karnataka

The efforts of the Forest Department can be summarised into a few definite components viz.,

- a) Taking up of departmental plantations,
- b) Raising and distribution of seedlings,
- c) Conservation of existing forests and
- d) Educational and Training programmes.

The Forest Department has implemented several programmes for the development of forests. All of them had

above components in varying proportions. The main features of these programmes have been indicated in the table. It could be observed that the development of forests has many facets and a special programme is initiated whenever a specific objective is taken up on priority bases. The objectives range from providing basic amenities like fuel and fodder to create export potential.

#### 4.2 Specieswise plantations raised by the Forest Department

The basic data regarding specieswise plantations raised during 1978-79 to 1990-91 under various Forest Development Programmes are presented in the appendix (A-3).

The trend equations for the areas covered under various species as estimated by Orthogonal Polynomial regression analysis are presented in the Table 4.1. The fitness of the model as indicated by F values and  $R^2$  values for the four species-teak, soft wood, cashew and eucalyptus-are non-significant indicating the wide fluctuations which could not be statistically captured even with the application of Orthogonal Polynomial analysis. However the goodness of fit indicated the appropriateness of the model for two species fuelwood and miscellaneous and bamboo-and also the total of all species. The visual presentation of the latter three are made in figure 2.1.

Table 4.1. Trend functions of specieswise plantations raised (1976-77 to 1990-91)

| Sl. No. | Species           | Intercept | X                  | X2                 | X3                  | X4                 | X5                | F     | R2    |
|---------|-------------------|-----------|--------------------|--------------------|---------------------|--------------------|-------------------|-------|-------|
| 1.      | Teak              | 4228.73   | -948.43<br>(1.887) | -                  | -                   | -                  | -                 | 3.56  | 0.16  |
| 2.      | Softwood          | 3201.13   | -222.18<br>(0.664) | -35.49<br>(1.22)   | -                   | -                  | -                 | 0.96  | 0.005 |
| 3.      | Cashew            | -65534.7  | -21621<br>(1.454)  | -                  | -                   | -                  | -                 | 2.11  | 0.074 |
| 4.      | Eucalyptus        | -62165.1  | -21713<br>(1.408)  | -1408.1<br>(1.052) | -3348.08<br>(0.269) | -                  | -                 | 1.05  | 0.011 |
| 5.      | Fuel wood & Misc. | 25835.6   | 1564.2<br>(8.167)  | 7.708<br>(0.463)   | -74.306<br>(4.625)  | -                  | -                 | 29.44 | 0.86  |
| 6.      | Bamboo            | -66203.8  | 250210<br>(4.508)  | -2452.4<br>(5.088) | -2288.8<br>(4.915)  | -154.83<br>(4.239) | 94.564<br>(3.312) | 19.86 | 0.87  |
| 7.      | Total             | 37613.4   | 918.57<br>(2.859)  | -5.455<br>(-0.195) | -107.46<br>(-3.986) | -                  | -                 | 8.03  | 0.601 |

Figures in parentheses indicate student T value.

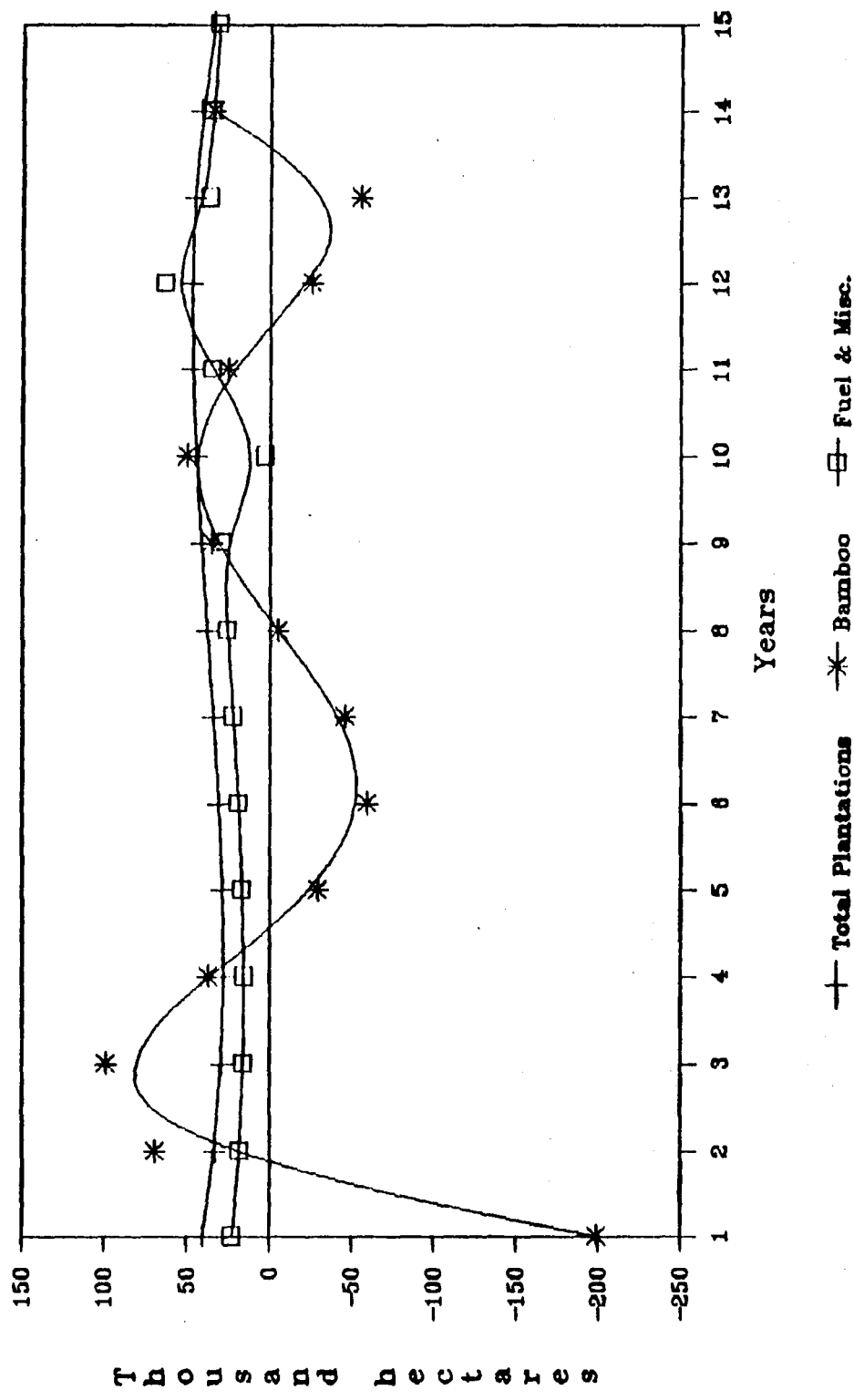


Fig. 2. Species wise plantations raised by the  
Karnataka State Forest Department

#### 4.3 Revenue and expenditure of Karnataka State Forest Department

The Table 4.2 presents the flow of revenue and expenditure of the Karnataka state Forest Department, over the period of 21 years (1970-71 to 1990-91). The data were analysed through polynomial regression analysis. The graph is also presented (Fig.No.3 ). The polynomial analysis was made up to 4th degree functions, for both Revenue and Expenditure, but, however, 't' (student's 't') value was found to be significant for the first degree function in case of the revenue, and for second degree in the case of the expenditure. That is, only good fit of the polynomial regression analysis were considered for the study.

It could be seen that the revenue, mainly from the sale of timber, pulpwood, fuelwood etc. - indicated a constant growth rate of 2.195 per cent per annum.

In the case of the expenditure incurred, there was a marginal decline during first three years and later a consistent increase in growth rate during rest of the period.

The expenditure exceeded the revenue from the 18th year (1987-88) onwards.

#### 4.4 Performance of Karnataka State Social Forestry Project

The S.F.P. was initiated during 1983-84 and has covered the entire State. However among the 20 districts 15

Table 4.2. Revenue and expenditure of Karnataka State Forest Department (1970-71 to 1990-91)

(Rs. in Crores)

| Sl. No.     | Year    | Revenue    | Expenditure | Expenditure as percentage of the revenue |
|-------------|---------|------------|-------------|------------------------------------------|
| 1           | 1970-71 | 14.50      | 7.54        | 52.00                                    |
| 2           | 1971-72 | 16.40      | 8.18        | 49.88                                    |
| 3           | 1972-73 | 20.65      | 8.35        | 40.05                                    |
| 4           | 1973-74 | 21.64      | 8.85        | 40.90                                    |
| 5           | 1974-75 | 27.82      | 10.45       | 37.56                                    |
| 6           | 1975-76 | 29.29      | 11.09       | 37.86                                    |
| 7           | 1976-77 | 29.00      | 12.30       | 42.41                                    |
| 8           | 1977-78 | 29.92      | 13.31       | 44.48                                    |
| 9           | 1978-79 | 36.45      | 15.28       | 41.92                                    |
| 10          | 1979-80 | 35.25      | 17.42       | 49.42                                    |
| 11          | 1980-81 | 37.76      | 21.48       | 56.88                                    |
| 12          | 1981-82 | 47.03      | 24.65       | 52.41                                    |
| 13          | 1982-83 | 44.47      | 27.60       | 62.06                                    |
| 14          | 1983-84 | 53.39      | 34.36       | 64.36                                    |
| 15          | 1984-85 | 55.74      | 43.22       | 77.54                                    |
| 16          | 1985-86 | 56.36      | 47.16       | 83.68                                    |
| 17          | 1986-87 | 53.13      | 51.89       | 97.67                                    |
| 18          | 1987-88 | 52.38      | 59.60       | 113.78                                   |
| 19          | 1988-89 | 46.24      | 61.79       | 133.63                                   |
| 20          | 1989-90 | 51.43      | 72.22       | 140.42                                   |
| 21          | 1990-91 | 57.04      | 76.46       | 134.05                                   |
| Total       |         | 816.09     | 633.20      | 1452.96                                  |
| Average     |         | 38.86      | 30.15       | 69.19                                    |
| Per hectare |         | Rs. 100.55 | Rs. 78.00   |                                          |



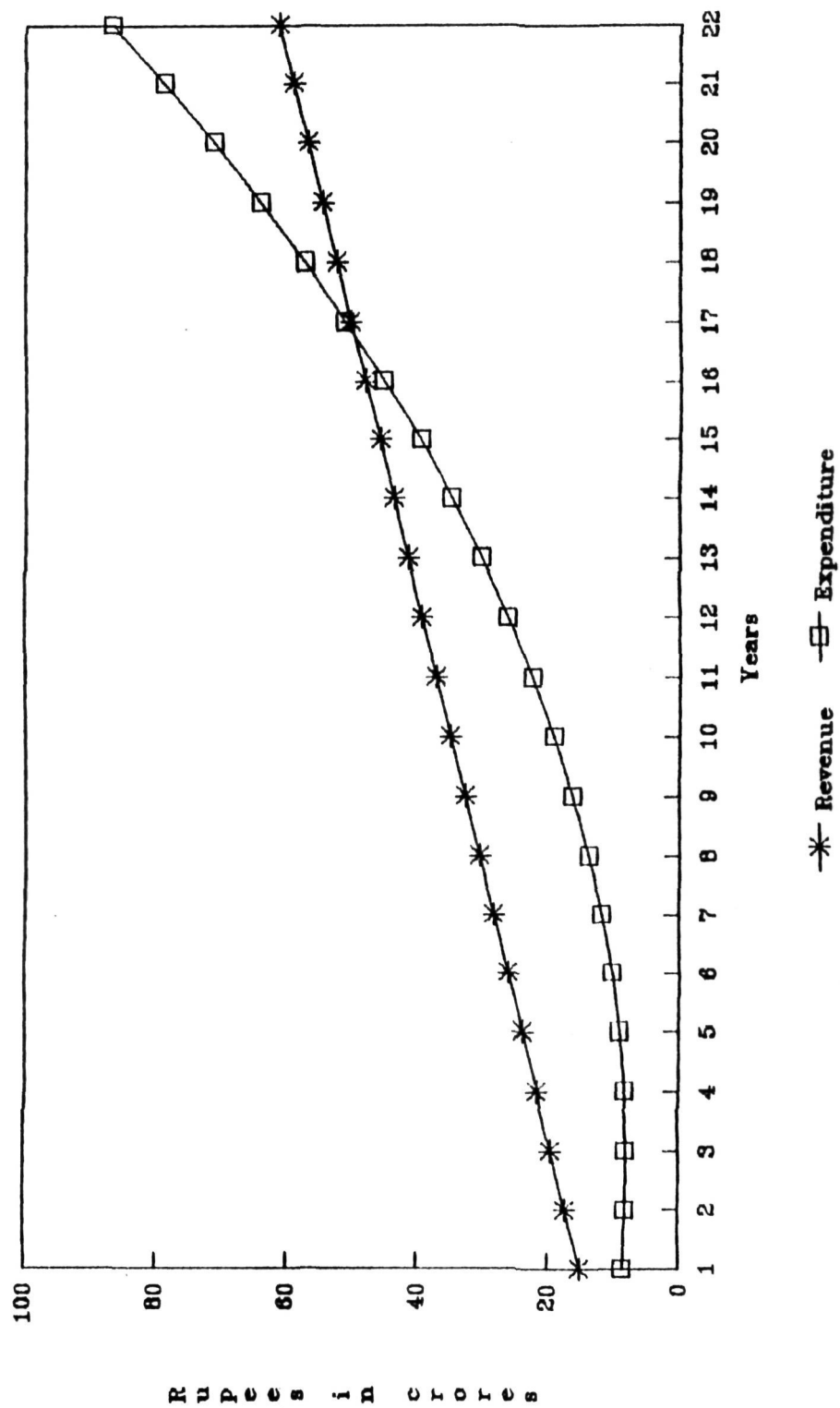


Fig. 3. Revenue and Expenditure of Karnataka  
State Forest Department  
(1970-71 to 1990-91)

were identified as priority districts managed by separate Social Forestry wing under the State Forest Department. Therefore, the S.P. has covered all the six regions and ten agro-climatic zones of district. In effect the S.F.P. was implemented in heavy rainfall areas, transitional belt and dry regions of the State. Generally it is opined that, the performance of the S.F.P. differed among these three settings. In this sections the results pertaining to the performance of the S.F.P. in general in the State in the following sub sections.

#### 4.4.1 Performance of Karnataka State Social Forestry Project at the State level

Componentwise and total performance (targets and achievements) are highlighted in the Table 4.3.

As per the results it could be said that no consistency was observed in fixation of targets and subsequent achievements for all the components, including financial allocation and actual expenditure.

Total achievements under all components (including financial) were less than their respective targets, except under 'Gomal land' plantations, where the total achievements exceeded the total targets (1983-84 to 1990-91) by 4.68 per cent. Whereas under other components viz., C and

Table 4.3 Karnataka Social Forestry Project : Physical and Financial Targets and Achievements 1983-84 to 1990-91

| Sl. Models<br>No. |                                                               | 1983-84         |                   | 1984-85           |                   | 1985-86         |                   | 1986-87           |                    | 1987-88           |                   | 1988-89           |                   | 1989-90           |                    | 1990-91            |                    | Grand Total        |                    |
|-------------------|---------------------------------------------------------------|-----------------|-------------------|-------------------|-------------------|-----------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                   |                                                               | Target          | Achievement       | Target            | Achievement       | Target          | Achievement       | Target            | Achievement        | Target            | Achievement       | Target            | Achievement       | Target            | Achievement        | Target             | Achievement        | Target             | Achievement        |
| 1                 | 2                                                             | 3               | 4                 | 5                 | 6                 | 7               | 8                 | 9                 | 10                 | 11                | 12                | 13                | 14                | 15                | 16                 | 17                 | 18                 | 19                 | 20                 |
| 1                 | Gomai land (ha)                                               | 1465<br>(14.29) | 1325.2<br>(12.36) | 2729<br>(26.63)   | 2005.8<br>(18.20) | 2185<br>(21.32) | 2632<br>(24.54)   | 1400<br>(13.66)   | 1629.1<br>(15.19)  | 525<br>(5.12)     | 1286.3<br>(11.99) | 636.5<br>(6.21)   | 521.5<br>(4.86)   | 226<br>(2.20)     | 333<br>(3.10)      | 1079<br>(10.53)    | 992.5<br>(9.25)    | 10245.5<br>(100.0) | 10725.4<br>(100.0) |
| 2                 | C & D class land (ha)                                         | 2210<br>(15.62) | 1519.7<br>(12.16) | 2472<br>(17.48)   | 1727.6<br>(13.81) | 2030<br>(14.35) | 2157<br>(17.25)   | 1570<br>(11.10)   | 2227.7<br>(17.82)  | 2085<br>(14.74)   | 1735.5<br>(15.0)  | 817<br>(5.78)     | 833.5<br>(6.67)   | 1668<br>(11.8)    | 1139<br>(9.84)     | 1289<br>(9.11)     | 1161.2<br>(9.29)   | 1441<br>(100.0)    | 12501<br>(100.0)   |
| 3                 | Tank Poreshore (ha)                                           | 744<br>(10.83)  | 301<br>(5.18)     | 1005<br>(14.63)   | 1100<br>(18.95)   | 750<br>(10.91)  | 845<br>(14.55)    | 690<br>(10.04)    | 796.75<br>(13.72)  | 950<br>(13.83)    | 776<br>(14.69)    | 410<br>(7.06)     | 402<br>(6.92)     | 1795<br>(17.95)   | 1012.5<br>(17.43)  | 525<br>(7.64)      | 572.5<br>(9.86)    | 6869<br>(100.0)    | 5805.8<br>(100.0)  |
| 4                 | Canal bank (km)                                               | 237<br>(17.05)  | 29<br>(2.59)      | 361<br>(25.97)    | 214<br>(19.17)    | 195<br>(14.02)  | 278<br>(24.91)    | 250<br>(17.98)    | 193.5<br>(17.34)   | 250<br>(17.98)    | 272.5<br>(24.79)  | 97<br>(6.97)      | 112<br>(10.17)    | -                 | -                  | -                  | 17.0<br>(100.0)    | 1407<br>(100.0)    | 1116<br>(100.0)    |
| 5                 | Road side (km)                                                | 604<br>(13.32)  | 538<br>(12.45)    | 1014<br>(22.37)   | 722<br>(16.72)    | 880<br>(19.41)  | 839<br>(19.42)    | 725<br>(16.00)    | 833<br>(19.29)     | 1000<br>(22.06)   | 966.5<br>(21.39)  | 208.5<br>(4.70)   | 260<br>(5.93)     | -                 | 159.1<br>(3.68)    | 101.5<br>(2.24)    | -                  | 4533<br>(100.0)    | 4318.1<br>(100.0)  |
| 6                 | Bamboo (ha)                                                   | 450<br>(15.25)  | -                 | 495<br>(16.80)    | 385.2<br>(18.49)  | 525<br>(17.82)  | 585<br>(28.32)    | 335<br>(11.37)    | 338.5<br>(16.38)   | 400<br>(13.58)    | 265<br>(12.82)    | 70<br>(2.37)      | 125<br>(6.05)     | 505<br>(17.14)    | 305<br>(14.76)     | 165<br>(5.60)      | 89.0<br>(3.14)     | 2945<br>(100.0)    | 2089.5<br>(100.0)  |
| Total             |                                                               | 5710<br>(12.40) | 3712.9<br>(10.81) | 8076.9<br>(17.54) | 6151.4<br>(17.92) | 6565<br>(14.26) | 7336<br>(21.37)   | 4970<br>(10.79)   | 6018.55<br>(17.53) | 5210<br>(11.32)   | 5301.8<br>(15.45) | 2239<br>(4.86)    | 2254.5<br>(6.56)  | 4194<br>(9.11)    | 2984.6<br>(859.0)  | 3159.5<br>(6.75)   | 2832.2<br>(1.72)   | 40124.4<br>(100.0) | 36556.0<br>(100.0) |
| 7                 | Farm forestry<br>No.in lakhs                                  | 1120<br>(18.14) | 942<br>(20.90)    | 1000<br>(16.20)   | 852<br>(18.90)    | 1280<br>(20.73) | 850<br>(18.85)    | 795<br>(12.88)    | 732<br>(16.24)     | 600<br>(9.72)     | 490<br>(10.87)    | 575<br>(8.34)     | 391.93<br>(8.69)  | 34.12<br>(5.41)   | 178.84<br>(33.96)  | 527<br>(8.53)      | 464.34<br>(1.56)   | 6171.82<br>(100.0) | 4901.11<br>(100.0) |
| 8                 | Financial progress<br>including expend-<br>ture of all models | 600.2<br>(7.95) | 335.67<br>(4.94)  | 828.27<br>(10.97) | 811.89<br>(11.95) | 930<br>(12.32)  | 928.36<br>(13.67) | 965.65<br>(12.79) | 963.85<br>(14.19)  | 900.82<br>(11.93) | 896.9<br>(13.20)  | 787.17<br>(10.43) | 720.94<br>(10.61) | 1182.25<br>(15.7) | 1068.14<br>(15.72) | 1351.44<br>(17.90) | 1066.91<br>(15.71) | 7545.8<br>(100.0)  | 6792.66<br>(100.0) |

Figures in parentheses indicate percentages to the total

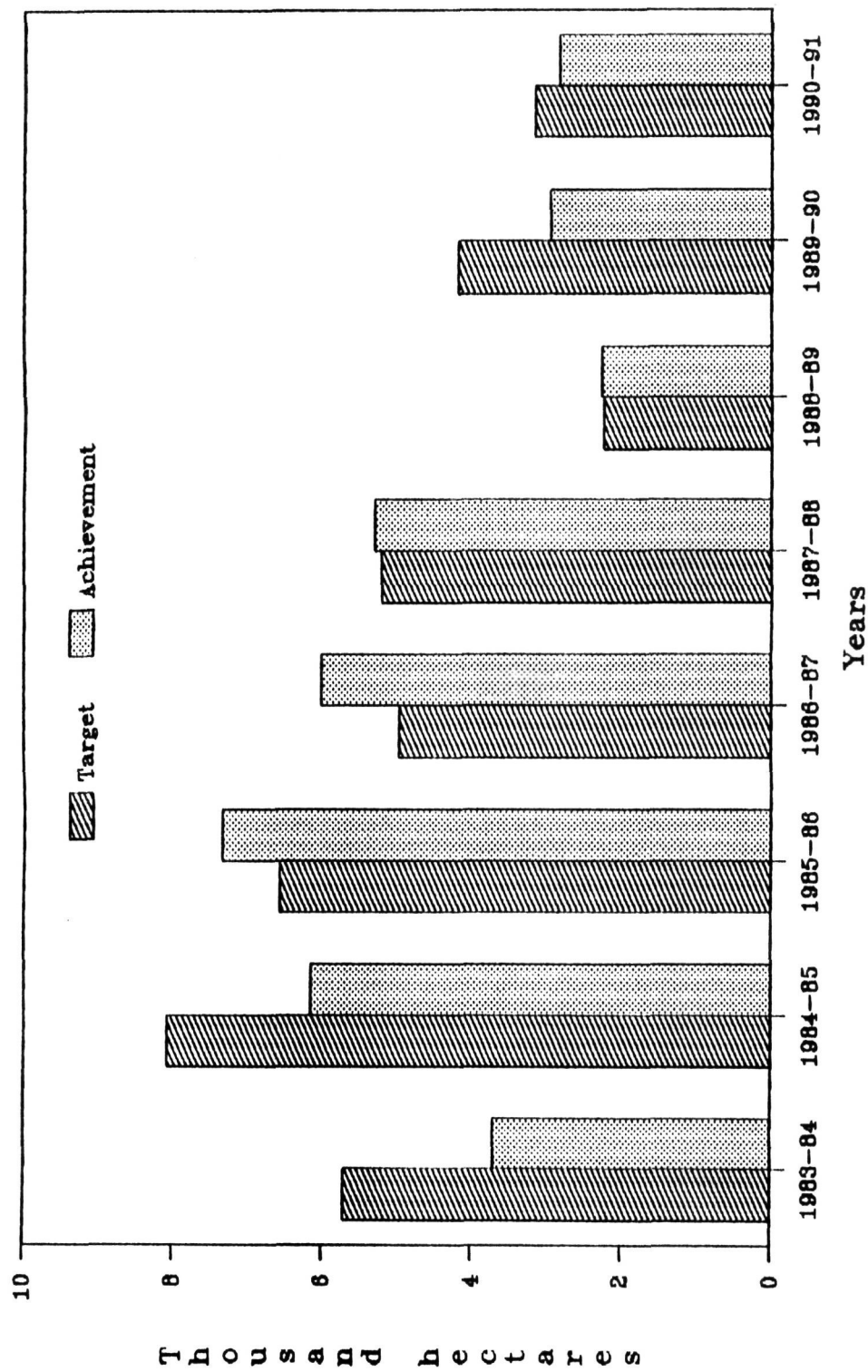


Fig. 4. Karnatak Social Forestry Project  
Targets and Achievements (physical)

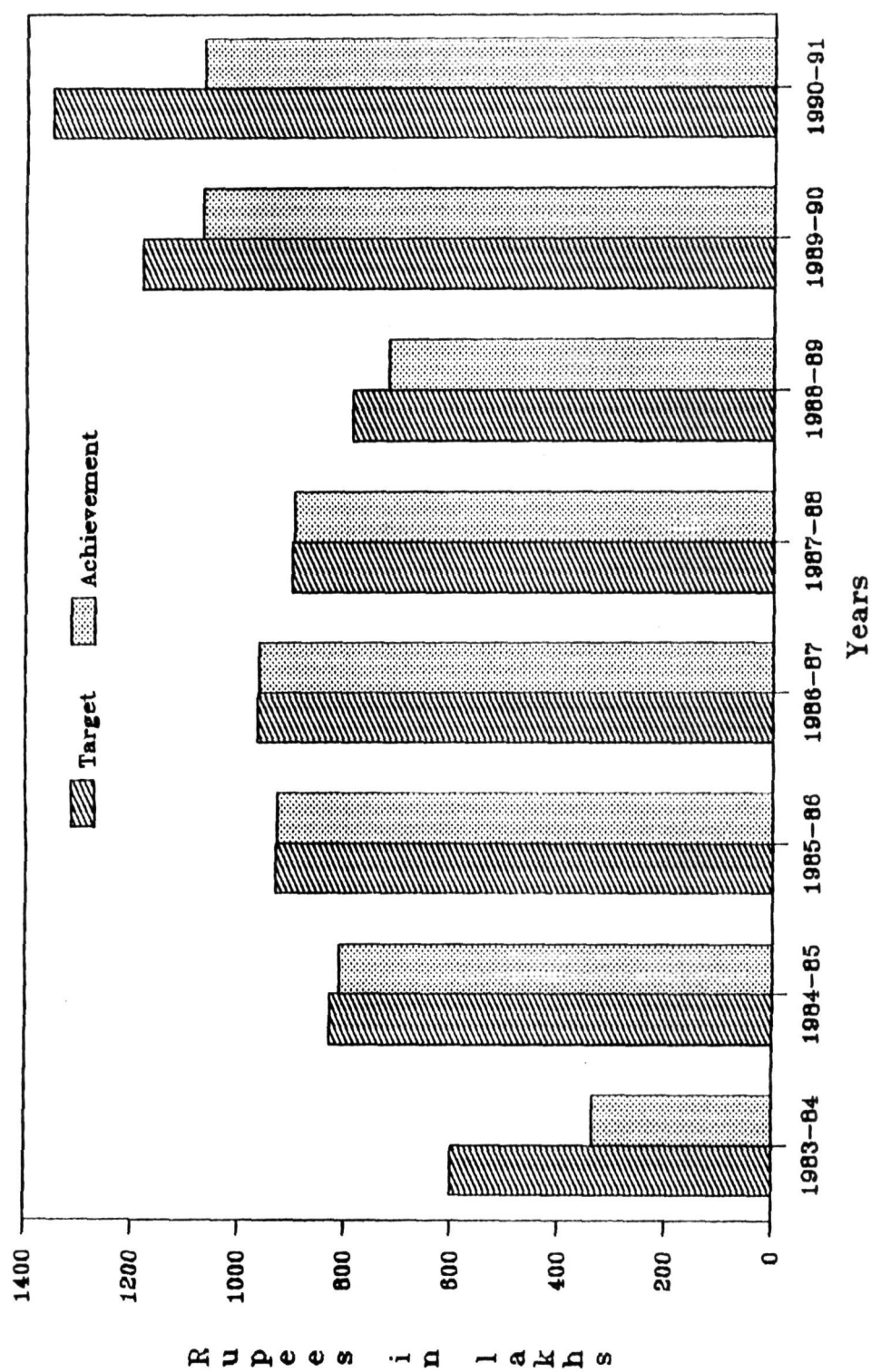


Fig. 5. Karnatak Social Forestry Project  
Targets and Achievements (financial)

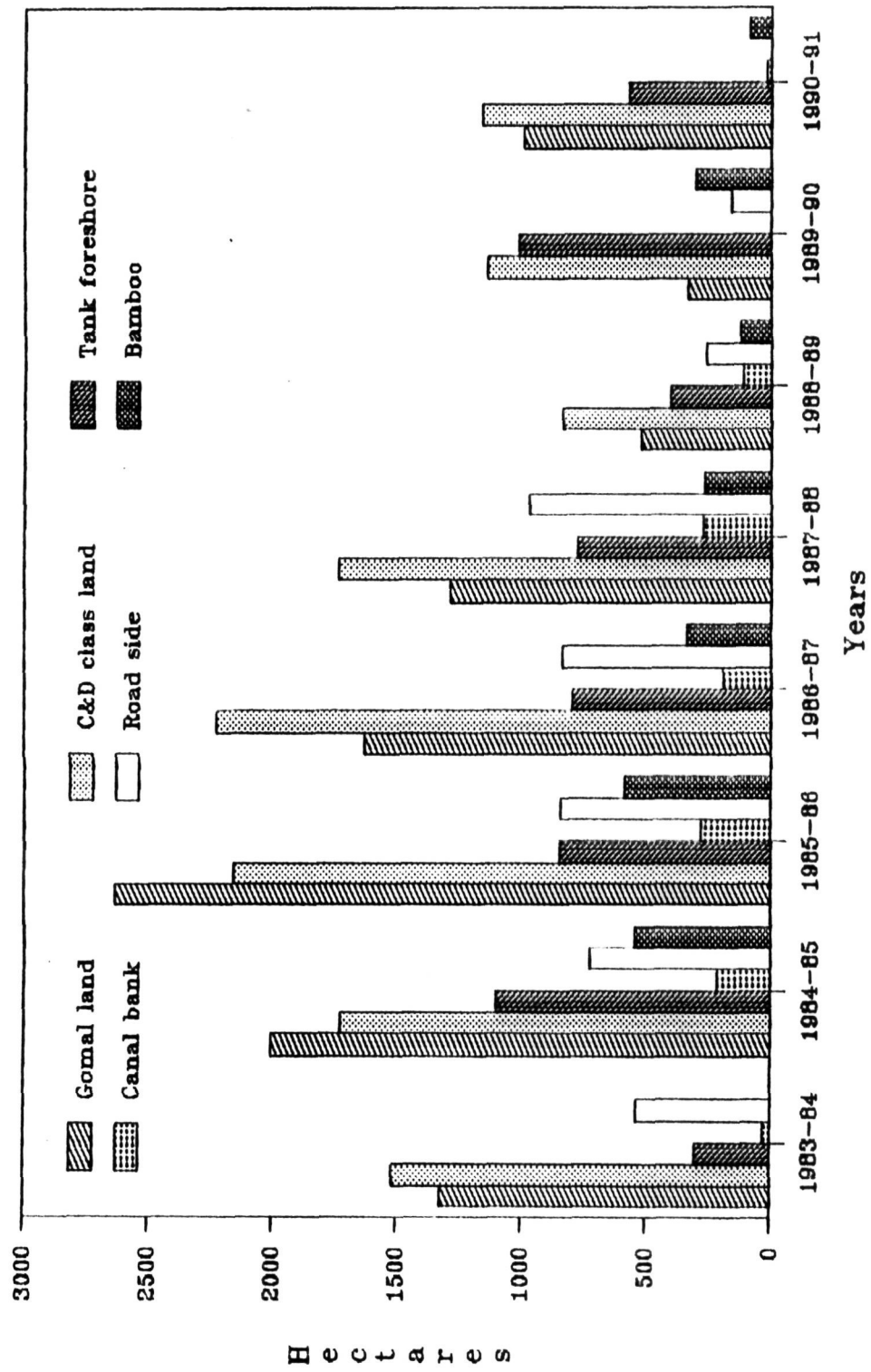


Fig. 6. Karnatak Social Forestry Project  
componentwise physical achievement

Table 4.14 Performance of Karnataka State Social Forestry Project under different managements

| Sl. Components No.                | Forest Department  |       |                    |       | Zilla parishad     |       |                    |       |
|-----------------------------------|--------------------|-------|--------------------|-------|--------------------|-------|--------------------|-------|
|                                   | Targets            | %     | Achieve-ments      | %     | Targets            | %     | Achieve-ments      | %     |
| 1. Gomal land (ha)                | 7779.00<br>(30.72) | 75.90 | 7592.10<br>(32.7)  | 70.29 | 2466.50<br>(16.67) | 24.06 | 3133.30<br>(23.49) | 29.70 |
| 2. C & D class land (ha)          | 8282.00<br>(32.71) | 58.55 | 7632.00<br>(32.87) | 61.04 | 5859.00<br>(39.41) | 41.45 | 4869.27<br>(36.50) | 38.96 |
| 3. Tank foreshore                 | 3189.00<br>(12.59) | 46.41 | 3042.75<br>(13.10) | 52.40 | 3680.00<br>(24.86) | 53.59 | 2764.02<br>(20.12) | 46.41 |
| 4. Canal bank (Kms)               | 1043.00<br>(4.12)  | 75.02 | 714.50<br>(3.08)   | 64.01 | 364.00<br>(2.46)   | 24.98 | 401.73<br>(3.67)   | 35.99 |
| 5. Road side (Kms)                | 3223.00<br>(12.73) | 71.10 | 2932.00<br>(12.63) | 67.88 | 1310.00<br>(8.85)  | 28.90 | 1560.16<br>(11.7)  | 6.12  |
| 6. Bamboo (ha)                    | 1805.00<br>(7.13)  | 61.24 | 1308.70<br>(5.64)  | 63.19 | 1140.00<br>(7.70)  | 38.76 | 784.00<br>(5.88)   | 36.71 |
| 7. Total (ha)                     | 25321.90<br>(100)  | 54.99 | 23218.85<br>(100)  | 67.63 | 14802.50<br>(100)  | 45.01 | 13337.00<br>(100)  | 32.30 |
| 8. Farm forestry (Lakh seedlings) | 4195.00            | 67.95 | 3376.00            | 74.89 | 1978.66            | 32.05 | 1131.94            | 25.11 |
| 9. Financial (Rs. in lakhs)       | 3324.12            | 44.03 | 3039.77            | 44.75 | 4225.55            | 55.97 | 3753.01            | 55.25 |

Note : Figures in parentheses indicate the percentages in the column

D class lands, Tank foreshore, canal bank, roadside plantations, bamboo plantations, and financial allocations, and actual expenditure, achievements fell short of their respective targets by 11.6, 15.4, 19.71, 4.75, 29.05, 20.6 and 9.08 per cent respectively (Table 4.3).

When the performance of the Karnataka State Social Forestry project is considered, dividing the total period of 8 years (1983-84 to 1990-91) into two halves based on their management i.e., by the Forest Department and by the Zilla Parishads respectively, (i.e., 1983-84 to 1986-87 and 1987-88 to 1990-91), it is observed that achievements fell short of the targets under all components except in the case of the financial component (Table 4.4). That is, the actual expenditure was more in second half (during Z.P. management) than that in the first half (during Department management) of the period.

#### 4.4.2 Regionalisation of Karnataka State Social Forestry Project

For the purpose of regionalisation of Karnataka State Social Forestry Project Cluster analysis technique was applied for finding out the clusters of different districts of Karnataka, based on the data available on the achievement of different components of Social Forestry Project viz.,



Table 4.5 Regionalisation of Karnataka State Social Forestry Project (1983-84 to 1991)

| Cl. No. | District          | Total geogra-<br>phical area | Forest<br>area | % of F.A.<br>to T.G.A. | Total land<br>available for<br>planting trees | % to<br>T.G.A. | Total area<br>Planted | % to T.G.A. | % to coln.<br>No. 6 | Per capita<br>availability<br>of F.A. (ha) |
|---------|-------------------|------------------------------|----------------|------------------------|-----------------------------------------------|----------------|-----------------------|-------------|---------------------|--------------------------------------------|
| I       | i) Bijapur        | 1706900                      | 83103          | 4.87                   | 197242                                        | 11.55          | 6257                  | 0.37        | 3.17                | 0.035                                      |
|         | ii) Bidar         | 544800                       | 22822          | 4.19                   | 119128                                        | 21.87          | 6276                  | 1.15        | 5.27                | 0.023                                      |
|         | iii) Raichur      | 1401700                      | 47840          | 3.41                   | 195404                                        | 13.94          | 8614                  | 0.61        | 4.41                | 0.027                                      |
| II      | i) Mysore         | 1195400                      | 338461         | 28.31                  | 229606                                        | 19.21          | 11786                 | 0.98        | 5.13                | 0.13                                       |
|         | ii) Bellary       | 988500                       | 117416         | 11.88                  | 114429                                        | 11.58          | 8343                  | 0.84        | 7.29                | 0.079                                      |
|         | iii) Chitradurga  | 1085200                      | 90639          | 8.35                   | 294218                                        | 27.11          | 8141                  | 0.75        | 2.77                | 0.051                                      |
| III     | i) Hassan         | 681400                       | 54029          | 7.93                   | 129801                                        | 19.05          | 8393                  | 1.23        | 6.47                | 0.04                                       |
|         | ii) Belgaum       | 1341500                      | 190424         | 14.19                  | 107861                                        | 8.04           | 12844                 | 0.96        | 11.91               | 0.064                                      |
|         | iii) Shimoga      | 1055300                      | 328623         | 31.14                  | 299213                                        | 28.35          | 5612                  | 0.53        | 1.88                | 0.198                                      |
|         | iv) Chikmagalore  | 720100                       | 179018         | 24.86                  | 227060                                        | 31.53          | 5618                  | 0.78        | 2.47                | 0.196                                      |
|         | v) Gulbarga       | 1622400                      | 66184          | 4.08                   | 211999                                        | 13.07          | 6516                  | 0.4         | 3.07                | 0.032                                      |
| IV      | i) Tumkur         | 1059800                      | 44984          | 4.24                   | 358629                                        | 33.84          | 13839                 | 1.3         | 3.86                | 0.023                                      |
|         | ii) Kolar         | 822300                       | 70293          | 8.55                   | 227970                                        | 27.72          | 15786                 | 1.92        | 6.92                | 0.037                                      |
|         | iii) Mandya       | 496100                       | 23765          | 4.79                   | 140750                                        | 28.37          | 14310                 | 2.88        | 10.17               | 0.017                                      |
| V       | i) South Kanara   | 844100                       | 225755         | 26.74                  | 237625                                        | 28.15          | 3737                  | 0.44        | 1.57                | 0.095                                      |
|         | ii) Kodgu         | 410200                       | 134657         | 32.83                  | 75872                                         | 18.5           | 2586                  | 0.63        | 3.41                | 0.291                                      |
|         | iii) North Kanara | 1029100                      | 82605          | 80.61                  | 47325                                         | 4.6            | 7931                  | 0.77        | 16.76               | 0.774                                      |
|         | Dharwad           | 1373800                      | 114854         | 8.36                   | 74487                                         | 5.42           | 6778                  | 0.49        | 9.09                | 0.039                                      |
|         | Bangalore         | 8005001                      | 84570          | 10.56                  | 201677                                        | 25.19          | 18542                 | 2.32        | 9.19                | 0.017                                      |

F.A. : Forest Area, T.G.A. : Total Geographical Area, Cl. : Cluster

plantation in Gomal land, in C and D class lands, Tank fore shore, canal bank, bamboo plantations, and Farm forestry. Five distinct clusters emerged out of the above mentioned cluster analysis, as it is presented in the Table 4.5. The first cluster included three districts of Northern Karnataka viz., Bijapur, Bidar and Raichur. The second cluster consisted Mysore, Bellary and Chitradurga districts, the third cluster had five districts viz., Hassan, Belgaum, Shimoga, Chickmagalore and Gulbarga, in its ambit. The fourth Cluster covered Tumkur, Kolar and Mandya districts. And finally, the fifth Cluster covered Dakshina Kannada, Kodagu and North Kanara district.

Two districts viz., Dharwad and Bangalore were distinctly separate.

#### 4.4.3 Implications of Social Forestry Project

Implications of S.F.P. are mainly in terms of the change in the availability and consumption of fuel, fodder, timber, poles and so forth. In other words the impact of S.F.P. on many aspects like pattern of fuel consumption, sources of fodder etc. are studied. These aspects are presented in this section.

##### 4.4.3.1 Pattern of fuel consumption

In relatively drier divisions of Dharwad and Bijapur, agricultural waste constituted the major part of fuel

followed by fuelwood and dung cakes (Table 4.6). The shares of the sources were of the order of 70, 20 and 10 per cents respectively, with some minor differences between Bijapur and Dharwad divisions (Table 4.7).

In dry division of Bijapur, use of dung as fuel was more than in Dharwad division which is in transitional belt. Even the fuelwood used in Bijapur division was a little more than that in Dharwad division.

However, in North Kanara division, which is in malnad belt, only two sources of fuel contributed to almost entire fuel consumption. Fuelwood from forest resources occupied 85% and agricultural wastes the remaining part.

In Bijapur district, small farmers used 30% fuelwood, 60% agricultural waste and 10% dung out of their total fuel consumption. Medium farmers used 25% fuelwood, 65% agricultural waste and 10% dung, and large farmers used only 10% fuelwood, 80% agricultural waste and 10% dung to meet their fuel requirement.

Respondents in Dharwad division used more agricultural wastes and less of fuelwood and dung. Small farmers on an average, used 15% fuelwood, 80% agricultural waste and only 5% dung. Medium farmers used 20%, 72% and 5%

Table 4.6. Pattern of fuel consumption  
(Per cent to the total fuel consumption)

|         |                           | DHARWAD N1=60 |           |           |         | BIJAPUR N2=60 |           |           |         | N. KANARA N3=60 |           |           |         |
|---------|---------------------------|---------------|-----------|-----------|---------|---------------|-----------|-----------|---------|-----------------|-----------|-----------|---------|
| Sl. No. | Item                      | S.F. n=20     | M.F. n=20 | L.F. n=20 | Average | S.F. n=20     | M.F. n=20 | L.F. n=20 | Average | S.F. n=20       | M.F. n=20 | L.F. n=20 | Average |
| 1.      | Fuel wood                 | 15            | 20        | 15        | 17      | 30            | 25        | 10        | 22      | 90              | 80        | 85        | 85      |
| 2.      | Agricultural waste        | 80            | 72        | 76        | 76      | 60            | 65        | 80        | 68      | 10              | 20        | 15        | 15      |
| 3.      | Dung                      | 5             | 5         | 5         | 5       | 10            | 10        | 10        | 10      | -               | -         | -         | -       |
| 4.      | Gas (Natural & gobar gas) | -             | 3         | 4         | 2       | -             | -         | -         | -       | -               | -         | -         | -       |
| 5.      | Electricity               | -             | -         | *         | *       | -             | -         | *         | *       | -               | -         | -         | -       |
| 6.      | Kerosene                  | *             | *         | *         | *       | *             | *         | *         | *       | *               | *         | *         | *       |

\* Negligible

Table 4.7. Share of different types of fuel in the total fuel consumption

|         |                           | DHARWAD DISTRICT N=60 |           |           |         | BIJAPUR DISTRICT N=60 |           |           |         | N.KANARA DISTRICT N=60 |           |           |         |
|---------|---------------------------|-----------------------|-----------|-----------|---------|-----------------------|-----------|-----------|---------|------------------------|-----------|-----------|---------|
| Sl. No. | Item                      | S.F. N=20             | M.F. N=20 | L.F. N=20 | Average | S.F. N=20             | M.F. N=20 | L.F. N=20 | Average | S.F. N=20              | M.F. N=20 | L.F. N=20 | Average |
| 1.      | Fuel wood                 | 15%                   | 20%       | 15%       | 17%     | 30%                   | 25%       | 10%       | 22%     | 90%                    | 80%       | 85%       | 85%     |
| 2.      | Agricultural waste        | 80%                   | 72%       | 76%       | 76%     | 60%                   | 65%       | 80%       | 68%     | 10%                    | 20%       | 15%       | 15%     |
| 3.      | Dung cakes                | 5%                    | 5%        | 5%        | 5%      | 10%                   | 10%       | 10%       | 10%     | -                      | -         | -         | -       |
| 4.      | Gas (Natural & gobar gas) | -                     | 3%        | 4%        | 23%     | -                     | -         | -         | -       | -                      | -         | -         | -       |
| 5.      | Electricity               | -                     | -         | *         | *       | -                     | -         | *         | *       | -                      | -         | -         | -       |
| 6.      | Kerosene                  | *                     | *         | *         | *       | *                     | *         | *         | *       | *                      | *         | *         | *       |

\* Negligible

of fuelwood, agricultural waste and dung, respectively. Three percent of the medium farmers' and 4% of large farmers' fuel requirement was also met by use of gobar gas. On an average every respondent in Dharwad division used 16.67% fuelwood, 76% agricultural waste, 5% dung and 2.33% gobar gas.

In North Kanara, where fuelwood was available in sufficient quantity, more than 75% of the total fuel requirement was met by fuelwood only. On an average, every small farmer used 90% fuelwood and 10% agricultural waste. Medium farmers used 80% fuelwood and 20% agricultural waste. Large farmers used 85% fuelwood and 15% agricultural waste.

#### 4.4.3.2 Sources of fuelwood

A perusal of the Table 4.8 brings it to the light that, all medium and large farmers from all the three divisions obtained fuelwood, from the trees grown in their own farm lands, apart from obtaining from other sources. All small farmers in Dharwad division 25% in Bijapur and 30% in North Kanara obtained fuelwood from their own farm lands.

None of the medium and large farmers from all the three divisions and none of the small farmer in North Kanara obtained fuelwood from roadside trees. Only 30% of small farmers in Bijapur and 10% in Dharwad division obtained

Table 4.8. Sources of fuelwood

| Sl. No. | Item                           | Dharwad N1 = 60 |                |                |       | Bijapur N2 = 60      |                |                |                | North Kanara N3 = 60 |                      |                |                | Overall averages |       |                  |           |       |
|---------|--------------------------------|-----------------|----------------|----------------|-------|----------------------|----------------|----------------|----------------|----------------------|----------------------|----------------|----------------|------------------|-------|------------------|-----------|-------|
|         |                                | S.P.<br>n = 20  | M.P.<br>n = 20 | L.P.<br>n = 20 | Total | Percentage<br>n = 20 | S.P.<br>n = 20 | M.P.<br>n = 20 | L.P.<br>n = 20 | Total                | Percentage<br>n = 20 | S.P.<br>n = 20 | M.P.<br>n = 20 | L.P.<br>n = 20   | Total | Percent-<br>tage | Frequency |       |
| 1.      | Production in the<br>own land  | 20              | 20             | 20             | 60    | 100                  | 5              | 20             | 20             | 45                   | 75                   | 6              | 20             | 20               | 46    | 76.67            | 151       | 83.89 |
| 2.      | Roadside trees                 | 2               | -              | -              | 2     | 3.33                 | 6              | -              | -              | 6                    | 10                   | -              | -              | -                | -     | -                | 8         | 4.44  |
| 3.      | Bushes around the<br>villages  | 10              | -              | -              | 10    | 16.67                | 20             | 5              | -              | 25                   | 41.67                | -              | -              | -                | -     | -                | 35        | 13.44 |
| 4.      | Govt. wasteland/<br>Gomal land | 20              | 10             | -              | 30    | 50                   | 20             | 15             | -              | 35                   | 58.33                | -              | -              | -                | -     | -                | 65        | 6.11  |
| 5.      | Others field                   | 3               | -              | -              | 3     | 5                    | 20             | -              | -              | 20                   | 33.33                | -              | -              | -                | -     | -                | 23        | 12.78 |
| 6.      | Nearby forests                 | -               | -              | -              | -     | -                    | -              | -              | -              | -                    | -                    | 20             | 20             | 15               | 55    | 91.67            | 55        | 30.56 |

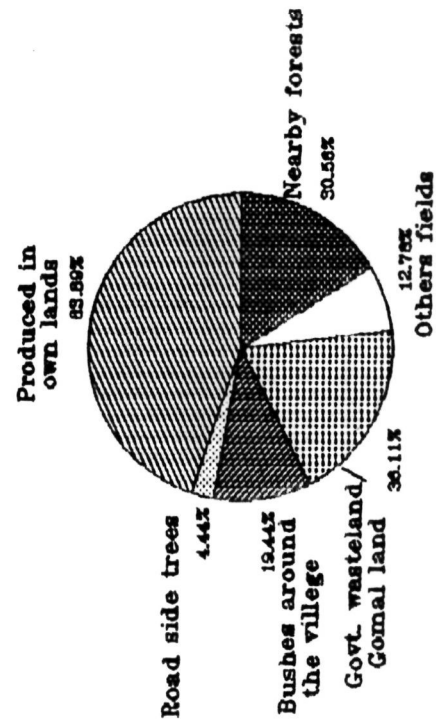
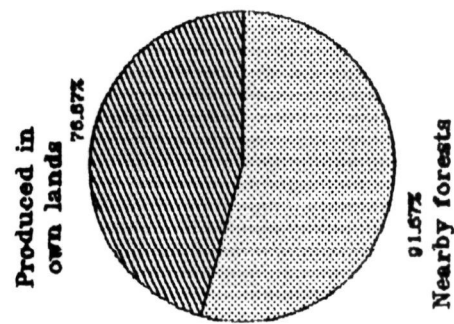
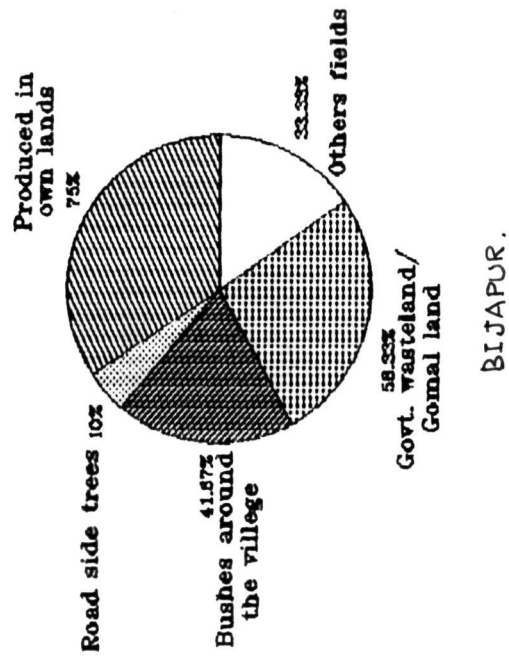
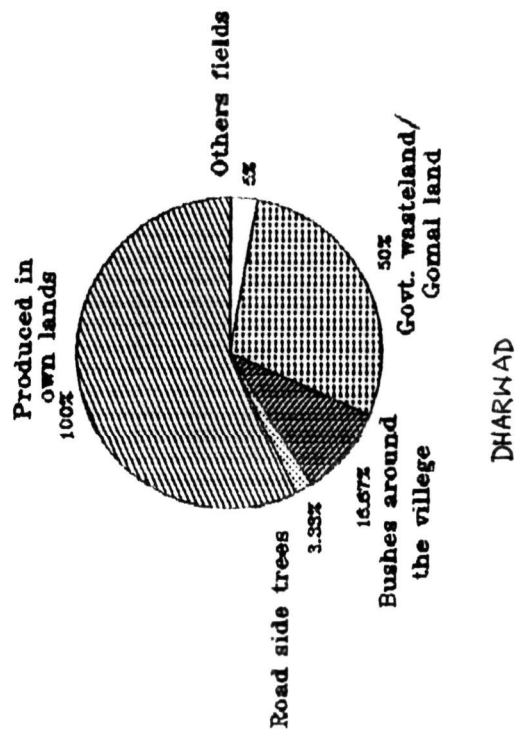


Fig.7 Sources of fuel wood



fuelwood from roadside trees, apart from obtaining it from other mentioned sources.

Fuelwood from bushes around villages was obtained by all small farmer respondents in Bijapur and 50% of them in Dharwad division.

None of the medium and large farmers from Dharwad and North Kanara obtained fuelwood from bushes around villages.

All small farmers from Bijapur and Dharwad divisions and none from North Kanara obtained fuelwood from the government waste lands and/or gomal lands. None of the large farmers obtained fuelwood from this source. Seventy five percent of the medium farmers in Bijapur and 50% of them in Dharwad and none in North Kanara, obtained fuelwood from government wastelands/gomal lands.

All small farmers in Bijapur division, 15% in Dharwad and none in the North Kanara obtained fuelwood from others fields.

None of the medium and large farmers from any of the three divisions obtained fuelwood from others fields.

None of the respondents from Bijapur and Dharwad obtained fuelwood from the forests. But in case of

North Kanara, all small and medium farmers and 75% of the large farmers obtained fuelwood from the nearby forests.

None of the respondents purchased fuelwood in any of the three divisions.

Dung was collected, for use as fuel, by family members of all small farmers in Bijapur and of 60% in Dharwad division. This was not observed in any of the medium and large farmers and small farmers in North Kanara.

#### 4.4.3.3 Livestock maintained by the respondents

Table 4.9, shows the number of cattle, buffaloes and Goat/sheep owned by the respondents coming under small farmer, medium farmer and large farmer categories, in all the three Social Forestry Divisions selected for the present study.

Bijapur Division ranked first with highest number of animals in all three categories of the farmers. On an average, every small farmer (among respondents) had owned 2.8 cattle, 1.1 buffalo and 20.6 goat/sheep. Every medium farmer owned 4.85 cattle 1.70 buffalo and 13.65 sheep/goat.

In Dharwad division on an average, every small farmer had owned 3.6 cattle, 1.25 buffalo and 1.55 goat/sheep. Every medium farmer, on an average, had owned 5.95 cattle,

Table 4.9. Livestock maintained by the respondents

N=180

(Number of animals)

|         |             |      |      | DHARWAD |         |       |       | BIJAPUR  |         |      |            |
|---------|-------------|------|------|---------|---------|-------|-------|----------|---------|------|------------|
|         |             |      |      |         |         |       |       | N.KANARA |         |      |            |
| Sl. No. | LIVESTOCK   | SF   | MF   | LF      | AVERAGE | SF    | MF    | LF       | AVERAGE | SF   | MF         |
|         |             |      |      |         |         |       |       |          |         |      | LF AVERAGE |
| 1.      | CATTLE      | 3.60 | 5.95 | 6.80    | 6.12    | 2.80  | 4.85  | 6.55     | 4.73    | 4.50 | 6.40       |
|         |             |      |      |         |         |       |       |          |         |      | 13.60      |
|         |             |      |      |         |         |       |       |          |         |      | 8.17       |
| 2.      | BUFFALOES   | 1.25 | 2.25 | 3.00    | 2.17    | 1.10  | 1.70  | 2.50     | 1.77    | 2.30 | 3.80       |
|         |             |      |      |         |         |       |       |          |         |      | 6.30       |
|         |             |      |      |         |         |       |       |          |         |      | 4.13       |
| 3.      | GOATS/SHEEP | 1.55 | 1.25 | 0.70    | 1.17    | 20.60 | 13.65 | 9.75     | 14.67   | *    | -          |
|         |             |      |      |         |         |       |       |          |         |      | *          |
| Total   |             | 6.40 | 9.45 | 10.50   | 9.45    | 24.50 | 20.20 | 18.80    | 7.06    | 6.80 | 10.20      |
|         |             |      |      |         |         |       |       |          |         |      | 19.90      |
|         |             |      |      |         |         |       |       |          |         |      | 12.30      |

\* NEGLIGIBLE

2.25 buffaloes, 1.25 goat/sheep, with over all average of 9.45 animals per house hold. Slight increase in the animal number was observed in the case of large farmers. On an average, each large farmer owned 6.8 cattle, 3 buffaloes and 0.7 goat/sheep.

Among the respondents of three divisions viz. Bijapur, Dharwad and North Kanara, respondents from North Kanara had maintained highest number of animals. Every small farmer had maintained 4.5 cattle, 2.3 buffaloes and very small (negligible) number of goats/sheep. Whereas, medium farmers on an average maintained 6.4 cattle and 3.8 buffaloes. Every large farmer had maintained on an average 13.6 cattle and 6.3 buffaloes. No goats/sheep were maintained by medium and large farmers (among respondents) in North Kanara.

#### 4.4.3.4 Sources of fodder

##### I Sources of fodder

Sources of fodder for the livestock owned by the beneficiaries, were not only varied in nature but also in their share to the total fodder consumption. The Table 4.10 implies that open grazing, Which is a most common practice in all third world countries, for which India is not an exceptional, that too in the village common lands was found to be a common feature in all the three divisions, practiced by

Table 4.10. Sources of fodder

|                            |                                   | N = 18          |            |            |                  |                 |            |            |                  |                  |            |            |                  |
|----------------------------|-----------------------------------|-----------------|------------|------------|------------------|-----------------|------------|------------|------------------|------------------|------------|------------|------------------|
|                            |                                   | Dharwad N1 = 60 |            |            |                  | Bijapur N2 = 60 |            |            |                  | N.Kanara N3 = 60 |            |            |                  |
| Sl.No.                     | Source                            | S (n = 20)      | M (n = 20) | L (n = 20) | Overall averages | S (n = 20)      | M (n = 20) | L (n = 20) | Overall averages | S (n = 20)       | M (n = 20) | L (n = 20) | Overall averages |
|                            |                                   | F               | %          | P          | %                | F               | %          | P          | %                | F                | %          | P          | %                |
| I. Sources of fodder       |                                   |                 |            |            |                  |                 |            |            |                  |                  |            |            |                  |
| 1.                         | Open grazing                      | 20              | 100        | 20         | 100              | 20              | 100        | 20         | 100              | 20               | 100        | 20         | 100              |
| a.                         | In village common land            | 20              | 100        | 20         | 100              | 20              | 100        | 20         | 100              | 20               | 100        | 20         | 100              |
| b.                         | In own land                       | 20              | 100        | 20         | 100              | 20              | 100        | 20         | 100              | 20               | 100        | 20         | 100              |
| 2.                         | Agriculture by products           | 20              | 100        | 20         | 100              | 20              | 100        | 20         | 100              | 20               | 100        | 20         | 100              |
| 3.                         | Leaf fodder                       | 12              | 60         | 7          | 35               | 5               | 25         | 24         | 40               | 20               | 100        | 16         | 80               |
| 4.                         | Purchased                         | -               | -          | -          | -                | -               | -          | -          | -                | -                | -          | -          | -                |
| II. Sources of leaf fodder |                                   |                 |            |            |                  |                 |            |            |                  |                  |            |            |                  |
| 1.                         | Road side trees                   | 12              | 100        | 7          | 100              | 5               | 100        | 24         | 100              | 20               | 100        | 16         | 100              |
| 2.                         | Trees/bushes in common land       | 10              | 83.33      | -          | -                | -               | -          | 10         | 41.67            | 20               | 100        | 15         | 93.75            |
| 3.                         | Trees/bushes in own land/backyard | 12              | 100        | 6          | 85.71            | -               | -          | 18         | 75               | 20               | 100        | 16         | 100              |
| 4.                         | Trees in nearby forests           | -               | -          | -          | -                | 5               | 100        | 24         | 100              | 20               | 100        | 16         | 100              |
| 5.                         | Purchased                         | -               | -          | -          | -                | -               | -          | -          | -                | -                | -          | -          | -                |

S : Small farmer, M : Medium farmer, L : Large Farmer, P : Frequency

all the respondents, belonging to the different categories of the farmers. All beneficiaries allowed their animals to graze in their own land in Dharwad Division, irrespective of their category.

In Bijapur division, totally 66.67 per cent of the beneficiaries practiced grazing, in their own lands in addition to that in village common lands (grazing lands). In North Kanara division, which has distinct land using pattern, compared to the other two divisions, only 28.33 per cent of the beneficiaries practiced grazing in their own fields. On an average, 65 per cent of the beneficiaries, allowed their animals to graze in their fields/lands in all the divisions.

Agricultural by products were used as fodder by all beneficiaries belonging to all categories of farmers and divisions, which is a universal one. All the beneficiaries in Bijapur and North Kanara divisions, and 60 per cent in Dharwad division, belonging to small farmers category, used green leaves as fodder for their animals. All beneficiaries, belonging to medium and large farmer categories, in North Kanara division, were found to be no exceptional in using green leaves as fodder. Only 35 per cent and 80 per cent beneficiaries, under medium category in Dharwad and Bijapur divisions, used green leaves as fodder respectively. In large

category, 25 per cent of the beneficiaries in Dharwad and 60 per cent in Bijapur divisions used leaf fodder. None of the beneficiaries purchased fodder to feed their animals.

## II Sources of leaf fodder

Roadside trees, trees/bushes in village common lands and in own lands and trees in nearby forests, were the sources of leaf fodder, for the beneficiaries, who used leaf fodder (Table 4.10). It was remarkable to note that none of the beneficiaries collected leaves from the roadside trees in North Kanara division. But everybody (in N.Kanara) from the other three sources of leaf fodder. In Bijapur division also, all leaf fodder using beneficiaries in small farmer category, collected leaves from all above mentioned sources, except from the nearby forests. None of the beneficiaries in Dharwad and Bijapur divisions collected leaves from the nearby forests, since no forests were in existence. All the leaf fodder using beneficiaries belonging to medium and large farmer categories, used trees/bushes in own fields/lands as source of leaf fodder. In Dharwad and Bijapur divisions also more than 83 per cent of small beneficiaries in Dharwad, cent per cent in Bijapur and more than 93 per cent of medium category beneficiaries in Bijapur division, also depended on Roadside trees, as a source of leaf fodder. None of the beneficiaries purchased leaf fodder.

#### 4.4.3.5 Timber requirement of the beneficiaries (per annum)

Timber requirement of all categories of respondents of three divisions has been presented in the Table 4.11.

On an average a small farmer respondent in Bijapur division required timber worth of Rs. 43/- per year for the use as agricultural implements and other such uses. A medium farmer required Rs. 110/- worth of timber and a large farmer of Rs.140/- for the above mentioned purpose in Bijapur division.

In Dharwad division also respondents obtained timber from their own fields and purchased some quantity of it for agricultural uses. A small farmer in the district required timber worth of Rs. 75/-, a medium farmer worth of Rs. 160/- and a large farmer, timber worth of Rs. 240/- per year in Dharwad division.

But in North Kanara, a small farmer required timber worth of Rs. 300/-, a medium farmer timber worth of Rs. 375/- and a large farmer requires timber worth of Rs. 1045/-.

#### 4.4.3.6 Money spending pattern of the beneficiaries to meet their timber requirement (only for agricultural purposes)

For successful planning and implementation of Social Forestry Project, it would be most appropriate to know



Table 4.11. Timber requirement of the beneficiaries (Rs./year)

N = 180

| Sl.       | Dharwad                      |              |              |              |                 | Bijapur      |              |              |                 |        | N.Kanara     |              |              |                 |        |
|-----------|------------------------------|--------------|--------------|--------------|-----------------|--------------|--------------|--------------|-----------------|--------|--------------|--------------|--------------|-----------------|--------|
| No.       | Source                       | SP<br>n = 20 | MF<br>n = 20 | LP<br>n = 20 | Total<br>n = 60 | SP<br>n = 20 | MF<br>n = 20 | LP<br>n = 20 | Total<br>n = 60 | %      | SP<br>n = 20 | MF<br>n = 20 | LP<br>n = 20 | Total<br>n = 60 | %      |
| 1.        | Trees grown in<br>own fields | 18           | 20           | 20           | 58              | 96.67        | 18           | 20           | 56              | 93.33  |              |              |              |                 |        |
|           | Value (Rs.)                  | 50           | 120          | 180          | 116.67          | -            | 25           | 70           | 85              | 60     | -            |              |              |                 | 66.67  |
| 2.        | Purchased                    | 20           | 15           | 13           | 48              | 80.00        | 20           | 20           | 60              | 100.00 |              |              |              |                 |        |
|           | Value (Rs.)                  | 25           | 40           | 60           | 41.67           | -            | 18           | 40           | 55              | 37.67  | -            | -            | -            | -               | -      |
| 3.        | Forests                      | -            | -            | -            | -               | -            | -            | -            | -               | -      |              |              |              |                 |        |
|           | Value (Rs.)                  | -            | -            | -            | -               | -            | -            | -            | -               | -      |              |              |              |                 |        |
|           | Total (Rs.)                  | 75           | 160          | 240          | 158.34          | -            | 43           | 110          | 140             | 97.67  | -            | 300          | 375          | 1045            | 573.35 |
| * Average |                              |              |              |              |                 |              |              |              |                 |        |              |              |              |                 |        |

Table 4.12. Average money spending pattern of the beneficiaries to meet their annual timbe requirement : (For Agril. purpose)

N = 180  
Rs./annum

|                       |                            | Dharwad N1 = 60 |            |            |                  | Bijapur N2 = 60 |            |            |                  | N.Kanara N3 = 60 |            |            |                  |            |            |            |                  |
|-----------------------|----------------------------|-----------------|------------|------------|------------------|-----------------|------------|------------|------------------|------------------|------------|------------|------------------|------------|------------|------------|------------------|
| Sl.No.                | Source & money spent       | S (n = 20)      | M (n = 20) | L (n = 20) | Overall averages | S (n = 20)      | M (n = 20) | L (n = 20) | Overall averages | S (n = 20)       | M (n = 20) | L (n = 20) | Overall averages | S (n = 20) | M (n = 20) | L (n = 20) | Overall averages |
|                       |                            | P/Rs. %         | P/Rs. %    | P/Rs. %    | P/Rs. %          | P/Rs. %         | P/Rs. %    | P/Rs. %    | P/Rs. %          | P/Rs. %          | P/Rs. %    | P/Rs. %    | P/Rs. %          | P/Rs. %    | P/Rs. %    | P/Rs. %    | P/Rs. %          |
| 1.                    | Own trees *                | 18              | 90         | 20         | 100              | 20              | 100        | 20         | 100              | 58               | 96.67      | 12         | 90               | 20         | 100        | 20         | 100              |
|                       | Estimated value (Rs./year) | 50              | 66.67      | 120        | 75               | 180             | 60         | 116.67     | 73.68            | 30               | 66.67      | 70         | 58.33            | 125        | 38.46      | 75         | 45.92            |
| 2.                    | Purchased *                | 20              | 100        | 15         | 75               | 13              | 65         | 48         | 80               | 20               | 100        | 20         | 100              | 20         | 100        | 60         | 100              |
|                       | Estimated value (Rs./year) | 25              | 33.33      | 40         | 25               | 60              | 40         | 41.67      | 26.32            | 15               | 33.33      | 50         | 41.67            | 200        | 61.54      | 88.33      | 54.08            |
| 3.                    | Nearby forests *           | -               | -          | -          | -                | -               | -          | -          | -                | -                | -          | -          | -                | -          | -          | -          | -                |
|                       | Estimated value (Rs./year) | -               | -          | -          | -                | -               | -          | -          | -                | -                | -          | -          | -                | -          | -          | -          | -                |
| Total Value (Rs)/year |                            | 75              | 100        | 160        | 100              | 240             | 100        | 158.34     | 100              | 45               | 100        | 120        | 100              | 325        | 100        | 163.33     | 100              |

P = Frequency  
S = Small category M = Medium category  
\* = Indicated in frequency L = Large category

the sources and value (monetary) of timber, poles etc. being used by the rural people, for whom the social Forestry project is mainly meant for. The results obtained in this regard are presented in the Table 4.12.

The results indicated that more than 96 per cent of the beneficiaries procured timber from the trees grown in their own lands/fields in Dharwad divisions, 86.67 per cent in Bijapur and cent per cent in North Kanara division. The average estimated value of this timber was Rs. 117, Rs. 75 and Rs. 767 in Dharwad, Bijapur and North Kanara divisions respectively.

On an average, 80 per cent of the beneficiaries in Dharwad division, cent per cent in Bijapur and none of the beneficiaries in North Kanara division purchased timber for agricultural purposes.

Every beneficiary, on an average, was spending Rs. 42 in Dharwad division and Rs.88 in Bijapur division respectively to purchase timber, per annum. None of the beneficiaries in Dharwad and Bijapur divisions procured timber from nearby forests, because of absence of forests, and all beneficiaries in North Kanara procured timber from nearby forests, worth of Rs. 1233 every year.

All beneficiaries coming under all the three divisions procured timber, worth of Rs. 319 from the trees grown in their own lands/fields. On an average, every beneficiaries spent Rs. 43 for purchasing timber and also procured timber worth of Rs. 774 from the nearby forests annually.

#### 4.4.3.7 Per capita annual income of sample beneficiary and non-beneficiary households

Per capita annual income of sample beneficiary and non-beneficiary households of all categories, and from all three social forestry divisions have been presented in the Table 4.13.

All categories of sample beneficiary and non beneficiary households in North Kanara, have highest per capita annual income among the three divisions.

Per capita annual income of the respondents was least, among the three divisions, in Bijapur division.

On an average sample beneficiary household belonging to small, medium and large farmer categories earned per capita annual income of Rs.9,670, Rs.23,743 and Rs.44,817 respectively resulting in an overall average income of Rs.26,077.

Table: 4.13 Per Capita Annual Income of Sample Beneficiary and Non-beneficiary Households: (Rs.)

| Category                                                         | Dharwad     |                 |         | Bijapur         |                 |         | North Kanara |                 |         | Average         |       |
|------------------------------------------------------------------|-------------|-----------------|---------|-----------------|-----------------|---------|--------------|-----------------|---------|-----------------|-------|
|                                                                  | Beneficiary |                 |         | Non-beneficiary |                 |         | Beneficiary  |                 |         | Non-beneficiary |       |
|                                                                  | Beneficiary | Non-beneficiary | Average | Beneficiary     | Non-beneficiary | Average | Beneficiary  | Non-beneficiary | Average | B               | NB    |
| A. Small                                                         | 7500        | 6800            | 4650    | 3960            | 13700           | 8153    | 16860        | 9670            | 23117   | 40077           | 23782 |
| B. Medium                                                        | 14090       | 12650           | 8540    | 6400            | 50300           | 23117   | 48600        | 23743           | 40077   | 23782           | 23117 |
| C. Large                                                         | 35600       | 34500           | 12350   | 10680           | 75050           | 40077   | 86500        | 44817           | 40077   | 23782           | 23117 |
| All categories (Average)                                         | 19063       | 1798            | 8513    | 7013            | 46350           | 23782   | 50653        | 26077           | 40077   | 23782           | 23117 |
| D. Kissan nursery                                                | 6500        | -               | 4200    | -               | -               | -       | *            | -               | -       | -               | -     |
| B : Beneficiary NB : Non-beneficiary                             |             |                 |         |                 |                 |         |              |                 |         |                 |       |
| * : All Kissan nurseries were raised by voluntary organisations. |             |                 |         |                 |                 |         |              |                 |         |                 |       |

Small, medium and large category non-beneficiary households on an average earned Rs.8,153, Rs.23,117 and Rs.40,077 per annum, and an overall average income of Rs.23,782 (all categories combined) per household was observed. In total, beneficiary households registered higher income level than their non beneficiary counter parts which was observed to be marginal.

#### 4.3.8 Farm Forestry; Average number of seedlings planted and their survival rate

The results regarding the specieswise average number of seedlings planted by each beneficiary and their survival rate, under farm forestry component of the Social Forestry project, for all three divisions, have been presented in the Tables 4.14, 4.15 and 4.16.

It is evident from the results that the average number of seedlings planted by beneficiaries, under medium and large farmer categories, was observed to be highest in Dharwad division, among the three sample divisions. In Dharwad division, on an average a small farmer beneficiary planted 170 seedlings with a survival rate of 73.53 per cent, a medium farmer beneficiary 244 with a survival rate of 71.72 per cent and a large farmer beneficiary 265 with a survival rate of 69.81 percent.

Table 4.14. Average number of seedlings planted and their survival rate : Dharwad Division

| Sl. No. | Species           | Small farmers                 |                                |                      |                               | Medium farmers                 |                      |                               |                                | Large farmers        |                               |                                |                      | Overall averages              |                                |                      |  |
|---------|-------------------|-------------------------------|--------------------------------|----------------------|-------------------------------|--------------------------------|----------------------|-------------------------------|--------------------------------|----------------------|-------------------------------|--------------------------------|----------------------|-------------------------------|--------------------------------|----------------------|--|
|         |                   | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) |  |
| 1.      | Eucalyptus        | 45                            | 34                             | 75.87                | 74                            | 57                             | 77.19                | 95                            | 71                             | 75.26                | 71                            | 54                             | 76.06                |                               |                                |                      |  |
| 2.      | Subabul           | 25                            | 15                             | 61.11                | 36                            | 23                             | 64.50                | 46                            | 28                             | 61.43                | 36                            | 22                             | 61.11                |                               |                                |                      |  |
| 3.      | Ber               | 18                            | 16                             | 86.50                | 19                            | 16                             | 84.17                | 16                            | 12                             | 76.50                | 18                            | 15                             | 8.30                 |                               |                                |                      |  |
| 4.      | Neem              | 16                            | 11                             | 71.82                | 17                            | 12                             | 71.00                | 19                            | 17                             | 73.75                | 14                            | 13                             | 92.86                |                               |                                |                      |  |
| 5.      | Tamarind          | 21                            | 14                             | 68.08                | 20                            | 13                             | 63.06                | 15                            | 9                              | 59.87                | 19                            | 12                             | 633.16               |                               |                                |                      |  |
| 6.      | Casuarina         | 10                            | 8                              | 78.57                | 13                            | 11                             | 82.60                | 13                            | 11                             | 81.37                | 11                            | 10                             | 90.90                |                               |                                |                      |  |
| 7.      | Bamboo            | 19                            | 15                             | 80.73                | 27                            | 18                             | 66.07                | 26                            | 14                             | 55.87                | 24                            | 16                             | 66.67                |                               |                                |                      |  |
| 8.      | D. Sisso          | 13                            | 10                             | 80.00                | 26                            | 16                             | 62.08                | 16                            | 9                              | 56.82                | 18                            | 12                             | 66.67                |                               |                                |                      |  |
| 9.      | A. Auriculiformis | 3                             | 2                              | 82.50                | 12                            | 9                              | 72.50                | 19                            | 14                             | 76.00                | 9                             | 8                              | 88.89                |                               |                                |                      |  |
| Total   |                   | 170                           | 125                            | 73.53                | 244                           | 175                            | 71.72                | 265                           | 185                            | 69.81                | 220                           | 162                            | 73.64                |                               |                                |                      |  |

Table 4.15. Average number of seedlings planted and their survival rate : Bijapur Division

| Sl. No. | Species    | Small farmers                 |                                |                      | Medium farmers                |                                |                      | Large farmers                 |                                |                      | Overall averages              |                                |                      |
|---------|------------|-------------------------------|--------------------------------|----------------------|-------------------------------|--------------------------------|----------------------|-------------------------------|--------------------------------|----------------------|-------------------------------|--------------------------------|----------------------|
|         |            | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) |
| 1.      | Eucalyptus | 43                            | 14                             | 32.56                | 65                            | 22                             | 33.85                | 66                            | 30                             | 45.45                | 58.00                         | 22.00                          | 37.93                |
| 2.      | Subabul    | 46                            | 10                             | 21.74                | 50                            | 10                             | 20.00                | 57                            | 8                              | 14.03                | 51.00                         | 9.33                           | 18.29                |
| 3.      | Ber        | 28                            | 15                             | 53.57                | 33                            | 18                             | 54.54                | 39                            | 30                             | 76.92                | 33.33                         | 21.00                          | 63.00                |
| 4.      | Weem       | 15                            | 5                              | 33.33                | 24                            | 10                             | 41.67                | 30                            | 10                             | 33.33                | 23.00                         | 8.33                           | 36.23                |
| 5.      | Tamarind   | 29                            | 9                              | 31.00                | 12                            | 10                             | 83.33                | 26                            | 13                             | 50.00                | 19.33                         | 10.00                          | 55.19                |
| 6.      | Bamboo     | 15                            | 2                              | 13.33                | 20                            | 6                              | 30.00                | 21                            | 0                              | 0.00                 | 18.66                         | 2.67                           | 14.28                |
| 7.      | D. Sisso   | 8                             | 0                              | 0.00                 | 5                             | 1                              | 20.00                | 9                             | 2                              | 25.00                | 7.00                          | 2.00                           | 28.57                |
| Total   |            | 175                           | 55                             | 31.43                | 209                           | 77                             | 41.63                | 247                           | 93                             | 37.65                | 210.32                        | 74.33                          | 37.24                |



Table 4.16. Average number of seedlings planted and their average survival rate : N. Kanara Division

| Sl. No. | Species                | Small farmers                 |                                |                      |                               | Medium farmers                 |                      |                               |                                | Large farmers        |                               |                                |                      | Overall averages              |                                |                      |  |
|---------|------------------------|-------------------------------|--------------------------------|----------------------|-------------------------------|--------------------------------|----------------------|-------------------------------|--------------------------------|----------------------|-------------------------------|--------------------------------|----------------------|-------------------------------|--------------------------------|----------------------|--|
|         |                        | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) | Average No. seedlings planted | Average No. seedlings survival | Rate of survival (%) |  |
| 1.      | Eucalyptus             | 8                             | 8                              | 100                  | 13                            | 13                             | 100                  | 12                            | 12                             | 100                  | 11                            | 11                             | 100                  |                               |                                | 100                  |  |
| 2.      | Acacia auriculi-formis | 4                             | 3                              | 75                   | 10                            | 10                             | 100                  | 6                             | 4                              | 66.67                | 7                             | 6                              | 85.71                |                               |                                |                      |  |
| 3.      | Casurina               | 50                            | 48                             | 96                   | 73                            | 71                             | 97.26                | 68                            | 68                             | 100                  | 64                            | 62                             | 96.88                |                               |                                |                      |  |
| 4.      | Bamboo                 | 13                            | 12                             | 92.31                | 20                            | 20                             | 100                  | 24                            | 23                             | 95.83                | 19                            | 18                             | 94.7                 |                               |                                |                      |  |
| 5.      | Teak                   | 5                             | 5                              | 100                  | 32                            | 29                             | 90.62                | 31                            | 31                             | 100                  | 23                            | 22                             | 95.65                |                               |                                |                      |  |
| 6.      | D. sissoo              | 6                             | 6                              | 100                  | 10                            | 10                             | 100                  | 11                            | 11                             | 100                  | 9                             | 9                              | 100                  |                               |                                |                      |  |
| 7.      | D. latifolia           | 3                             | 3                              | 100                  | 5                             | 5                              | 100                  | 14                            | 14                             | 100                  | 7                             | 7                              | 100                  |                               |                                |                      |  |
| Total   |                        | 89                            | 85                             | 95.51                | 163                           | 158                            | 96.93                | 166                           | 163                            | 98.19                | 140                           | 135                            | 96.43                |                               |                                |                      |  |

The above mentioned figures in Bijapur division are 175 with a survival rate of 31.43 per cent, 209 with a survival rate of 41.63 per cent and 247 with a survival rate of 37.65 per cent, for small, medium and large categories respectively.

The average rate of survival was observed to be highest in N.Kanara division, where, more than 95 per cent of the seedlings survived, followed by in DHarwad (73.64%) and was least in Bijapur division where it was observed to be 37.24 per cent.

#### 4.4.3.9 Resource potential for Social Forestry among sample households

The Table 4.17 highlights the resource potential for adoption of Social Forestry components, among the beneficiary and non-beneficiary households in the study areas.

Potential of idle land resources viz., wastelands (both culturable as well as permanent wastes), farm bund space, back yards, front yard etc. was found to be more in Bijapur division but negligible in North Kanara division.

Among the available land resources, availability of other areas (including back yard, front yard

Table : 4.17 Resource potential for Social Forestry among sample households during 1990-91

| Resources                                       | DHARWAD     |            |            |              | BIJAPUR   |           |            |               | NORTH KANARA |    |    |         |
|-------------------------------------------------|-------------|------------|------------|--------------|-----------|-----------|------------|---------------|--------------|----|----|---------|
|                                                 | SF          | MF         | LF         | Average      | SF        | MF        | LF         | Average       | SF           | MF | LF | Average |
| I. Among beneficiaries                          |             |            |            |              |           |           |            |               |              |    |    |         |
| (a) Availability of waste land (ha)             | 0.03 (62.5) | 0.08 (80)  | 0.16 (50)  | 0.09 (64.17) | 0.07 (25) | 0.19 (40) | 1.03 (80)  | 0.43 (48.33)  | *            | *  | *  | *       |
| (b) Farm bund lengths (mts)                     | 150 (50)    | 580 (65)   | 1150 (65)  | 626.67 (60)  | 190 (100) | 920 (100) | 1830 (100) | 980 (100)     | *            | *  | *  | *       |
| (c) Other areas (ha) (backyard/front-yard etc.) | 0.007 (100) | 0.02 (100) | 0.04 (100) | 0.022 (100)  | *         | *         | 0.003 (70) | 0.001 (23.33) | *            | *  | *  | *       |
| II Among non-beneficiaries                      |             |            |            |              |           |           |            |               |              |    |    |         |
| (a) Availability of waste land (ha)             | 0.04        | 0.06       | 0.12       | 0.07         | 0.06      | 0.21      | 1.25       | 0.51          | *            | *  | *  | *       |
| (b) Bund length (mt)                            | 165         | 610        | 1090       | 621.67       | 210       | 870       | 1790       | 956.67        | *            | *  | *  | *       |
| (c) Other areas (ha) (backyard/front-yard etc.) | *           | 0.01       | 0.03       | 0.01         | *         | *         | 0.005      | *             | *            | *  | *  | *       |

\* Negligible. Figures in parentheses indicate percentages.

etc.) was found to be negligible with the beneficiaries belonging to small and medium farmer categories, in Bijapur division.

#### 4.4.3.10 Place of planting the seedlings

The Table 4.18 containing the results regarding place of planting the seedlings by the beneficiaries, obtained under free distribution of seedlings scheme, revealed that, all the the beneficiaries planted seedlings in their Backyards, Frontyards and on boundaries of their farms, in North Kanara. None of them planted seedlings on farm bunds, culturable waste, permanent waste and cultivated land, in North Kanara division.

Majority of the farmers in Dharwad division planted seedlings on farm bunds (71.67%), permanent waste (76.67%), Backyard (86.67%) and Farm boundary (100%). Whereas in Bijapur division, most of the beneficiaries planted seedlings on their farm boundaries (91.67%), farm bunds (75%) and permanent waste lands (51.67%).

In general, on an average, in all the divisions and among all categories of beneficiaries, 48.89 per cent of the beneficiaries planted seedlings on farm bunds, 17.78 per cent in culturable waste, 42.78 per cent in permanent waste, only 6.11 per cent in cultivated land, 67.78 per cent in

Table 4.18. Place of planting the seedlings

N = 180

| Sl.No. | Place            | DHARWAD     |             |             |               | BIJAPUR     |             |            |               | N.KANARA    |             |             |             | Averages/Totals |               |               |                |
|--------|------------------|-------------|-------------|-------------|---------------|-------------|-------------|------------|---------------|-------------|-------------|-------------|-------------|-----------------|---------------|---------------|----------------|
|        |                  | SP          | MP          | LP          | Total         | SP          | MP          | LP         | Total         | SP          | MP          | LP          | Total       | SP              | MP            | LP            | Total          |
| 1      | Farm bunds       | 10<br>(50)  | 13<br>(65)  | 20<br>(100) | 43<br>(71.67) | 20<br>(100) | 15<br>(75)  | 10<br>(50) | 45<br>(75)    | -           | -           | -           | -           | 30<br>(50)      | 28<br>(46.67) | 30<br>(50)    | 88<br>(48.89)  |
| 2      | Cultivable waste | 5<br>(25)   | 2<br>(10)   | 10<br>(50)  | 17<br>(28.33) | 2<br>(10)   | 7<br>(35)   | 6<br>(30)  | 15<br>(25)    | -           | -           | -           | -           | 7<br>(11.67)    | 9<br>(15)     | 16<br>(20.67) | 32<br>(17.78)  |
| 3      | Permanent waste  | 20<br>(100) | 16<br>(80)  | 10<br>(50)  | 46<br>(76.67) | 10<br>(50)  | 8<br>(40)   | 13<br>(65) | 31<br>(51.67) | -           | -           | -           | -           | 30<br>(50)      | 24<br>(40)    | 23<br>(38.33) | 77<br>(42.78)  |
| 4      | Cultivate land   | -           | 2<br>(10)   | 0.5<br>(25) | 6<br>(10)     | -           | -           | 4<br>(20)  | 4<br>(6.67)   | -           | -           | -           | -           | -               | 2<br>(3.33)   | 9<br>(15)     | 11<br>(6.11)   |
| 5      | Back yard        | 20<br>(100) | 20<br>(100) | 12<br>(60)  | 52<br>(86.67) | 3<br>(15)   | 2<br>(10)   | 5<br>(25)  | 10<br>(16.67) | 20<br>(100) | 20<br>(100) | 20<br>(100) | 60<br>(100) | 43<br>(71.67)   | 42<br>(70)    | 37<br>(61.67) | 122<br>(67.78) |
| 6      | Farm boundary    | 20<br>(100) | 20<br>(100) | 20<br>(100) | 60<br>(100)   | 18<br>(90)  | 20<br>(100) | 17<br>(85) | 55<br>(91.67) | 20<br>(100) | 20<br>(100) | 20<br>(100) | 60<br>(100) | 58<br>(95.67)   | 60<br>(100)   | 57<br>(95)    | 175<br>(97.22) |
| 7      | Front yard       | 6<br>(30)   | 4<br>(20)   | 11<br>(655) | 21<br>(35)    | -           | -           | -          | -             | 20<br>(100) | 20<br>(100) | 20<br>(100) | 60<br>(100) | 26<br>(43.33)   | 24<br>(40)    | 31<br>(51.67) | 81<br>(45)     |
| 8      | Totan (N)        | 20          | 20          | 20          | 60            | 20          | 20          | 20         | 60            | 20          | 20          | 20          | 60          | 60              | 60            | 60            | 180<br>(100)   |

Note : Figures in parentheses indicate percentages.

Backyard, 97.82 per cent on farm boundaries and 45 per cent in their frontyards.

#### 4.4.3.11 Farm forestry : Employment generation

The Table 4.19 indicates the extent of employment generation for individual sample households due to adoption of farm forestry component of the Social Forestry Project. The employment generation is found to be negligible in comparison to the total employment in a year. Employment generation is relatively more for the large farmer households.

#### 4.4.3.12 Benefits presently derived from the trees planted under farm forestry component

The various benefits viz., fuelwood, fodder, poles and small timber for construction purposes are listed in the Table 4.20 along with their monetary values.

The various benefits derived by the beneficiaries varied from beneficiary category to category and from division to division.

On an average every small, medium and large farmer beneficiary obtained fuelwood worth Rs.6.67, Rs.31.67 and Rs.46.67 annually, respectively. The overall average quantity of fuelwood obtained was found to be worth Rs.28.33.

Table 4.19. FARM FORESTRY : Employment generation.

| Respondents' category | (Mandays/year) |        |         |         |        |        |              |         |       |         |         |         |
|-----------------------|----------------|--------|---------|---------|--------|--------|--------------|---------|-------|---------|---------|---------|
|                       | Dharwad        |        |         | Bijapur |        |        | North Kanara |         |       | Average |         |         |
|                       | SFP            | Others | Total   | SFP     | Others | Total  | SFP          | Others  | Total | SFP     | Others  | Total   |
| 1. Small farmer       | 7              | 956    | 963     | 5       | 792    | 797    | 4            | 836     | 840   | 5.33    | 861.33  | 866.67  |
| 2. Medium farmer      | 5              | 1018   | 1023    | 7       | 915    | 922    | 3            | 1128    | 1131  | 5       | 1020.33 | 1025.33 |
| 3. Large farmer       | 8              | 1092   | 1100    | 7       | 643    | 650    | 6            | 1560    | 1566  | 7       | 1098.33 | 1105.33 |
| Average               | 6.67           | 1022   | 1028.67 | 6.33    | 783.33 | 789.66 | 4.33         | 1174.67 | 1179  | 5.78    | 993.33  | 999.11  |

Table : 4.20 Benefits presently derived from the trees planted under farm forestry component.

| Particulars of benefits            | (Rs./year) |     |     |         |         |     |     |         |              |        |        |         |
|------------------------------------|------------|-----|-----|---------|---------|-----|-----|---------|--------------|--------|--------|---------|
|                                    | DHARWAD    |     |     |         | BIJAPUR |     |     |         | NORTH KANARA |        |        |         |
|                                    | SP         | MF  | LF  | Average | SP      | MF  | LF  | Average | SP           | MF     | LF     | Average |
| 1. Fuelwood                        | 20         | 50  | 60  | 43.33   |         | 20  | 50  | 23.33   | *            | 25     | 30     | 27.5    |
|                                    |            |     |     |         |         |     |     |         | 6.67         | 31.67  | 46.67  | 28.33   |
| 2. Fodder                          | 125        | 220 | 235 | 193.33  | 50      | 80  | 85  | 215     | *            | 60     | 75     | 67.5    |
|                                    |            |     |     |         |         |     |     |         | 58.33        | 120    | 131.67 | 103.33  |
| 3. Poles/small timber              | 50         | 150 | 170 | 123.33  | 25      | 40  | 120 | 61.67   | *            | 130    | 190    | 160     |
|                                    |            |     |     |         |         |     |     |         | 25           | 106.67 | 160    | 97.22   |
| 4. Timber for construction purpose | 162        | 200 | 230 | 197.33  | 87      | 135 | 160 | 127.33  | *            | *      | 41.5   | 55.83   |
|                                    |            |     |     |         |         |     |     |         |              |        | 65     | 162.33  |
| Total                              | 357        | 620 | 695 | 557.32  | 162     | 275 | 415 | 427.33  | *            | 215    | 295    | 255     |
|                                    |            |     |     |         |         |     |     |         | 131.5        | 314.17 | 403.34 | 391.21  |
| * Negligible                       |            |     |     |         |         |     |     |         |              |        |        |         |



On an average, fodder worth Rs.58.33, Rs.120 and Rs.131.67 was obtained by the respective categories of beneficiaries in the above mentioned order. The overall quantity of fodder obtained by all categories of beneficiaries was worth Rs.103.33.

On an average a small, medium and large farmer beneficiaries obtained poles/small timber worth Rs.25, Rs.106.67 and Rs.160 respectively. The overall average came to Rs.97.22.

All small farmer beneficiaries in North Kanara division obtained negligible quantity of fuelwood, fodder, poles/small timber and timber for construction purpose. And all other beneficiaries in North Kanara obtained negligible quantity of timber for the same purpose.

On an average, timber worth Rs.41.5, Rs.55.83 and Rs.65 purpose was obtained for construction by beneficiaries belonging to small, medium and large farmer categories respectively. The overall average quantity of timber obtained was worth Rs.162.33.

In total, benefits worth Rs.131.5, Rs.314.17 and Rs.403.34 were obtained by beneficiaries belonging to small, medium and large farmer categories respectively.

Overall benefits, irrespective of category and division of beneficiaries, were worth Rs.391.21, per annum.

#### Kissan Nursery Scheme

The results of analysis of Kissan nursery scheme, regarding number of seedlings raised, seedling accepted and rejected, employment generation, costs and returns are presented in the Table 4.21. The results show that on an average 13,691; 15,000 and 10,000 seedlings were raised in Dharwad, Bijapur and N. Kanara divisions respectively, of which 92.06, 91.54 and 94.74 per cent of seedlings were accepted by the Forest Department and rest were rejected.

On an average every kissan nursery generated 159, 152.5 and 108 mandays of employment in Dharwad, Bijapur and N. Kanara divisions respectively, out of which 146.2, 142.7 and 108 days were utilised by the family members and rest by the hired labourers.

Average gross cost of raising seedlings was found to be highest in N.Kanara (25 paise per seedling) followed by in Dharwad and Bijapur Divisions, with 15 paise and 12 paise respectively.

However, average net profit was observed to be highest in Dharwad division (24 paise per seedling) among the

Table:4.21 Kissan nursery scheme : Among sample beneficiary households (1991-92)

| Sl.No. | Item                                                   | Dharwad            | Bijapur            | N.Kanara        | Average            |
|--------|--------------------------------------------------------|--------------------|--------------------|-----------------|--------------------|
| 1.     | Average number of seedlings raised (per beneficiary) : | 13691<br>(100)     | 15000<br>(100)     | 10000<br>(100)  | 12867<br>(100)     |
| 2.     | Average number of seedlings accepted                   | 12550<br>(92.06)   | 13731<br>(91.54)   | 9474<br>(94.74) | 11918<br>(92.62)   |
| 3.     | Average number of seedlings rejected                   | 1088<br>(7.94)     | 1269<br>(8.46)     | 526<br>(5.26)   | 96<br>(7.38)       |
| 4.     | Employment generation<br>(man days/raising)            |                    |                    |                 |                    |
|        | a. Family labour                                       |                    |                    |                 |                    |
|        | i) Male :                                              | 0.75               | 2.40               | 108.00          |                    |
|        | ii) Female :                                           | 142.45             | 139.30             | -               |                    |
|        | Total (a)                                              | 146.20             | 141.70             | 108.00          | 131.97             |
|        | b. Hired labour                                        |                    |                    |                 |                    |
|        | i) Male :                                              | 0.40               | 1.75               | -               |                    |
|        | ii) Female :                                           | 12.40              | 8.05               | -               |                    |
|        | Total (b)                                              | 12.80              | 9.80               | -               | 11.30              |
|        | Total (a+b)                                            | 159.00             | 152.50             | 108.00          | 139.83             |
| 5.     | Gross cost : (Rs.)                                     |                    |                    |                 |                    |
|        | a) Sand, soil & manure                                 | 526.00<br>(27.89)  | 541.25<br>(26.28)  | 265.00          | 444.08<br>(20.76)  |
|        | b) Fertilizer & plant protection chemicals             | 13.50<br>(0.71)    | 20.50<br>(0.99)    | -               | 11.33              |
|        | c) Equipment & miscellaneous                           | 40.50<br>(2.15)    | 32.75<br>(1.59)    | 46.00           | 39.75<br>(5.57)    |
|        | Total (a+b+c)                                          | 580.00<br>(30.75)  | 594.50<br>(28.86)  | 311.00          | 495.17<br>(23.15)  |
|        | d) Labour cost :                                       |                    |                    |                 |                    |
|        | i) Imputed family labour cost                          | 1215.45<br>(64.44) | 1353.75<br>(65.71) | 2160.00         | 1576.30<br>(73.69) |
|        | ii) Hired labour cost                                  | 90.70<br>(4.81)    | 111.90<br>(5.43)   |                 | 67.77<br>(3.17)    |
|        | Total (d)                                              | 1306.15<br>(69.25) | 1465.35<br>(71.14) | 2160.00         | 1643.83<br>(76.85) |
|        | Total (a+b+c+d)                                        | 1886.15<br>(100)   | 2059.85<br>(100)   | 2471.00         | 2139.00<br>(100)   |
|        | e) Average cost of raising seedlings (per seedling)    | 0.12               | 0.15               | 0.25            | 0.17               |
| 6.     | Gross returns (Rs.) :                                  | 5469.87            | 4222.72            | 3131.62         | 4274.74            |
| 7.     | Net profit (Rs.)                                       | 3583.72            | 2162.87            | 660.62          | 2135.74            |
| 8.     | Average net profit per seedling raised (Rs.)           | 0.24               | 0.16               | 0.06            | 0.15               |

Figures in parentheses indicate percentages.

three sample divisions followed by in Bijapur (16 paise) and N. Kanara (0.06 paise).

When the gross cost is divided in to cost A<sub>1</sub>, cost A<sub>2</sub>, cost B and cost C, Cost A<sub>1</sub> and cost A<sub>2</sub> were found to be same in all the three divisions. Cost B was observed to be highest in Dharwad division and least in N. Kanara. Cost C was highest in N. Kanara followed by in Bijapur and Dharwad.

#### 4.4.3.14 Awareness/knowledge of social forestry among the respondents

The Table 4.22 portrays that in general 25 per cent & 38.33 per cent of the beneficiaries and 10 per cent & 16.67 per cent of the non-beneficiaries, had knowledge of concept of social forestry to a greater extent and to some extent respectively. But 36.67 per cent and 73.33 per cent of respondents of the above mentioned categories had no knowledge of the concept of the social forestry at all.

As far as the breakup of results of the above mentioned overall results, gave a widely varied picture from division to division, and also from category to category of beneficiaries, due to some obvious reasons which would be made clear later, while discussing the results.

Among small beneficiary category (all divisions combined), only 5 per cent of the beneficiaries and none of

Table 4.22. Social Forestry : Awareness/Knowledge

|                                                    |                                                          | DHARWAD N1=120 |         |         |         |         |         | BIJAPUR N2=120 |       |         |         |         |         | NORTH KANARA N3=120 |         |         |         |       |         | N = 360 |         |
|----------------------------------------------------|----------------------------------------------------------|----------------|---------|---------|---------|---------|---------|----------------|-------|---------|---------|---------|---------|---------------------|---------|---------|---------|-------|---------|---------|---------|
| Sl. No.                                            | Item                                                     | SMALL          |         | MEDIUM  |         | LARGE   |         | SMALL          |       | MEDIUM  |         | LARGE   |         | SMALL               |         | MEDIUM  |         | LARGE |         |         |         |
|                                                    |                                                          | E              | N.B.    | E       | N.B.    | E       | N.B.    | E              | N.B.  | E       | N.B.    | E       | N.B.    | E                   | N.B.    | E       | N.B.    | E     | N.B.    | E       | N.B.    |
|                                                    |                                                          | 20             | 20      | 20      | 20      | 20      | 20      | 20             | 20    | 20      | 20      | 20      | 20      | 20                  | 20      | 20      | 20      | 20    | 20      | 20      | 20      |
| <b>I Knowledge of concept of social forestry</b>   |                                                          |                |         |         |         |         |         |                |       |         |         |         |         |                     |         |         |         |       |         |         |         |
| 1.                                                 | Yes                                                      | 11             | 3       | 14      | 5       | 18      | 7       | 6              | -     | 8       | 3       | 14      | 3       | 7                   | 3       | 16      | 9       | 20    | 15      | 7       | 3       |
|                                                    |                                                          | (55)           | (15)    | (70)    | (25)    | (90)    | (35)    | (30)           | -     | (40)    | (15)    | (70)    | (15)    | (35)                | (15)    | (80)    | (45)    | (100) | (75)    | (35)    | (15)    |
| 2.                                                 | No                                                       | 9              | 17      | 6       | 15      | 2       | 13      | 14             | 20    | 12      | 17      | 6       | 17      | 13                  | 17      | 4       | 11      | -     | 5       | 13      | 17      |
|                                                    |                                                          | (45)           | (85)    | (30)    | (75)    | (10)    | (65)    | (70)           | (100) | (60)    | (85)    | (30)    | (85)    | (65)                | (85)    | (20)    | (55)    | (25)  | (25)    | (65)    | (85)    |
| <b>II Awareness of social forestry</b>             |                                                          |                |         |         |         |         |         |                |       |         |         |         |         |                     |         |         |         |       |         |         |         |
| 1.                                                 | Well before it was started                               | -              | -       | -       | -       | -       | -       | -              | -     | -       | -       | -       | -       | -                   | -       | 2       | -       | 3     | -       | -       | -       |
|                                                    |                                                          | (27.27)        | -       | (14.29) | -       | (33.33) | -       | -              | -     | -       | -       | (28.57) | -       | -                   | -       | (12.5)  | -       | (15)  | -       | -       | -       |
| 2.                                                 | During the initial phase                                 | 3              | 2       | 5       | 2       | 6       | 2       | -              | -     | -       | -       | 4       | -       | -                   | -       | 6       | -       | 10    | -       | -       | -       |
|                                                    |                                                          | (27.27)        | (14.29) | (33.33) | (28.57) | (33.33) | (28.57) | -              | -     | (37.5)  | -       | (28.57) | -       | (57.14)             | -       | (37.5)  | -       | (50)  | -       | -       | -       |
| 3.                                                 | Months after its inception                               | 2              | 1       | 7       | 3       | 5       | 5       | 6              | -     | 3       | 3       | 6       | 3       | 4                   | 3       | 5       | -       | 6     | 10      | 4       | 3       |
|                                                    |                                                          | (18.18)        | (33.33) | (35.71) | (40)    | (38.89) | (28.57) | (100)          | -     | (37.5)  | (100)   | (42.86) | (100)   | (57.14)             | (100)   | (18.75) | -       | (30)  | (66.67) | (57.14) | (100)   |
| 4.                                                 | Very recently                                            | 6              | 2       | 7       | 3       | 5       | 5       | 6              | -     | 2       | 2       | 6       | 3       | 3                   | 3       | 2       | -       | 1     | 4       | 3       | 3       |
|                                                    |                                                          | (54.55)        | (66.67) | (50)    | (60)    | (27.78) | (71.43) | (100)          | -     | (25)    | (100)   | (42.86) | (100)   | (42.86)             | (100)   | (31.25) | -       | (5)   | (26.67) | (42.86) | (100)   |
| 5.                                                 | Can't say                                                | -              | -       | -       | -       | -       | -       | -              | -     | 3       | 3       | -       | -       | -                   | -       | 2       | -       | 1     | -       | -       | -       |
|                                                    |                                                          | -              | -       | -       | -       | -       | -       | -              | -     | (37.5)  | (37.5)  | -       | -       | -                   | -       | (12.5)  | -       | (5)   | -       | -       | -       |
| <b>III Objectives of social forestry programme</b> |                                                          |                |         |         |         |         |         |                |       |         |         |         |         |                     |         |         |         |       |         |         |         |
| 1.                                                 | To supply fuel wood, fodder, timber etc. to local people | 8              | 2       | 12      | 3       | 15      | 4       | 3              | -     | 6       | -       | 10      | 2       | 5                   | -       | 10      | 3       | 18    | 10      | 5       | -       |
|                                                    |                                                          | (72.73)        | (66.67) | (85.71) | (60)    | (93.33) | (57.14) | (50)           | -     | (75)    | -       | (71.43) | (66.67) | (71.43)             | -       | (71.43) | (33.33) | (90)  | (66.67) | (71.43) | -       |
| 2.                                                 | To plant trees in wastelands                             | 3              | 3       | 10      | -       | 12      | 5       | -              | -     | 7       | 2       | 12      | 3       | 7                   | 2       | 12      | 5       | 20    | 14      | 7       | 2       |
|                                                    |                                                          | (27.27)        | (100)   | (71.43) | -       | (66.67) | (71.43) | -              | -     | (87.5)  | (66.67) | (85.71) | (100)   | (100)               | (66.67) | (75)    | (55.56) | (100) | (73.33) | (66.67) | (66.67) |
| 3.                                                 | To check soil and water erosion                          | 2              | 4       | 4       | -       | 6       | 3       | -              | -     | 3       | -       | 4       | 3       | 4                   | -       | 4       | 3       | 14    | 8       | -       | -       |
|                                                    |                                                          | (18.18)        | (100)   | (28.57) | -       | (33.33) | (42.86) | -              | -     | (7.5)   | -       | (28.57) | (100)   | (57.14)             | -       | (28.57) | (33.33) | (70)  | (53.33) | -       | -       |
| 4.                                                 | To maintain ecological balance                           | 10             | 3       | 13      | 5       | 17      | 6       | 6              | -     | 5       | 3       | 13      | 3       | 5                   | 3       | 5       | 8       | 20    | 15      | 5       | 3       |
|                                                    |                                                          | (90.91)        | (100)   | (92.86) | (100)   | (94.44) | (85.71) | (100)          | -     | (71.43) | (100)   | (92.86) | (100)   | (71.43)             | (100)   | (87.5)  | (88.89) | (100) | (100)   | (100)   | (100)   |
| 5.                                                 | To reduce biotic pressure on existing forests            | 10             | -       | 11      | 4       | 13      | -       | 4              | -     | -       | -       | 4       | 1       | 7                   | 3       | 10      | 7       | 20    | 13      | 7       | 3       |
|                                                    |                                                          | (90.91)        | -       | (78.57) | (80)    | (72.22) | -       | (66.67)        | -     | -       | -       | (28.57) | (33.33) | (100)               | (100)   | (62.5)  | (77.78) | (100) | (86.67) | (100)   | (100)   |

E : Beneficiaries N.B. : Non beneficiaries  
 Figures in parentheses indicate percentage to the total

the non-beneficiaries had knowledge of concept of social forestry to a greater extent. Thirty five per cent and 10 per cent of the beneficiaries and non-beneficiaries had knowledge to some extent, respectively. But majority of them, 60 per cent of the beneficiaries and 90 per cent of non-beneficiaries, had no knowledge at all.

Results showed that, among medium category of beneficiaries only 20 per cent and 43.33 per cent of beneficiaries and just 2.5 per cent and 23.33 per cent of non-beneficiaries had knowledge of concept of social forestry to a greater and to some extent respectively.

Large farmers, it seems, had better level of knowledge of concept of Social Forestry than the small and medium farmer. Fifty per cent and 25 per cent of the beneficiaries and non-beneficiaries possessed knowledge to a greater extent respectively. Among the respondents having knowledge to some extent were 37.67 per cent of the beneficiaries and 16.67 per cent of the non-beneficiaries. Among the beneficiaries (large category) 13.35 per cent and 58.33 per cent among non-beneficiaries possessed no knowledge.

The results encompassing all respondents belonging to different farmer categories, and Social Forestry divisions revealed the following scenario, 17.5 per cent and

27.5 per cent of the respondents possessed knowledge to a greater extent and to a some extent respectively about the concept of social forestry. But, 55 per cent of them had no knowledge of the same.

#### 4.4.3.15 Awareness/knowledge of Farm Forestry among the respondents

The Table 4.23 depicts that, for majority of the respondents (75.28%) farm forestry meant planting trees on farm bunds, along with 59.17 per cent and 3.33 per cent of the respondents for whom it meant planting trees in waste/marginal land of the farmer and growing trees and crops together, respectively. For 4.44 per cent of the respondents, it was an activity where cultivated land was diverted for growing trees, and 24.72 per cent of the respondents had no idea about it at all.

Majority of the respondents (75.83%) from North Kanara division, equated farm forestry to planting trees in waste or marginal lands of the farmer. This view was shared by 68.33 per cent and 33.33 per cent of the respondents in Dharwad and Bijapur divisions, respectively.

More than 46 per cent (46.67%) of the respondents in Bijapur division were unaware of the concept of Farm Forestry, whose number was highest among the three

Table 4.23. Farm Forestry : Awareness/Knowledge

|                                       |                                                          | DHARWAD N1=120 |       |         |         |       |         | BIJAPUR N2=120 |         |         |       |       |         | NORTH KANARA N3=120 |         |        |         |       |       |
|---------------------------------------|----------------------------------------------------------|----------------|-------|---------|---------|-------|---------|----------------|---------|---------|-------|-------|---------|---------------------|---------|--------|---------|-------|-------|
| Sl. No.                               | Item                                                     | SMALL          |       | MEDIUM  |         | LARGE |         | SMALL          |         | MEDIUM  |       | LARGE |         | SMALL               |         | MEDIUM |         | LARGE |       |
|                                       |                                                          | B              | N.B.  | B       | N.B.    | B     | N.B.    | B              | N.B.    | B       | N.B.  | B     | N.B.    | B                   | N.B.    | B      | N.B.    | B     | N.B.  |
|                                       |                                                          | 20             | 20    | 20      | 20      | 20    | 20      | 20             | 20      | 20      | 20    | 20    | 20      | 20                  | 20      | 20     | 20      | 20    | 20    |
| <b>I Meaning of farm forestry</b>     |                                                          |                |       |         |         |       |         |                |         |         |       |       |         |                     |         |        |         |       |       |
| 1.                                    | Planting trees in wasteland/marginal lands of the farmer | 16             | 6     | 15      | 10      | 18    | 17      | 10             | 10      | 11      | -     | 14    | 5       | 18                  | 10      | 19     | 9       | 20    | 15    |
|                                       |                                                          | (80)           | (30)  | (75)    | (50)    | (90)  | (85)    | (50)           | -       | (55)    | -     | (70)  | (25)    | (90)                | (50)    | (95)   | (45)    | (100) | (75)  |
| 2.                                    | Planting trees on farm bunds                             | 17             | 10    | 18      | 15      | 20    | 18      | 15             | 3       | 17      | 1     | 20    | 7       | 20                  | 14      | 20     | 15      | 20    | 20    |
|                                       |                                                          | (85)           | (50)  | (90)    | (75)    | (100) | (90)    | (75)           | (15)    | (85)    | (5)   | (100) | (35)    | (100)               | (70)    | (100)  | (75)    | (100) | (100) |
| 3.                                    | Growing trees & crops together                           | 33             | 15    | -       | -       | -     | -       | -              | -       | 2       | -     | 3     | 4       | -                   | -       | -      | -       | -     | -     |
|                                       |                                                          | (15)           | (10)  | -       | -       | -     | -       | -              | -       | (10)    | -     | (15)  | (20)    | -                   | -       | -      | -       | -     | -     |
| 4.                                    | Growing only trees in the cultivated land                | -              | 2     | -       | -       | -     | -       | -              | -       | -       | 1     | -     | 2       | -                   | -       | -      | -       | 5     | 6     |
|                                       |                                                          | (10)           | (10)  | -       | -       | -     | -       | -              | -       | -       | (5)   | -     | (10)    | -                   | -       | -      | (25)    | (30)  | (30)  |
| 5.                                    | No idea                                                  | 3              | 10    | 2       | 5       | -     | 2       | 5              | 17      | 3       | 18    | -     | 13      | 6                   | 5       | -      | -       | -     | -     |
|                                       |                                                          | (15)           | (50)  | (10)    | (25)    | -     | (10)    | (25)           | (85)    | (15)    | (90)  | -     | (65)    | (30)                | (25)    | -      | -       | -     | -     |
| <b>II Objectives of farm forestry</b> |                                                          |                |       |         |         |       |         |                |         |         |       |       |         |                     |         |        |         |       |       |
| 1.                                    | Efficient utilisation of land resources                  | 8              | 4     | 13      | 6       | 16    | 8       | 3              | -       | 12      | -     | 14    | 2       | 18                  | 7       | 19     | 10      | 20    | 12    |
|                                       |                                                          | (47.06)        | (40)  | (72.22) | (40)    | (80)  | (44.44) | (20)           | -       | (70.58) | -     | (70)  | (15.38) | (90)                | (50)    | (95)   | (66.67) | (100) | (55)  |
| 2.                                    | To supply fuelwood, fodder, timber, poles etc.           | 10             | 3     | 12      | 9       | 20    | 15      | 14             | 2       | 16      | 2     | 20    | 7       | 13                  | 10      | 15     | 6       | 20    | 10    |
|                                       |                                                          | (58.82)        | (0)   | (66.67) | (60)    | (100) | (83.33) | (93.33)        | (66.67) | (94.12) | (100) | (100) | (53.95) | (65)                | (53.82) | (75)   | (40)    | (100) | (50)  |
| 3.                                    | To check soil and water erosion                          | 12             | 9     | 14      | 12      | 15    | 13      | 3              | -       | 8       | -     | 4     | 3       | 10                  | 6       | 13     | 10      | 14    | 6     |
|                                       |                                                          | (70.59)        | (90)  | (77.78) | (80)    | (75)  | (72.22) | (20)           | -       | (47.06) | -     | (20)  | (23.08) | (50)                | (42.86) | (65)   | (66.67) | (70)  | (30)  |
| 4.                                    | To create shelter/wind belts                             | 6              | -     | 9       | 4       | 8     | 4       | -              | -       | 3       | -     | 2     | -       | 16                  | 12      | 20     | 15      | 20    | 14    |
|                                       |                                                          | (35.20)        | -     | (50)    | (26.67) | (40)  | (22.22) | -              | -       | (17.65) | -     | (10)  | -       | (80)                | (85.71) | (100)  | (100)   | (100) | (70)  |
| 5.                                    | To supply green manure                                   | 9              | 2     | 10      | 7       | 6     | 3       | 2              | -       | 6       | -     | 5     | -       | 18                  | 14      | 20     | 14      | 20    | 18    |
|                                       |                                                          | (52.94)        | (20)  | (55.55) | (46.67) | (30)  | (16.67) | (13.3)         | -       | (35.28) | -     | (25)  | -       | (90)                | (100)   | (100)  | (93.33) | (100) | (90)  |
| 6.                                    | To maintain soil fertility                               | 3              | 6     | 8       | 3       | 9     | 10      | 7              | -       | 7       | -     | 9     | -       | 4                   | -       | 6      | 3       | 16    | 8     |
|                                       |                                                          | (17.65)        | (60)  | (44.44) | (20)    | (45)  | (55.56) | (46.67)        | -       | (41.13) | -     | (45)  | -       | (20)                | -       | (30)   | (20)    | (50)  | (40)  |
| 7.                                    | To create employment opportunity                         | 2              | -     | 2       | -       | 3     | -       | -              | -       | -       | -     | -     | -       | -                   | -       | -      | -       | -     | -     |
|                                       |                                                          | (11.76)        | -     | (11.11) | -       | (15)  | -       | -              | -       | -       | -     | -     | -       | -                   | -       | -      | -       | -     | -     |
| 8.                                    | To maintain ecological balance                           | 17             | 10    | 18      | 14      | 17    | 13      | 6              | 3       | 14      | 2     | 18    | 6       | 6                   | 10      | 14     | 11      | 15    | 12    |
|                                       |                                                          | (100)          | (100) | (100)   | (93.33) | (85)  | (72.22) | (40)           | (100)   | (82.35) | (100) | (90)  | (46.15) | (30)                | (58.82) | (70)   | (73.33) | (75)  | (60)  |

B : Beneficiaries N.B. : Non beneficiaries  
 Figures in parentheses indicate percentage to the total



divisions, the others being 18.33 per cent and 9.17 per cent in Dharwad and North Kanara divisions respectively.

When a set of eight objectives of Farm Forestry were made known to the respondents, 76.01 per cent of them made it a point that introduction of Farm Forestry was to maintain the ecological balance in the region. Supply of fuelwood, fodder, timber, poles etc. was another main objective of the Farm Forestry, followed by efficient land utilization, to supply green manure, to check soil and water erosion, to create shelter/wind belts, to maintain soil fertility and to create employment opportunity, with respective percentages of 75.28, 67.16, 56.83, 56.09, 49.08, 34.32 and 2.58, of the respondents.

#### 4.4.3.16 Sources of information for obtaining freely distributed seedlings

Results given in the Table 4.24 reveal that the motivators and kissan nursery raisers were the major sources of information, for small farmer category beneficiaries in Dharwad and Bijapur divisions, respectively (30% in each case). Kissan nursery raisers (20%), panchayat members (25%) and Agricultural Department officials (30%) were the other sources of information for medium farmer category beneficiaries in Dharwad division. An equal number of large

Table 4.24. Sources of information : For beneficiaries under free distribution of seedlings

|        |                                 | W1 + W2 + W3 = 180 |     |    |            |                 |     |            |     |                   |            |    |     |            |     |    |            |    |     |
|--------|---------------------------------|--------------------|-----|----|------------|-----------------|-----|------------|-----|-------------------|------------|----|-----|------------|-----|----|------------|----|-----|
|        |                                 | Dharwad W1 = 60    |     |    |            | Bijapur W2 = 60 |     |            |     | K. Kanara W3 = 60 |            |    |     |            |     |    |            |    |     |
| Sl.No. | Sources                         | S (n = 20)         |     |    | M (n = 20) |                 |     | L (n = 20) |     |                   | S (n = 20) |    |     | M (n = 20) |     |    | L (n = 20) |    |     |
|        |                                 | P                  | S   | F  | P          | S               | F   | P          | S   | F                 | P          | S  | F   | P          | S   | F  | P          | S  | F   |
| 1.     | Motivators                      | 6                  | 30  | 33 | 15         | 2               | 10  | 2          | 10  | 5                 | 25         | 3  | 15  | 2          | 10  | -  | -          | -  | -   |
| 2.     | Forest Department Officials     | -                  | -   | -  | -          | 3               | 15  | -          | -   | -                 | -          | 2  | 10  | 10         | 50  | 13 | 65         | 15 | 75  |
| 3.     | Publicity literature, Hoardings | 3                  | 15  | -  | -          | 3               | 15  | -          | -   | -                 | -          | 4  | 20  | -          | -   | -  | -          | 2  | 10  |
| 4.     | Friends, Relatives etc.         | 4                  | 20  | 2  | 10         | 2               | 10  | 5          | 25  | 6                 | 30         | -  | -   | -          | -   | -  | -          | -  | -   |
| 5.     | Kissan nursery raisers          | 3                  | 15  | 4  | 20         | 5               | 25  | 6          | 30  | 7                 | 35         | 5  | 25  | 8          | 40  | 2  | 10         | 3  | 15  |
| 6.     | Panchayat members               | -                  | -   | 5  | 25         | 3               | 15  | 2          | 10  | 5                 | 25         | -  | -   | -          | -   | 5  | 25         | -  | -   |
| 7.     | Agriculture Dept. Officials     | 4                  | 20  | 6  | 30         | 2               | 10  | 2          | 10  | 2                 | 10         | 6  | 30  | -          | -   | -  | -          | -  | -   |
| 8.     | Radio/Television/Newspapers     | -                  | -   | -  | -          | -               | -   | -          | -   | -                 | -          | -  | -   | -          | -   | -  | -          | -  | -   |
| Total  |                                 | 20                 | 100 | 20 | 100        | 20              | 100 | 20         | 100 | 20                | 100        | 20 | 100 | 20         | 100 | 20 | 100        | 20 | 100 |

S : Small farmer, M : Medium farmer, L : Large farmer, P : Frequency

farmer category beneficiaries in Dharwad division derived information from the forest department officials, publicity literature and local panchayat members. Kissan nursery raisers also informed 25% of the beneficiaries about the availability of seedlings, in Dharwad division.

Again, kisan nursery raisers formed the largest source of information by informing 35 per cent of the medium farmer category beneficiaries, followed by friends/relatives (30%) and local panchayat members (25%) in Bijapur division. Publicity unit of the Forest Department utterly failed to inform the beneficiaries, about the availability of the seedlings freely, i.e. none of the small and medium farmer beneficiaries received information from the publicity unit. Twenty five per cent of the large farmer beneficiaries could come in contact of the publicity material of the Forest Department. Agricultural Department officials informed maximum (30%) number of the beneficiaries (large category) in Bijapur division followed by kisan nursery raisers (25%).

In North Kanara division, majority of the beneficiaries received information from the Forest Department officials followed by that from the kisan nursery raisers.

4.4.3.17 Sources of information for beneficiaries under Kissan  
nursery scheme

It is apparent from the Table 4.25 that there was considerable variation in the sources of information from division to division and between the categories of farmers also. The results are as follows :

Majority of the beneficiaries received information on kissan nursery scheme, from their local elected representatives (Panchayat members), in Dharwad (65%) and Bijapur (75%) divisions. Whereas in North Kanara division, 65 per cent of them received information from the forest department and 25 per cent from their respective panchayat members.

Motivators were a source of information for 25 per cent of the beneficiaries, each in Dharwad and Bijapur divisions, and only for 10 per cent in North Kanara division.

Forest Department personnel were source of information for only 10 per cent of beneficiaries in Dharwad and none in Bijapur division.

Agricultural Department personnel, friends/relatives, publicity literature of the Forest Department and other mass media, as it is shown in the Table 4.25, did not

Table 4.25. Sources of information for beneficiaries under kissan nursery scheme  
N = 60

| Source                                          | DHARWAD DISTRICT BIJAPUR DISTRICT N. KANARA DISTRICT |    |                   |    |
|-------------------------------------------------|------------------------------------------------------|----|-------------------|----|
|                                                 | Frequency<br>N=20                                    | %  | Frequency<br>N=20 | %  |
| 1. <u>Personnel</u>                             |                                                      |    |                   |    |
| a. Forest department                            | 2                                                    | 10 | -                 | 13 |
| b. Motivators                                   | 5                                                    | 25 | 5                 | 25 |
| c. Agril. Dept.                                 | -                                                    | -  | -                 | -  |
| 2. Panchayat members/<br>office bearers         | 1                                                    | 65 | 15                | 75 |
| 3. Friends/relatives                            | -                                                    | -  | -                 | -  |
| 4. Publicity literature<br>of forest department | -                                                    | -  | -                 | -  |
| 5. News paper                                   | -                                                    | -  | -                 | -  |
| 6. Radio                                        | -                                                    | -  | -                 | -  |
| 7. Television                                   | -                                                    | -  | -                 | -  |

form the source of information for any of the beneficiaries  
of kissan nursery scheme.

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#### 4.4.3.18 Publicity for Social Forestry Programme

It can be observed from the Table 4.26 that 85 per cent of the respondents in Bijapur division made it clear that the publicity was not at all given to Social Forestry Programme in their areas. Fifteen per cent of the respondents pointed out that, the publicity given was inadequate and moreover untimely.

Sixty percent of the respondents in Dharwad division were not aware of the Social Forestry Programme. Fifteen per cent of the respondents clarified that publicity was not only adequate but also knowledgeable. Twenty five percent of them reported that publicity was inadequate but timely. Forty percent of the respondents dubbed it as an untimely event.

In North Kanara, even though publicity was given in the respondents' areas, 60% of the respondents felt that it was inadequate, 25% untimely, 75% timely, 40% adequate and 40% knowledgeable.

#### 4.4.3.19 Economic viability of village woodlots

For the purpose of Economic Evaluation of Social Forestry project of Karnataka, an attempt has been made

**Table 4.26. Nature and extent of publicity for Social Forestry Programme**  
N = 180

| Sl. No. | Item         | DHARWAD DISTRICT BIJAPUR DISTRICT N. KANARA DISTRICT |    |                   |    |                   |    |
|---------|--------------|------------------------------------------------------|----|-------------------|----|-------------------|----|
|         |              | Frequency<br>N=60                                    | %  | Frequency<br>N=60 | %  | Frequency<br>N=60 | %  |
| 1.      | Adequate     | 9                                                    | 15 | -                 | -  | 24                | 40 |
| 2.      | Inadequate   | 15                                                   | 25 | 9                 | 15 | 36                | 60 |
| 3.      | Timely       | 24                                                   | 40 | -                 | -  | 15                | 25 |
| 4.      | Untimely     | 9                                                    | 15 | 9                 | 15 | 15                | 25 |
| 5.      | Knowledgable | 9                                                    | 15 | -                 | -  | 24                | 40 |
| 6.      | No publicity | 36                                                   | 60 | 51                | 85 | -                 | -  |

Table 4.27. Economic viability of village woodlots

| Sl. No.                                                                        | Discounting rates                    | I<br>Mamadapur | II<br>Dammur | III<br>Bevinahalli | IV<br>Navalur | V<br>Aggarni | VI<br>Hosur |
|--------------------------------------------------------------------------------|--------------------------------------|----------------|--------------|--------------------|---------------|--------------|-------------|
| 1)                                                                             | $\bar{B} - \bar{C}$ (10% discount)   | 12.83          | 2.71         | 5.64               | 4.62          | 5.49         | 4.14        |
| 2)                                                                             | $\bar{B} - C \uparrow$ by 10%        | 11.66          | 2.47         | 5.13               | 4.19          | 4.98         | 4.60        |
| 3)                                                                             | $B \downarrow$ (by 10%) - $\bar{C}$  | 11.55          | 2.44         | 5.07               | 3.64          | 4.94         | 3.73        |
| 4)                                                                             | $B \downarrow - C \uparrow$ (by 10%) | 10.50          | 2.22         | 4.61               | 3.31          | 4.49         | 3.39        |
| $\uparrow$ : Increases $\downarrow$ : Decreases      B : Benefit      C : Cost |                                      |                |              |                    |               |              |             |
| $\bar{B}-\bar{C}$ : Discounted at 10 perr cent                                 |                                      |                |              |                    |               |              |             |



in this study to know the economic viability of village woodlots raised under Social Forestry project, through working out the Benefit-Cost ratios. To try out the robustness of the results, through the 'Sensitivity analysis', different sets of assumptions have been made use of. The results are presented in the Table 4.27.

The higher B-C ratios of all the plantations, even under different sets of assumptions, make it clear that the potential productivity and investment feasibility in the project is high. Among the plantations considered, first (I) and Second (II) plantations, coming in Bijapur Social Forestry division, showed highest and lowest B-C ratios, respectively.

#### 4.4.3.20 Performance of Social Forestry training institutes

Total number of persons, including Range Forest Officers, Foresters, Forest Guards, Motivators, members of voluntary organisations etc. trained under Social Forestry Project, at two training centers, Kadugodi near Bangalore and Thathihalla in North Kanara district, is presented in the Table 4.28.

The Table 4.28 portrays that majority of the trainees were trained in Kadugodi (59.09%) than in Thathihalla (40.91%). All Range Forest Officers, Foresters and members of

**Table 4.28. Number of persons trained under Social Forestry Project in the State upto 1990-91**

| Sl. No. | Details of the Trinees                | Name of the training centre |       |              |       | Total       |     |
|---------|---------------------------------------|-----------------------------|-------|--------------|-------|-------------|-----|
|         |                                       | Kadugodi                    | %     | Thathi-halla | %     | Total       | %   |
| 1.      | Range Forest Officers                 | 36                          | 100   | -            | -     | 36 (2.63)   | 100 |
| 2.      | Foresters                             | 24                          | 100   | -            | -     | 24 (1.75)   | 100 |
| 3.      | Forest Guards                         | 50                          | 62.5  | 30           | 37.5  | 80 (5.84)   | 100 |
| 4.      | Motivators                            | 349                         | 71.22 | 141          | 28.78 | 490 (35.79) | 100 |
| 5.      | NSS volunteers                        | 244                         | 70.32 | 103          | 29.68 | 347 (25.35) | 100 |
| 6.      | Prosperous Farmers                    | 1                           | 2.56  | 38           | 97.44 | 38 (2.85)   | 100 |
| 7.      | Farmers raising nursaries(KNN)        | 34                          | 41.98 | 47           | 58.02 | 81 (5.92)   | 100 |
| 8.      | Members of mahila mandals             | -                           | -     | -            | -     | -           | -   |
| 9.      | Members of youth mandals              | -                           | -     | 70           | 100   | 70 (5.11)   | 100 |
| 10.     | Members of voluntary organisations    | 1                           | 1.92  | 51           | 98.08 | 52 (3.8)    | 100 |
| 11.     | Mandal prdhans, Secretaries & Members | 69                          | 51.49 | 65           | 48.51 | 134 (9.79)  | 100 |
| 12.     | Teachers                              | 1                           | 6.25  | 15           | 93.75 | 16 (1.17)   | 100 |
| Total   |                                       | 809                         | 59.09 | 560          | 40.91 | 1369 (100)  |     |

Note : Figures in parentheses indicate perccentages to the total

Youth Mandals were trained in Kadugodi, but none in Thathihalla.

The overall profile of the trainees trained in the two institutions revealed that the motivators (35.79%) and NSS volunteers (25.35%) form the two largest groups of the trainees. Only 16 teachers, accounting for 1.17 per cent of the total number of trainees, were trained forming the smallest group of trainees.

#### 4.5.1 Evaluation of the Forest Development Programmes through proxy variables by officials of the State Forest Department

##### 4.5.1.1 Evaluation of impact variables by the officials

Evaluation of impact of Forest Development Programmes by the higher officials, middle level officers and field level officers, clearly differed, as it is seen in the Table 4.29. In four out of the total seven impact variables listed, the evaluation by higher and field level officers did not differ significantly, wherein, other three indeed. An interesting thing which could be noticed from the Table 4.29 that in all seven level variables, the opinions of higher and field level officials differed significantly.

The evaluation of three levels of officials differed significantly in case of the variables viz.,  $V_2, V_3, V_6$  and  $V_7$ .

Table 4.29. Evaluation of the impact variables by officials

| SL.NO. | VARIABLE NO. | VARIABLE                                                             | MAXIMUM SCORE | HIGH  | MIDDLE | FIELD | H VALUE | 1&2 | 1&3 | 2&3 |
|--------|--------------|----------------------------------------------------------------------|---------------|-------|--------|-------|---------|-----|-----|-----|
| 1.     | V1           | IMPACT OF REGULAR FOREST DEVELOPMENT PROGRAMMES                      | 8             | 6.93  | 5.86   | 3.46  | 33.4517 | N.S | *   | *   |
| 2.     | V2           | IMPACT OF SOCIAL FORESTRY PROGRAMME                                  | 16            | 11.53 | 5.8    | 3.66  | 36.2238 | *   | *   | N.S |
| 3.     | V3           | IMPACT OF VILLAGE WOODLOTS                                           | 12            | 6.66  | 3.8    | 2.8   | 32.1532 | *   | *   | N.S |
| 4.     | V4           | IMPACT OF KISSAN NURSERY PROGRAMME                                   | 6             | 5.6   | 5.2    | 4     | 15.0571 | N.S | *   | N.S |
| 5.     | V5           | IMPACT OF FREE DISTRIBUTION OF SEEDLINGS                             | 8             | 7.46  | 5.66   | 4.2   | 29.756  | N.S | *   | N.S |
| 6.     | V6           | IMPACT OF ADOPTION OF FARM FORESTRY                                  | 16            | 12.46 | 7.53   | 4.33  | 45.1896 | *   | *   | *   |
| 7.     | V7           | DEVELOPMENT OF INFRASTRUCTURE FACILITIES VS EMPLOYMENT OPPORTUNITIES | 10            | 9.4   | 7.53   | 5.13  | 29.55   | N.S | *   | *   |

\* Significant at five per cent level of significance.

N.S : Non significant

Thus, however, in total, the evaluation by the higher, middle and field level officials indeed differed either significantly or insignificantly, the means of scores obtained by individual groups, have also been given in the same Table 4.29, which also suggested the same.

The Kruskal-wallis statistic was found to be significant for all variables, at significant level  $\alpha = 0.05$ , leading to the rejection of the null hypothesis ( $H_0$ ) i.e., there is no difference in the evaluation by the three different levels of officials.

#### 4.5.1.2 Evaluation of 'Technical feasibility' and 'Problems' variables

It was implied by higher scores obtained by the higher officials in comparison with those obtained by middle and field level officials, that the difference in the evaluation between and among the classes was significant as far as Technical feasibility of Regular Forest Development Programmes and of Social Forestry Project ( $V_8$  and  $V_9$ ) were concerned (Table 4.30). Obviously the 'H' value was significant leading to the acceptance of the alternative hypothesis ( $H_1$ ).

As far as the opinions of three levels of officials on Technical feasibility of over all Social Forestry

Table 4.30. Evaluation of the Technical feasibility and the Problem variable by officials

| SL.NO. | VARIABLE NO. | VARIABLE                                                     | MAXIMUM SCORE | HIGH  | MIDDLE | FIELD | H VALUE | 1&2 | 1&3 | 2&3 |
|--------|--------------|--------------------------------------------------------------|---------------|-------|--------|-------|---------|-----|-----|-----|
| 1.     | V8           | TECHNICAL FEASIBILITY OF REGUL FOREST DEVELOPMENT PROGRAMMES | 22            | 17.46 | 9.74   | 6.66  | 37.28   | *   | *   | *   |
| 2.     | V9           | TECHNICAL FEASIBILITY OF SOCIAL FORESTRY PROGRAMMES          | 14            | 11.46 | 6.46   | 6.8   | 29.4911 | *   | *   | N.S |
| 3.     | V10          | PROBLEMS IN PROMOTION OF DECENTRALISED NURSERY SCHEMES       | 22            | 10.87 | 12.53  | 15.13 | 131.7   | *   | *   | N.S |
| 4.     | V11          | PROBLEMS IN ADOPTION OF FARM FORESTRY                        | 22            | 5.00  | 6.13   | 6.26  | 5.7612  | N.S | N.S | N.S |
| 5.     | V12          | PROBLEMS IN ESTABLISHING VILLAGE WOOD LOTS                   | 22            | 7.33  | 9.33   | 8.66  | 4.9631  | N.S | N.S | N.S |
| 6.     | V13          | PROBLEMS IN ESTABLISHING PLANTATIONS IN C&D CLASS LAND       | 18            | 7.4   | 9.74   | 10.33 | 11.0278 | N.S | *   | N.S |
| 7.     | V14          | REASONS FOR HIGH MORTALITY RATE OF SEEDLINGS                 | 14            | 9.66  | 7.66   | 7.26  | 11.8559 | *   | *   | N.S |
| 8.     | V15          | PROBLEMS IN RAISING KISSAN NURSERY                           | 24            | 4.53  | 6.26   | 7.8   | 34.758  | N.S | *   | N.S |
| 9.     | V16          | PROBLEMS IN DISTRIBUTION OF SEEDLINGS                        | 22            | 5.13  | 6.53   | 9.4   | 29.9232 | N.S | *   | *   |
| 10.    | V17          | PROBLEMS IN UTILISING FREELY DISTRIBUTED SEEDLINGS           | 14            | 2.74  | 4.93   | 8.93  | 38.1237 | N.S | *   | *   |

\* Significant at five per cent level of significance.

N.S : Non significant

Project and its major components viz., Decentralised nursery scheme, Farm Forestry, Village woodlots, and plantations in C and D lands, was concerned, alternative hypothesis ( $H_1$ ) was rejected and null hypothesis ( $H_0$ ) was accepted for Farm Forestry Component ( $V_{11}$ ) and Village woodlots ( $V_{12}$ ) where the difference in the evaluation by all three level officials, from each other was insignificant. The difference in evaluation made by the three groups was significant between the higher and middle level officials. The evaluation of the problems faced in distribution of seedlings and in lifting the freely distributed seedlings, it was revealed by the results (Table 4.3D) that the difference was found to be insignificant only in case between higher and middle level officials.

#### 4.5.1.3 Evaluation of the 'Involvement' variables by officials

Evaluation by the three levels of officials did differ significantly (Table 4.31) as far as the 'H' values were concerned, in case of "Involvement variables" ( $V_{18}$ ,  $V_{19}$ ,  $V_{20}$ ,  $V_{21}$  and  $V_{22}$ ).

But when the difference among the three groups (i.e., 1 and 2, 1 and 3 and 2 and 3) was taken into consideration, it was observed that for variables  $V_{18}$  and  $V_{19}$

Table 4.31. Evaluation of Involvement variables by officials

| SL.NO. | VARIABLE NO. | VARIABLE                                                                 | MAXIMUM SCORE | HIGH  | MIDDLE | FIELD | H VALUE | 1&2 | 1&3 | 2&3 |
|--------|--------------|--------------------------------------------------------------------------|---------------|-------|--------|-------|---------|-----|-----|-----|
| 1.     | V18          | INVOLVEMENT IN SELECTION OF KISAN NURSEY BENEFICIARIES                   | 10            | 7.4   | 6      | 4.93  | 25.8234 | N.S | *   | N.S |
| 2.     | V19          | INVOLVEMENT IN MANAGEMENT OF-LOCAL KISAN NURSERY                         | 10            | 6.53  | 4.46   | 3.33  | 33.5723 | *   | *   | N.S |
| 3.     | V20          | INVOLVEMENT IN SELECTION & ESTABLISHMENT OF VILLAGE WOODLOTS             | 14            | 9.93  | 7.53   | 4.6   | 34.4815 | N.S | *   | *   |
| 4.     | V21          | INVOLVEMENT IN ROADSIDE PLANTATIONS & TANK FORESHORE PLANTATIONS         | 16            | 9.6   | 6.46   | 3.46  | 242.067 | *   | *   | *   |
| 5.     | V22          | INVOLVEMENT IN MANAGEMENT & DISTRIBUTION OF BENEFITS OF VILLAGE WOODLOTS | 14            | 10.33 | 6.8    | 4.86  | 34.3842 | *   | *   | N.S |

\* Significant at five per cent level of significance.  
N.S : Non significant



the difference was insignificant between higher and middle levels. The difference in the evaluation made by middle and field level officials was also observed to be insignificant for variables  $V_{18}$ ,  $V_{19}$  and  $V_{22}$ . It is important to note here that the difference in the evaluation made by higher and field level officials was significant for all variables.

#### 4.5.1.4. Evaluation of the 'Communication and Coordination' variables

The results obtained after the analysis of scores obtained by three levels of officials (higher, middle and field) on their evaluation of communication and coordination within their own department and with other departments/organisations/institutions, are presented in the Table 4.32.

Communication and coordination within the Social Forestry ( $V_{23}$  and  $V_{24}$ ) were good according to both higher and middle level officials, but not according to the field level officials. This was also true in case of variables ( $V_{25}$  and  $V_{26}$ ) i.e., communication and coordination between Social Forestry Project and other departments/organisations. The difference in the evaluation of all four variables i.e.,  $V_{23}$ ,  $V_{24}$ ,  $V_{25}$  and  $V_{26}$  was found to be insignificant only in case between higher and middle level

Table 4.32. Evaluation of Communication and Coordination variables by officials

| SL.NO. | VARIABLE NO. | VARIABLE                                                       | MAXIMUM SCORE | HIGH | MIDDLE | FIELD | H VALUE | 1&2 | 1&3 | 2&3 |
|--------|--------------|----------------------------------------------------------------|---------------|------|--------|-------|---------|-----|-----|-----|
| 1.     | V23          | COMMUNICATION WITHIN THE SOCIAL FORESTRY PROJECT               | 8             | 7.4  | 6.8    | 4.8   | 23.0627 | N.S | *   | *   |
| 2.     | V24          | COORDINATION WITHIN THE SOCIAL FORESTRY PROJECT                | 8             | 7.13 | 6.67   | 3.93  | 28.6686 | N.S | *   | *   |
| 3.     | V25          | COMMUNICATION BETWEEN SOCIAL FORESTRY PROJECT AND OTHER DEPTS. | 18            | 8.4  | 7.2    | 6.00  | 15.3748 | N.S | *   | *   |
| 4.     | V26          | COORDINATION BETWEEN SOCIAL FORESTRY PROJECT & OTHER DEPTS.    | 18            | 8.93 | 6.87   | 5.6   | 30.2553 | N.S | *   | *   |
| 5.     | V27          | COMMUNICATION WITHIN THE REGULAR FOREST DEPARTMENT             | 10            | 8.8  | 7.46   | 7.93  | 6.4942  | N.S | N.S | N.S |
| 6.     | V28          | COORDINATION WITHIN THE REGULAR FOREST DEPARTMENT              | 10            | 9.53 | 9.00   | 8.13  | 9.7057  | N.S | *   | N.S |
| 7.     | V29          | COMMUNICATIONS WITH OTHER DEPARTMENTS OR ORGANISATIONS         | 12            | 6.93 | 6.2    | 4.67  | 18.8519 | N.S | *   | N.S |
| 8.     | V30          | COORDINATION WITH OTHER DEPARTMENTS OR ORGANISATIONS           | 12            | 7.4  | 5.53   | 5.2   | 7.0109  | N.S | *   | N.S |

\* Significant at five per cent level of significance.  
N.S : Non significant

officials. However, the overall difference, where the scores were tested for their significance, using kruskal-wallis one way analysis of variance, was found to be significant with 'H' values 23.0627, 28.6686, 15.3248 and 30.2553 respectively, for variables  $V_{23}$ ,  $V_{24}$ ,  $V_{25}$  and  $V_{26}$ . Even though the evaluation of communication within the Regular Forest Department ( $V_{27}$ ) varied insignificantly among the three level officials, the overall difference observed was significant (Table 4.32). But in case of the, coordination within the Regular Forest Department, communication and coordination and coordination with other departments/organisations ( $V_{28}$ ,  $V_{29}$  and  $V_{30}$ ), the difference in the evaluation was found to be significant, at 0.05 level of significance between higher and field level staff only, nevertheless the over all difference was significant with 'H' values 9.7057, 18.8519 and 7.0109 respectively.

#### 4.5.1.5 Evaluation of the 'miscellaneous' variables

Evaluation of the Hurdles in implementation of programmes ( $V_{31}$ ) was insignificant between higher and middle levels only, this was true in case of variable ( $V_{32}$ ) 'Rendering technical guidance and service to kisan nursery holders (Table 4.33).

As it was expected, naturally, the differences between and among all levels of officials was noted to be

Table 4.33. Evaluation of Miscellaneous variables by officials

| SL.NO. | VARIABLE NO. | VARIABLE                                                        | MAXIMUM SCORE | HIGH | MIDDLE | FIELD | H VALUE | 1&2 | 1&3 | 2&3 |
|--------|--------------|-----------------------------------------------------------------|---------------|------|--------|-------|---------|-----|-----|-----|
| 1.     | V31          | HURDLES IN IMPLEMENTATION OF PROGRAMMES                         | 10            | 2.8  | 3.93   | 6.00  | 29.3571 | N.S | *   | *   |
| 2.     | V32          | RENDERING TECHNICAL GUIDANCE & SERVICE TO KISAN NURSERY HOLDERS | 20            | 18.2 | 18.01  | 19.26 | 6.8029  | N.S | *   | *   |
| 3.     | V33          | EDUCATION & TRAINING TO OFFICIALS & POLICY MAKERS               | 10            | 9.74 | 9.23   | 9.33  | 12.5537 | N.S | N.S | N.S |

\* Significant at five per cent level of significance.  
N.S : Non significant

insignificant, for the variable 'Education and Training to officials and policy makers' ( $V_{33}$ ).

#### 4.5.2 Evaluation of the Forest Development Programmes by officials, policy maker and beneficiaries through proxy variables

##### 4.5.2.1 Evaluation of impact of forest development programmes by officials, policy makers and beneficiaries through proxy variables

The results of the evaluation of the impact of various forest development programmes including that of Social Forestry programme, made by the three groups of respondents viz., officials, policy makers and beneficiaries are presented in the Table 4.34.

As far as the impact of Regular Forest Development programmes was concerned ( $V_1$ ), officials, who obtained higher scores than the policy makers, concluded that the impact was good. But on the other hand, policy makers disagreed with the official version (mean score of 3.6) of good impact. The difference in the evaluation was observed to be statistically significant.

Social Forestry Project ( $V_2$ ) made good impact, according to officials (mean scores: 11.6) but not according to policy makers (9.09) and beneficiaries (7.49). The

Table 4.34. Evaluation of Impact variables by officials, policy makers and beneficiaries

| SL.NO. | VARIABLE NO. | VARIABLE                                                                    | MAXIMUM SCORE | OFFICIALS | POLICY MAKERS | BENEFICIARIES | H VALUE  | 1&2 | 1&3 | 2&3 |
|--------|--------------|-----------------------------------------------------------------------------|---------------|-----------|---------------|---------------|----------|-----|-----|-----|
| 1.     | V1           | IMPACT OF REGULAR FOREST DEVELOPMENT PROGRAMMES                             | 8             | 7.51      | 3.6           | 0             | 352.1906 | *   | *   | -   |
| 2.     | V2           | IMPACT OF SOCIAL FORESTRY PROGRAMME                                         | 16            | 11.6      | 9.09          | 7.49          | 30.6577  | *   | *   | *   |
| 3.     | V3           | IMPACT OF VILLAGE WOODLOTS                                                  | 12            | 6.75      | 5.75          | 4.42          | 66.2568  | *   | *   | *   |
| 4.     | V4           | IMPACT OF KISSAN NURSERY PROGRAMME                                          | 6             | 5.6       | 5.58          | 4.51          | 29.221   | N.S | *   | *   |
| 5.     | V5           | IMPACT OF FREE DISTRIBUTION OF SEEDLINGS                                    | 8             | 7.42      | 6.51          | 6.27          | 23.0788  | *   | *   | *   |
| 6.     | V6           | IMPACT DUE TO ADOPTION OF FARM FORESTRY                                     | 16            | 11.35     | 3.73          | 8.38          | 39.0238  | *   | *   | *   |
| 7.     | V7           | IMPACT ON DEVELOPMENT OF INFRASTRURE FACILITIES Vs EMPLOYMENT OPPORTUNITIES | 10            | 8.91      | 4.69          | 6.16          | 92.9729  | *   | *   | *   |

\* Significant at five per cent level of significance.

N.S : Non significant

difference in the evaluation made by groups 1 & 2, and 1 & 3 were found to be significant among each other. But difference was insignificant between groups 2 & 3. However, overall difference was observed to be significant, as it was implied by the higher 'H' value (30.6577).

In case of the variable ( $V_3$ ) impact of village woodlots, policy makers scored high (mean scores: 6.95) followed by officials (5.75) and beneficiaries (4.42). The overall difference of opinions among each group was found to be significant.

Both officials and policy makers agreed that kissan nurseries ( $V_4$ ) provided better employment opportunity and provided substantial income for the beneficiaries. However, this view was not accepted by the beneficiaries, whose opinions differed significantly with both of officials and policy makers.

Scores obtained by three groups of respondents (7.42, 6.51 and 6.27 respectively out of maximum 8) made it clear that more or less all groups agreed each other group's views regarding the free distribution of seedlings ( $V_5$ ). However, the higher 'H' value (23.0788) led to the acceptance of alternative hypothesis ( $H_1$ ) i.e., there is difference in the evaluation made by different groups. It could further be

noted that, the evaluation made by group 2 and 3 varied from each other insignificantly, but, varied significantly from each other in other two combinations (1 and 2 and 1 and 3).

Policy makers scored least among the three groups (mean scores: 3.73) in case of the evaluation of the variable, impact of adoption of Farm Forestry ( $V_7$ ). The views expressed by all the three groups of respondents varied significantly from each other.

In case of variable, development of infrastructural facilities Vs employment opportunities ( $V_7$ ) also, the policy makers scored least (4.69) followed by beneficiaries and officials respectively. All these groups did not confirm each others views, which was indicated by the higher 'H' value.

#### 4.5.2.2 Evaluation of Technical feasibility variables, problem variables, and other variables through proxy variables

The present 'opinion survey' conducted for evaluation purpose of the various Forest Development Programmes through proxy variables based on the views of officials, policy makers and beneficiaries, presented a varied picture of the ground reality and assumption of three groups of respondents (Table 4.35).



Technical feasibility of the Regular (Territorial) Forest Development Programmes ( $V_8$ ) appeared to be sound according to the officials, who scored 19.53 out of 22 and 'some what' for the policy makers. The groups differed significantly in their evaluation.

All the three groups of respondents differed significantly, as far as their evaluation was concerned on the Technical feasibility of the Social Forestry Project ( $V_9$ ).

Similar results emerged in case of the following variables :

- $V_{10}$  : Problems in promotion of Decentralised nursery scheme,
- $V_{12}$  : Problems in establishing village woodlots,
- $V_{13}$  : Problems in establishing plantations in C & D lands,
- $V_{16}$  : Problems in free distribution of seedlings, and
- $V_{21}$  : Involvement in roadside plantations, tank foreshore plantations etc.

In overall comparison, the evaluation made by the respondents belonging to the three categories, differed significantly for the variables  $V_{11}$  : problems in adoption of farm forestry,  $V_{20}$  : involvement in selection and establishment of village woodlots and  $V_{22}$  : involvement in management in and distribution of benefits of village woodlots. However, for the above mentioned variables ( $V_{20}$  and

Table 4.35. Evaluation of Technical feasibility and Problem variables by officials, policy makers and beneficiaries

| SL.NO. | VARIABLE NO. | VARIABLE                                                       | MAXIMUM SCORE | OFFICIALS | POLICY MAKERS | BENEFICIARIES | H VALUE  | 1&2 | 1&3 | 2&3 |
|--------|--------------|----------------------------------------------------------------|---------------|-----------|---------------|---------------|----------|-----|-----|-----|
| 1.     | V8           | TECHNICAL FEASIBILITY OF REGULAR FOREST DEVELOPMENT PROGRAMMES | 22            | 19.53     | 10.13         | -             | 52.3964  | *   | *   | -   |
| 2.     | V9           | TECHNICAL FEASIBILITY OF SOCIAL FORESTRY PROGRAMMES            | 14            | 12.58     | 10.53         | 7.69          | 51.8454  | *   | *   | *   |
| 3.     | V10          | PROBLEMS IN PROMOTION OF DECENTRALISED NURSERY SCHEMES         | 22            | 7.22      | 13            | 14.87         | 81.3792  | *   | N.S | *   |
| 4.     | V11          | PROBLEMS IN ADOPTION OF FARM FORESTRY                          | 22            | 4.93      | 6.24          | 6.13          | 23.4953  | *   | *   | *   |
| 5.     | V12          | PROBLEMS IN ESTABLISHING VILLAGE WOODLOTS                      | 22            | 11.71     | 6.15          | 4.8           | 93.7996  | *   | *   | *   |
| 6.     | V13          | PROBLEMS IN ESTABLISHING PLANTATIONS IN C&D CLASS LAND         | 18            | 11.55     | 6.58          | 4.8           | 88.5944  | *   | *   | *   |
| 7.     | V14          | REASONS FOR HIGH MORTALITY RATE OF SEEDLINGS                   | 14            | 7.51      | 6.49          | 8.38          | 14.193   | *   | *   | N.S |
| 8.     | V15          | PROBLEMS IN RAISING KISSAN NURSERY                             | 24            | 4.22      | 5.24          | 10.98         | 99.2264  | N.S | *   | *   |
| 9.     | V16          | PROBLEMS IN DISTRIBUTION OF SEEDLINGS                          | 22            | 10.95     | 7.75          | 11.29         | 105.9496 | *   | *   | *   |
| 10.    | V17          | PROBLEMS IN UTILISING FREELY DISTRIBUTED SEEDLINGS             | 14            | 4.67      | 4.75          | 6.2           | 42.06669 | N.S | *   | *   |

\* Significant at five per cent level of significance.

N.S : Non significant

$V_{22}$ ) evaluation made by policy makers and beneficiaries was observed to be almost similar, where, no statistical no significance was noticed (Table 4.36).

Among the three groups of respondents, the combination of the two groups of officials and policymakers, implied similar (insignificant) evaluation for the variables  $V_{15}$ ,  $V_{17}$ ,  $V_{18}$  and  $V_{19}$  (Table 4.35). However, the groups in other combinations (1 & 3 and 2 & 3) differed significantly. Null hypothesis ( $H_0$ ) was accepted in case of variable  $V_{31}$ ; problems in implementation of programmes, where the variable was administered only for officials (Table 4.37).

Table 4.36. Evaluation of Involvement variables by officials, policy makers and beneficiaries

| SL.NO. | VARIABLE NO. | VARIABLE                                                                 | MAXIMUM OFFICIALS SCORE | POLICY MAKERS | BENEFICIARIES | H VALUE | 1&2 | 1&3 | 2&3 |
|--------|--------------|--------------------------------------------------------------------------|-------------------------|---------------|---------------|---------|-----|-----|-----|
| 1.     | V18          | INVOLVEMENT IN SELECTION OF KISAN NURSERY BENEFICIARIES                  | 10                      | 6.47          | 5.44          | 26.4246 | N.S | *   | N.S |
| 2.     | V19          | INVOLVEMENT IN MANAGEMENT OF LOCAL KISAN NURSERY                         | 10                      | 5.13          | 3.95          | 8.5341  | N.S | *   | *   |
| 3.     | V20          | INVOLVEMENT IN SELECTION & ESTABLISHMENT OF VILLAGE WOODLOTS             | 14                      | 11.28         | 6.67          | 93.032  | *   | N.S | *   |
| 4.     | V21          | INVOLVEMENT IN ROADSIDE PLANTATIONS & TANK FORESHORE PLANTATIONS         | 16                      | 11.35         | 8.58          | 51.9543 | *   | *   | *   |
| 5.     | V22          | INVOLVEMENT IN MANAGEMENT & DISTRIBUTION OF BENEFITS OF VILLAGE WOODLOTS | 14                      | 11.09         | 9.15          | 51.8689 | *   | N.S | *   |

\* Significant at five per cent level of significance.  
N.S : Non significant

Table 4.37. Evaluation of Miscellaneous variables by officials, policy makers and beneficiaries.

| SL.NO. | VARIABLE NO. | VARIABLE                                                        | MAXIMUM SCORE | OFFICIALS | POLICY MAKERS | BENEFIT CIARS | H VALUE | 1&2 | 1&3 | 2&3 |
|--------|--------------|-----------------------------------------------------------------|---------------|-----------|---------------|---------------|---------|-----|-----|-----|
| 1.     | V31          | PROBLEMS IN IMPLEMENTATION OF PROGRAMMES                        | 10            | 4.69      | -             | -             | 3.5739  | -   | -   | -   |
| 2.     | V32          | RENDERING TECHNICAL GUIDANCE & SERVICE TO KISAN NURSERY HOLDERS | 20            | -         | 7.49          | 18.8          | 22.8798 | N.S | N.S | *   |
| 3.     | V33          | EDUCATION & TRAINING TO OFFICI & POLICY MAKERS                  | 10            | -         | 9.6           | -             | 10.9885 | *   | -   | -   |

\* Significant at five per cent level of significance.  
N.S : Non significant

**CHAPTER - V**

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**DISCUSSION**

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## V DISCUSSION

Keeping in view the objectives of the study and the results obtained on various aspects forestry activities in Karnataka State the discussions are presented in this chapter. The discussions are made in the same order as the results are presented.

### 5.1 Forest Development Programmes in Karnataka

A low proportion (20.16 per cent) of the geographical area under the forest, existence of about 2 million hectares (about 50 per cent of the forest area) under degraded conditions and availability of 0.76 million hectares of waste land (C and D class) with the forest department awaiting afforestation are the clear indications of confirmed biotic interference, a wide gap between demand for and supply of forest products. The attempts of the State Government, more specifically State forest department, to invest more for forest development is also obvious from the fact five programmes have been continued since long and the remaining projects were launched during the past two decades. It ranged from development of regular territorial forests to that of balance and alkaline lands, and even wild life protection. But the efforts have been, so far, adhoc. Most of the time

projects have been prepared to suit the objectives of schemes launched by the Government of India with or without external financial assistance. Such projects also ceased to continue once the schemes were terminated. With the result, there were no proper follow up actions.

It is necessary to have a perspective plans for each of the agro-climatic regions for the forestry development utilising the frame work of a Land-use policy of the State. Even the planning is a difficult process and economic evaluation has become a more difficult aspect due to paucity of /inaccessibility to data in addition to the inherent problems associated with long gestation period, cost and return flows over a long period, variations among regions, plantations and so forth. The vital information on economic aspects, diversion of funds among programmes have been highlighted as the major limitations in precise economic evaluation (Madhav Gadgil, 1992). Since the plantation journals contain both accounts and also confidential reports of the forest department, they are not available for many important activities like planning, evaluation. It may be appropriate to separate out accounts and confidential reports. This may enable accessibility to former and this enable better planning, monitoring and evaluation. The targets and



achievements of different projects do not show a pattern over years. This is because the activities depend upon the allocation of funds every year. During the survey it was observed that, some times, the allocations were not sufficient to sustain the phased out physical activities from the previous years. Apart from the vacuum in planning for forest funds there is a persistent lacuna in planning for at least basic necessities like fodder, fuel, small timber which are the general demand.

With all the limitations observed in general, if one examines each of the project closely, it is possible to identify their merits. For example, development potential areas like Western ghats, most deprived dry lands, vulnerable (SC/ST) sections, soil conservation in river valleys, preservation of wild-life, development of irrigation command area, rejuvenation of degraded/waste land individually merit allocation of funds. But they cannot be taken up on ad-hoc basis without risking discontinuity and in effectiveness in the projects. However, among the forest development projects during the last two decades, the Social Forestry Programme (SFP) claims a distinction. A forestry programme is made a 'people's programme' for the first time in the S.F.P. To the

already existing administrative and technical dimensions  
 'Social dimension ' is added appropriately.

As regards the funds there are mainly three sources. State Plan Schemes (through Rural Development Programmes) centrally sponsored schemes with or without State share and Externally aided projects are the important sources. These schemes are often time-bound and object-specific. There will be always an attempt to attract the funds by preparing the projects to suit the spelled-out objectives, procedures, conditions. Some times this will lead to discrepancies between field realities and the project.

However, all the projects necessarily incorporates some of the common activities, namely, raising of seedlings (nursery activity), planting of seedlings, establishment of forests, protection of forest. All these are desired to develop bio-mass cover, but their efficiency depends upon planning. Therefore, there is need to have a wholistic approach and perspective plan for a sufficiently long period.

## 5.2 Species wise plantations raised by Karnataka State Forest Department

Due to limitations in the availability of data, as mentioned earlier, it was not possible to make any analysis

in each of the programme. However, an attempt was made to examine the pattern in raising different species by combining them from all the programmes. Since apriori information regarding the pattern was not known a more flexible technique namely Orthogonal polynomial regression analysis was made. As indicated by the results given in table 4.1. Even when the function was attempted up to 5th degree the  $R^2$  was very low for four species viz; teak, softwood, cashew and eucalyptus. This is clear indication of the law of a definite pattern in the number of seedlings planted in the above cases. Only species related to fuelwood and miscellaneous and bamboo showed appreciable  $R^2$  but, the trend was uniform. The situation regarding the total species is not much different from the above.

Allocation of funds was the major factor which decided the activities. Therefore, the allocation in the allocation of funds directly reflected the irregular behaviour in the physical activities. During discussions with the Forest officials a common notion-plans are based on outlays and achievements are based on the allocation of funds-was most prevalent. There were no perspective places in which, the schemes were fitted in. There were no priorities in planning of activities for utilising the allocated funds.

### 5.3 Revenue and Expenditure of the State Forest Department

The results show (table 4.2) the annual rate of increase of the revenue of the State Forest Department (by 2.195%) is almost similar to the rate of the growth of the population. Since revenue is mainly from the disposal (sale of timber, pulp wood, fuelwood etc) to the people, wood based industries and other related sectors of the economy, it is an indication of the persistent demand for forest products for various purposes. It is evident that the attempts to substitute the forest products by iron, steel, plastic, fibre and other non-wood materials have not made significant effect. While discussing the revenue it is also necessary to mention that realisation from the sale of the forest products has not been satisfactory, due to sale of forest products at abnormally low rates to wood based industries and the Government of India. This was observed even by the Karnataka State Public Accounts Committee. In addition to this even the harvests were made without keeping in view the regenerating capacity of the forests.

These factors are also contributed to the reduced revenues of the State Forest Department to the large extent.

However, looking to the expenditure pattern (Fig. No. 3) it is evident that there are sustained efforts throughout the period to launch projects involving forest development. Here, expenditure on forests in general, cannot be viewed on par with that in case of industrial sector and or other such sectors, whose benefits or outputs can be valued precisely in monetary terms. Since well maintained forests perform and provide so many non-monetary services and benefits, which form the very basis of survival of life on earth, higher expenditure on their development is welcome. It should not be considered as a drain of scarce Economic resources.

Except a marginal decline in the expenditure, for the initial period of 3-4 years, consistent increase in the expenditure of the Forest department is observed throughout the study period (1970-71 to 1990-91). This might be due to the increase in developmental activities of the department mainly in the form of establishment of many game sanctuaries, National parks, Development of infrastructure like buildings, communication, staff and vehicles.

Introduction of Social Forestry Project in 1983-84, even though it was aided by the foreign agencies, resulted in

the marked rise in the expenditure of the Department. Especially, after its (S.F.P.) transfer to the respective Zilla Parishads in 1987-88, expenditure continued to be more than the revenue of the department, for the rest of the study period (1987-88 to 1990-91), due to appointment of additional staff, construction of buildings, vehicles among others.

On an average the state Forest Department earned the revenue to the tune of Rs.388.6 million per annum, and spent Rs.301.5 million per annum during the study period. In other words, the department extracted forest products worth Rs.101 from every hectare of the state's forests, and in turn spent Rs.78 for development of every hectare of state's forests. If the village forests and private forests (12420 and 30842 hectares respectively) are excluded from the total forest area of the state, then the revenue from and expenditure on every hectare of the state's forests come to Rs.102 and Rs.79 respectively. However, at this juncture it is worth mentioning that utilization of funds is not for development of every hectare of forest, but only restricted to certain forest areas, where necessity of human effort, in the form of scientific management, was felt either for their conservation, regeneration or exploitation.

It has been clearly pointed out by researchers that, the revenue and expenditure in the forests of Karnataka state was very meager (Chandrakanth, 1981), and the revenue from forest sector was more than the expenditure till recently (1987-88).

The situation is more or less similar at the National level also. A study on trends in area, production and yield of forestry in India, conducted by Shivu Ram Dass and Vashist (1983) concluded that, the output from forestry was not keeping pace with the output from other sectors of the economy. They further underlined the fact that, an increase in forest produce was only due to increase in price and but not due to a rise in quantity, since contribution of forestry to the nation's G.D.P. at constant prices (1970-71) decreased, but increased at current prices. This is rather a disappointing trend in development of forestry sector, which needs to be reversed.

National Commission on Agriculture (1976), in its report on Forestry, felt that investment in forestry was inadequate. Even for forest development programmes, aimed at increasing the productivity of forest stands, financial allocation so far had been very meager. This might have

resulted in low production from India's forests, when compared to the productivity of forests in the developed countries. The above made discussion could be aided by analysing the development of forest sector under Five Year plans.

During the Five year plans, the expenditure on forest development was in the range of 0.5 to 1.00 per cent of the total plan expenditure. Total expenditure on forests during the first plan was Rs.10 crores (0.5 per cent of the total plan outlay), Rs.19 crores (0.4 per cent), Rs.46 crores (0.5 per cent) and Rs.93 crores (0.6 per cent) out of the total plan outlay during the second, third and fourth Five Year plans respectively. In other words, although in absolute terms there was an increase in plan outlay on forests, in relative terms, it was more or less insignificant. Experts felt that this allocation was insufficient for forest development, and this might explain to a considerable extent as to why the contribution of forest sector was low. As against the original allocation of Rs.655 crores in sixth plan during 1980-85, during the Seventh plan, the allocation for forestry and wild life was raised substantially to Rs.1,859 crores i.e. one per cent of the total plan outlay.

The main cause for low investment in the forestry sector might be that, forests had been looked upon as source



of revenue without the realization of the need for higher investment. The scarce resources are mainly allocated for production of goods and services to satisfy innumerable human wants. If large number of wants were to be satisfied, then the resources must be used to maximise efficiency. Capital is scarce, especially for the developing countries like India, where the governments have been trying to raise the standard of living of the exploding population, which needs expanded supply of forest products. Timber is needed for the manufacture of the paper for large number of people for the expansion of educational programmes and other innumerable purposes.

The capital is likely to become obsolete if the time taken for its creation is too long. Diversion of large sums of resources for the creation of such capital, which has a high probability of becoming obsolete, before its final products are ready, can hardly be justified, from the point of view of economic development. Forestry sector has a long gestation period which does not give it preference over other sectors. Thus, the necessity for higher investment in forestry sector diminishes with every advance in technology, compared to other sectors.

Foresters and Economists have always had a controversy. The former always tried to achieve the highest annual profits regardless of the capital employed and the time taken to build it up. All these difficulties associated with economic criterion have forced the forest planner to fall back upon the obvious choice of physical measures, to invest less in the forest sector.

Another important lapse in the forestry sector is that, there is a lack of linkage between forestry and forest based industries in India, often resulting in inadequately formulated Forest Development programmes and plans for both these sectors. National Commission on Agriculture in its report on forestry (1976), stressed that the requirements of industry should be a major reason for initiating forestry activities. As such, the essentiality of planning for forest resources before planning any forest based industry, should be emphasised. This was not done in the past, as the commission reports further, pricing of forest produce for industry should be fixed on remunerative basis, so that adequate funds are available for essential cost of regeneration, so that adequate funds are available for the essential cost of regeneration, conservation and maintenance of forest.

Like any other economic activity, forestry cannot be carried out without the resources. Therefore, for the alround development of the forestry sector and to reverse the present trend of low-cost low-yield forestry to a commercially high investment economic forestry.

However, it is heartening to mention that recently many private plantation companies have engaged themselves in raising tree plantations commercially, especially to raise tree plantations on large scale, under scientific management and motivating and encouraging people to invest more and more in such ventures, by forwarding lucrative offers. This not only attracts large scale investment in commercial forestry sector, but also reduces pressure on existing natural forests to a great extent. Thanks to the recent advances in genetic engineering, irrigation systems and related sciences which have brought down the gestation period of tree harvests.

#### 5.4 Karnataka State Social Forestry Project

Due to emphasis on agricultural sector to achieve self sufficiency in food production in the earlier Five Year Plans and to achieve favourable balance of payments through industrial sector in the subsequent Five Year Plans the investment on conservation, development and management of

natural resources in general and the forest resources in particular did not get sufficient budgetary allocation even up to Seventh Plan. Even when the forestry sector started getting higher allocation most of it was diverted to high rainfall Western Ghats. It is only during last decade that dry regions got more emphasis through many projects like Watershed Development Programmes (W.D.P.R.A.) and waste land development in addition to the other rural development programmes like Rural Landless Employment Guarantee Programme, National Rural Employment Programme and the recent Jawahar Rozagar Yojana. It is only the Social Forestry programme which is unique among the recent programmes which is directly involving people and trying to make Forest Development a people's programme. This programme is implemented throughout the State and separate establishment is provide for the purpose.

Social Forestry Project, which commenced in the State in 1983-84, consists seven components mainly, viz., plantations in Gomal Lands (GML), 'C and D' class lands, Tank-Foreshore, Canal Bank, Roadside plantation, Bamboo plantations and finally the more important one, the farm forestry. Here, an attempt has been made to discuss the

performance of the project in general and of particular component.

#### 5.4.1 Performance of Karnataka State Social Forestry Project

The result presented in the Table 4.3 indicate there is no consistency in fixing targets, in achievements and financial allocation and actual expenditure over the period (1983-84 to 1990-91).

Out of the first 6 components of the project (except the farm forestry) where the plantations were raised by the Forest Department, more resources and effort were diverted for taking up plantation in 'C and D 'class (34.2 per cent) followed by plantation Gomal lands (29.34 per cent), plantations on tank foreshores (15.88), Roadside plantations (11.81%), Bamboo plantations (5.71%) and for raising plantation on Canal Bank (3.05%) in order. This could be attributed to the following reasons : firstly, the basic purpose of implementation of the S.F.P. is to provide fuelwood, fodder, timber, poles etc. to the rural poor, through raising tree plantations near by their native villages. In other words raising plantations in village Gomal lands and other revenue waste lands (C and D class lands) around the villages. Secondly, availability of Gomal lands

and 'C and D ' class lands are only common lands, where plantations can be raised, in the absence of any other lands like degraded forest lands, for the purpose moreover availability of tank foreshores, canal banks and roadside space is meagre when compared to that of Gomal land and C and D class lands. Thirdly, these Gomal and 'C and D ' class lands have been completely degraded due to increased biotic pressure, soil erosion, encroachment and other activities which have hastened the degradation process.

Therefore, through raising plantation in hitherto misutilised and unutilized Gomal lands and 'C and D ' class lands, the project could increase the supply of fuelwood, fodder, timber, poles etc, to the villagers, and could help in improving the status of there lands through controlling soil erosion, increasing the vegetative cover and other such measures. Hence, nearly 65% of the resources were spared for raising plantation Gomal lands and 'C and D ' class lands.

Up to 1986-87 the Social Forestry Project was completely handled by the State Forest Department. But later, after introduction of the 'panchayat' system of governance in the State, the management of the project was handed over to the

respective Zilla parishads, for effective that local elected bodies (mandal panchayats, Taluka panchayats and Zilla parishads) would be in position, rich with local knowledge at grass roots level, to make the project more effective and meaningful. But in contrary to this above mentioned assumption, over all performance of the project was much better during the first half of the period (1983-84 to 1986-87), when the project was managed by the Forest Department, if the total targets and achievements were taken in to consideration.

Achievements under different components i.e., under Gomal lands, C and D lands, tank foreshores, canal bank, roadside plantations and bamboo plantation was 70.29, 61.04, 52.4, 64.01, 67.88 and 63.19 per cent of the total achievement, during the first half of the period i.e., under the Forest Department was in the change of the management, against the achievement of 29.71, 38.96, 46.41, 35.99, 36.12 and 36.71 per cent, respectively.

In total, 67.63 per cent of the total area of the plantations raised (excluding from forestry) by the Government agencies, was raised during the management of the project by the Forest Department and only 32.37 per cent of it during the management by respective Zilla parishads.

In case of performance of farm forestry components also, 74.89 per cent of the total number of seedlings distributed, was during the management of the Forest Department and only 25.11 per cent during the Z.P. management.

The poor performance cannot be attributed to the scarcity of funds, since, more than at the fund allocation and actual expenditure (financial achievement) was made during the second half of the period, i.e., during the Z.P. management. And, the poor performance can also not be attributed to non-availability of Gomal lands, C and D class lands and such other lands or vacant areas, where plantation under S.F. can be under taken, since still a large proportions of such lands are completely utilised for the purpose.

Therefore, poor performance of the during its management by respective Z.Ps might be due to the reasons that, firstly, increased political interference, undermining the importance of raising plantations, and increased overhead costs due to inefficiency and small size of plantations raised. Secondly, rise in wage rates and prices of other materials like fencing wire, and tree guards. Thirdly, initial interest and enthusiasm among the officials and other concerned people might have come down due to magnitude of problems faced and lapse in time.



In total, for the entire period of the study, the achievements of the project under different components viz; C and D class lands, Tank foreshore, Canal bank, Roadside, bamboo plantations and farm forestry, fell short of the fixed targets by 11.6, 15.48, 19.71, 4.75, 29.05 and 20.6 per cents respectively, except under plantation in Gomal lands where the achievements exceeded the targets by 4.68 per cent.

The combined achievement under all components of the project fell short of the target by 9.89 per cent during 1983-84 to 1990-91.

Totally, during the entire period (1983-84 to 1990-91) 9.08 per cent of the total funds sanctioned, was not made use of.

#### 5.4.2 Regionalisation of Karnataka State Social Forestry Project (1983-84 to 1990-91)

Five distinct clusters of districts (Social Forestry divisions) in the state, based on the total achievements under all components of the state Social Forestry programme, emerged against the null hypothesis that the total achievements are in proportion to the total area available for raising the plantations (i.e., fallow lands plus other uncultivated areas).

The null hypothesis, here, is developed based on the assumption that the targets under social Forestry components are fixed in proportion to the area available for such purposes in the respective districts.

But it can be observed from the results that total achievements under different components of the Social Forestry Programme in the state, have no established relationship with the availability of total fallow land and other uncultivated lands, where plantations could be raised. An inference which can also be drawn here is that, targets for each district were fixed arbitrarily without following any definite policy, which can be well defended by the fact that the percentage (proportion) of the total area of plantations raised to the total area available for that purpose (fallow lands plus other uncultivated lands) in the districts varied to a great extent (from 1.57 to 16.76%). Perhaps this might be due to the reason that vast areas of fallow and other uncultivated areas are under the control/ownership of different agencies/institutions/departments/private bodies. And, in many cases these areas, for instance Gomal lands, have been encroached illegally, thus making these areas not available for raising plantations, practically. However, these areas continue to be in existence in official documents only. Then,

there are many legal/bureaucratic hurdles preventing/delaying the transfer of these areas to the forestry department for raising plantations.

Targets (and achievements) were not fixed based on the population density or bovine population density or per capita availability of forest area, for the respective districts.

Another factor which might have adversely affected the precise cluster formation is that variation in the share of net sown area in the total geographical area, which varied from 10.81 in North Kanara to 74.82 per cent in Raichur District. Areas once covered by forests and other pastures have been gradually brought under cultivation, often leading to the encroachment of public/common lands.

Thus, for the successful implementation of the social forestry programme proportionate allocation of funds (in proportion to the targets) based on the biotic pressure on land and availability of the total land area, wherein activities under social forestry programme can be carried out.

#### 5.4.3 Implications of the Karnataka State Social Forestry Project

The implications of the Social Forestry Project are mainly in terms of the change in the availability and

consumption of fuel, fodder, timber, poles and so forth. These aspects are presented in this section.

#### 5.4.3.1 Pattern of fuel consumption of the Respondents

Sources and needs of fuelwood, fodder, timber, poles of a family are very important for shaping a farmer's decision to adopt the social forestry programme. This is more so for the reason that the programme seeks to augment particularly the fuel and fodder needs of the rural people (Bhattacharya, 1986). But, extent of needs, in quantitative terms, of fuel and fodder, largely influenced by pattern of fuel consumption, sources of fuel, number of animals (live stock) maintained by the beneficiary, their feeding pattern, sources of fodder, timber requirements, among other factors. Since the very purpose of implementation of the social forestry project in the country in general and in the state in particular, is to supply fuel, fodder, timber, poles etc. to the rural and semi urban population to alleviate their sufferings, it is almost prerequisite to study the above mentioned factors, rather in detail for meaningful evaluation of the performance of the social forestry project.

The pattern of fuel consumption in the three studied divisions indicated the influence of the extent of vegetation,

cropping pattern, live stock population and promotion of alternative fuel sources.

Among the six sources of fuel considered fuelwood, agricultural waste, dung cake and to some extent natural gas appear to be major sources. Electricity and kerosene did not form significant sources.

Agricultural wastes formed largest source for Bijapur and Dharwad district. But for North Kanara respondents, fuelwood was almost sole source of fuel.

In Bijapur district due to non availability of fuelwood and easy availability of agricultural waste, respondents used 68.33% agricultural waste. Small farmers, 30% fuelwood, which is more than that used by medium and large farmers. But they (small farmers) used less (60%) agricultural waste, which is less than that used by medium and large farmers. The main reason for this trend, as it was pointed out by the small farmers is that, for collection of agricultural waste they, often, would have to go to other farmers' field often resulting in quarrels, and was also time consuming, whereas, they could easily get fuelwood from Prosopis juliflora (Bellary jali as it is commonly known), which grows in abundance in waste lands, Gomal lands, on

roadsides, nala bunds, on farm bunds etc. This fuelwood is not only available at free of cost, but also saves time. Literally, Bellary jali, has grown luxuriantly in Bijapur district, covering most of the waste lands, Gomal lands, roadsides, nala bunds, farm bunds etc. Therefore, procurement of fuelwood has become easy and very cheap for rural people. Thus, here fuelwood in Bijapur district mostly means wood from Bellary jali only. Normally nobody uses any wood of Acacia nilotica (jali), neem and other timber species as fuelwood. Recently most of the farmers have started using poles and timber of Bellary jali for making agricultural implements, and for construction of semi-permanent wood structures. Bushes around village and on farm bunds, also contributed some fuelwood.

This, above mentioned fuelwood from Bellary jali, was also used by medium and large farmers also to the extent of 25% and 10% respectively.

Among agricultural wastes cotton stalk, sunflower stalk, jowar stubbles etc. were important to note. These agricultural wastes are collected by children and women usually during their leisure time. But most of the women labourers collect agricultural waste and fuelwood after

working hours, and bring in head loads whenever they go for working in fields. Medium and large farmers with their large land holdings, used agricultural waste produced in their own fields, available in sufficient quantity, as fuel. But they also used fuelwood to supplement their fuel requirement. Usually bushes, thorny shrubs, Bellary jali grown naturally on farm bunds and in waste lands, are cut for this purpose.

Every respondents used 10% dung as fuel. Usually children and women collect dung for making dung cakes, almost daily during their leisure time, at their convenience. This practice is common among small farmer households.

Climatic conditions are favourable for drying dung cakes in dry regions, dry dung cakes make good fuel as far as convenience is concerned.

Due to large area under cotton in Dharwad district, people use large quantity of cotton stalk for fuel purpose. Here also, Bellary jali has emerged as a major source of fuelwood for small and marginal farmers. Medium and large farmers used deadwood, found in their fields, as fuelwood. Small farmers also collected fuelwood by cutting bushes around their village and on farm bunds. Some medium and large farmers used gobar gas as fuel (3% by medium and 4% by large

farmers). Use of dung as fuel in Dharwad district was observed to be less (5%) when compared to that in Bijapur district (10%), mainly because of easy availability of agricultural waste, mainly cotton stalk.

In North Kanara, with large area under forests, respondents could get fuelwood easily and almost at free of cost in the form of deadwood, from the nearby forests with the permission of the local Forest Guards or Sentries in sufficient quantity. Even then, occasionally, almost all respondents used agricultural waste as fuel. Deadwood in own farm lands was used as fuelwood by most of the respondents. None of them used dung, as it was not necessary and also due to adverse climatic conditions.

Thus, it could be concluded, taking share of different types of fuel in the total fuel consumption that, respondents from North Kanara, due to easy availability of fuelwood from the nearby forests used fuelwood to the maximum extent (85%). Even though Bijapur district which is almost devoid of much tree cover, respondents used 21.67% fuelwood, mainly collected from Bellary jali, which grows in abundance in the district, almost solving the fuelwood problem. Respondents also used higher quantities of agricultural waste,



mainly cotton stalk, sunflower stalk, stubbles (68.33%). In Dharwad district, with large area under DCH-32 cotton, for most of the respondents cotton stalk formed the major source of fuel.

#### 5.4.3.2 Sources of fuelwood

Most of the respondents (45 in Bijapur, 60 in Dharwad and 46 in North Kanara) obtained fuelwood from their own fields. But, here, the fuelwood was obtained by cutting bushes on farm bunds and dead woods. None of the respondents cut the healthy timber yielding trees for obtaining fuelwood. But Bellary jali in Dharwad and Bijapur district was cut to obtain fuelwood.

Thirty percent of the small farmers in Bijapur and 10% farmers in Dharwad district collected small quantities of fuelwood from the roadside trees, that too in the form of deadwood. They also never cut, according to their own statement, healthy trees.

In Bijapur district, it was noticed that cutting bushes around villages and in farm lands was a common practice among the poor, landless, marginal and small farmers, which usually formed the working class. In the absence of any other sources of fuelwood, this source was important for many of the

respondents. In Dharwad also small and marginal farmers, landless and poor people obtained fuelwood from this source. This source is not only free of cost but also convenient to get for almost all respondents. All categories of respondents in North Kanara, could easily obtain fuelwood from the nearby forests, it was not at all necessary for them to collect fuelwood from others fields, bushes around the village, roadside trees or from government wastelands. Because of the absence of forest area in the study area, in Dharwad and Bijapur districts, the question of obtaining fuelwood from forests, naturally, did not arise for the respondents in these two districts.

In North Kanara, all small and medium farmers and 75% of large farmers obtained fuelwood in the form of deadwood, from the nearby forests, with the permission of the local forest guards, at free of cost.

Thus, it could be possible to arrive at a conclusion that, because of absence of forest area in Bijapur district, respondents could not obtain fuelwood from forests. But due to widespread and luxuriant growth of Bellary jali (porosophis juliflora) which is drought hardy, rural people could get sufficient fuelwood at free of cost and easily. Hence, none

of the respondents cut other timber yielding trees such as Acacia nilotica (jali), Neem etc. to obtain fuelwood which worked out to be a very costly affair. Agricultural waste formed the largest source of fuel, and 10% of the fuel requirement was met by using dung cakes. An interesting phenomenon to note here is that, extent of use of dung as fuel has come down, according to the statements of many respondents, after the advent of Bellary jali, which is a healthy sign to promote use of dung as farm yard manure. The situation in Dharwad district is also more or less similar.

Because of presence of natural forests in North Kanara, respondents, could obtain fuelwood from the nearby forests in the form of dead and dry wood with the permission of local forest guards. It is also interesting to note that the respondents did not cut healthy trees for fuel purposes, when alternative sources were available. This is clearly an indication of the tree consciousness of the public to allow healthy trees to grow.

#### 5.4.3.3 Livestock maintained by the respondents

A perusal of the results obtained in this connection, clearly indicates that goats/sheep population was considerably more in Bijapur district, followed by that in Dharwad district.

In Bijapur district, which is a drought prone area, 'sheep rearing has become a very attractive enterprise especially for small and medium farmers, with meagre resources. A goat/sheep, which Gandhiji once called a 'poor man's cow,' needs no specialised management, easy and cheap to maintain. Because of scanty and uncertain rainfall, an ordinary small and medium farmer, even large farmers often, can't expect good harvests, forcing them to search for some alternative and profitable vocations. An average small farmer, without much land to cultivate and with usually medium to large sized family, has found sheep rearing an attractive profession. Every sheep/goat, on an average he maintains, earns him 500 to 1000 rupees a year, without requiring any heavy investment. Almost every family in this category has engaged a child or two in sheep rearing, thus making sheep rearing cheaper further. Adult members earn wages working as a labourers in others fields. Maintenance of cattle and buffaloes is not only costly because of non-availability sufficient fodder throughout the year, making it non-profitable venture. Farmers who have irrigated land could only afford to maintain cattle and buffalo in more number. Then moreover, small farmers and medium farmers do not have large cattle sheds to maintain cows and buffaloes. Whereas

goats/sheep do not need any shelter. Even one need not to have enough land to maintain a large number of goats/sheep, since every day sheep/goats are taken out to waste lands, Gomal lands and others fields for grazing at no cost. Every day many trees in farm lands and even road side trees are cut to feed their ever increasing number of goats/sheep in Bijapur district. With maximum areable land, often hit by droughts, Bijapur district makes sheep rearing an attractive enterprise for both small and medium to earn their livelihood and even more. Moreover goats/sheep just like camels in desert, feed on any type of vegetation, and are drought resistant when compared to cattle and buffaloes.

In Dharwad district with almost assured rainfall, cultivation of land is more profitable. Often farmers take double crops under rainfed conditions only. In monsoon and rabi season almost every piece of land is cultivated, very little land is left over for grazing, thus discouraging sheep rearing. Then, some endemic and epidemic diseases which also make sheep rearing a less attractive. In spite of this goats/sheep rearing has become more attractive and profitable among landless and small farmers.

North Kanara, with sufficient forest lands for grazing and water resources, makes it attractive to maintain

more livestock. But due to heavy and continuous rainfall, sheep rearing is not possible. Then goats/sheep, unlike cattle and buffaloe can not protect themselves against the attack of predators i.e., wild animals. Thus, goats/sheep number per household is very less. Medium and large farmers did not maintain any goats/sheep.

Therefore, when a careful comparison is made between three districts, viz. Bijapur, Dharwad and North Kanara, goats/sheep were found to be maximum in Bijapur district followed that in Dharwad district per sample household, with negligible number in North Kanara.

As far as cattle and buffaloe population was concerned North Kanara with geographical and climatical advantages, had highest number of cattle heads and buffaloes for every sample household.

Cattle and buffalo was more in Dharwad district when compared to that in Bijapur district because of more availability of fodder and better water resources.

The pattern and population of livestock maintained by respondents in the studied divisions, indicate the pattern and preferences for maintaining livestock, because of

agro-climatic setting. The pattern indicated the preference of small animals in drier divisions. It is a common practice that goats/sheep are more often taken to fields for grazing rather than stall fed. Therefore, the requirement of vegetation in drier divisions, to meet the demand is on a higher scale. The social forestry programme while chalking out planting designs has to consider these factors. It would be advisable to grow more fodder yielding species in public lands while timber yielding species on private lands.

#### 5.4.3.4 Sources of fodder

An analysis of nature and sources of fodder (including leaf fodder) used by beneficiaries under social Forestry programme, clearly indicated that open grazing in village common lands (grazing lands) was widely practiced, in fact was a most common feature, in India. Number of animals per unit of grazing land is more in rural areas. Most of the farmers rear more number of animals, especially sheep/goat, as a source livelihood, often without any proper sources of fodder. Thus, the village common lands in most of the cases would be the only available source of fodder, with limited availability of agricultural by products.

Agricultural by products like Jowar Stalk, maize stalk etc. form the backbone of fodder supply system, ofcourse which is a universal phenomenon.

Leaf fodder, was mainly used to feed sheep and goats, in Dharwad and Bijapur divisions. But in North Kanara it was mainly used to feed cattle and buffaloes.

The use of Roadside trees as a source of leaf fodder, for most of the beneficiaries, especially for those who reared sheep and goats was an indication of absence of enough trees in both private and public lands, and total absence of forest lands in Dharwad and Bijapur districts. Road. trees in the absence of adequate patrolling or protection, often become easy source of leaves, leading to gradual decline in number of roadside and avenue trees. The roadside/avenue trees are not only cut for collection of leaves, but also to procure fuelwood, in rural areas and even in urban areas also. Now, it has become a common practice among the communities. This calls for urgent corrective and protective measures to save roadside/avenue trees, from this type of illicit cutting.

The tree species like Tamarindus indica (Tamarindus), Acacia nilotica (Kari jali), Ficus bengalensis,





Photograph 1 :A Soppina betta land in North Kanara division.

Ficus religiosa (Aladmar), Azadiricta indica (neem) etc. existing mainly in village common lands, and on roadsides formed the major source of leaf fodder, in Dharwad and Bijapur divisions.

Betta lands i.e., soppina betta lands were the major source of leaf fodder in North Kanara division. Ofcourse, the biotic pressure on these soppina bettas and village common lands in North Kanara, was considerably less when compared to that on village common lands/grazing lands in Dharwad and Bijapur divisions. This was mainly due to existence of natural forests in North Kanara, and villages in division are situated deep inside the natural forests.

Failure of forests to provide leaf fodder in Dharwad and Bijapur divisions was simply because of the fact that no forests existed in Bijapur division, and in most parts of Dharwad division (including study area), worth of their name and status.

It is said that, dramatic increase in both human and livestock population, leading to increase in demand for food, fuel, fodder, timber etc. has wiped out all the forest lands in Bijapur division, and in most parts of the Dharwad division. Vast areas, earlier forest lands, have been brought

under plough and used for other non-forest purposes like urbanization. Even this is the case in many parts of North Kanara division also.

Then, increasing sheep and goats population in Bijapur and Dharwad divisions, has posed a serious problem for the remaining tree cover.

Thus, at this juncture it would not be irrelevant, if objectives of and approach to social Forestry project are either remodified or strengthened to suit the local needs.

#### 5.4.3.5 Timber requirement of beneficiaries

Here, in this study, timber requirement is only for agricultural purposes, since none of the respondents used timber for any construction purposes every year, except for temporary structures like huts.

When the figures given in the table<sup>4-11</sup> are further analysed it could be arrived at a point that, in Bijapur district small farmers purchased 33.33 per cent of their total timber requirement of worth Rs. 25/-, when compared to the medium farmers, who purchased 25 per cent of their timber requirement of worth Rs. 40/- and the large farmer purchased timber requirement of worth Rs. 60/-.

This shows that, all categories of farmers (respondents) in general, were not self sufficient even to meet their own timber requirements, that too, for agricultural purpose. All of them felt shortage of poles and bamboos for making agricultural implements like ploughs, harrows, seed drill, cart etc. Under dryland conditions, it was extremely difficult, especially for medium and large farmers to protect trees in their farm lands from illicit cutting of branches and even whole full grown trees. During summer season, when there is no standing crop in fields, shepherds cut tree branches recklessly to feed their goats/sheep, and other poor farmers and landless people who cannot afford to purchase timber, also, literally steal timber from others field. Only in orchards and irrigated lands, where there is continuous watch and ward, trees could be protected from such illicit cutting.

The condition was no different in Dharwad district also. Earlier, it was thought that this phenomenon was common in drought prone areas, but now it is being increasingly reported, as it was observed by many respondents, who actually lost valuable timber from their farms, and even from their backyards too. In Dharwad district also respondents were not self sufficient in their timber requirements. On an average a small farmer purchased one third of his total timber

requirement, a medium farmer and a large farmer one fourth of their timber requirement every year, as it has been indicated by the results.

In North Kanara also, inspite of relatively large number of trees in and around farm lands, farmers were not self sufficient in their timber requirements, but did not purchase any timber for agricultural purposes and other purposes.

Small farmers on an average could not meet any of their timber requirement from their own trees, medium farmers and large farmers could meet only 1/5th, could meet 1/5th of their total timber requirement from their own trees.

It was observed and also told by the respondents that, small farmers and other landless people procured required quantity of timber from the near by forests in the form of dead wood, usually with the permission of local Forest Department personnel (especially Forest guards). Hence, they could get required quantity of timber at free of cost. Medium and large farmers also procured timber from the near by forests. But they had to pay some amount for larger quantity of timber, to the local forest guards/forests/rangers. But, only dead wood was procured in the above mentioned manner.

Because of adverse climactical and working conditions new agricultural implements, except few like ploughs, were required every year at the beginning of the preparatory tillage. The respondents also used large quantities of timber for construction of huts, cattle sheds, watch towers in paddy fields etc. in North Kanara.

In total, respondents of all categories were not self sufficient in their timber requirements, even for agricultural purpose also.

#### 5.4.3.6 Money spending pattern of the respondents to meet their annual timber requirement (for agricultural purpose only)

To make social forestry concept more meaningful and useful for the society, especially for the rural communities through meeting their daily requirements of food, fuel, fodder, timber, poles, bamboos etc. it is essential to know the basic aspects like sources of timber, and the quantity of timber required by the beneficiaries among others.

The results revealed that, on an average a beneficiary spent Rs. 88 in Bijapur division (54.08%), on purchase of timber, which was found to be much higher than what was spent in Dharwad division (Rs. 42 i.e., 26.32%) and

no money spent in North Kanara division. And all beneficiaries in North Kanara division procured timber from their fields in addition to that procured from the nearby forests, 96.67 per cent beneficiaries procured timber from trees grown in own lands/fields, and in Bijapur 86.67 per cent beneficiaries did the same. Thus, it could, here be concluded that Bijapur farmers spent more money on timber (for purchase of timber) than the farmers of the other two divisions. This could be attributed to the reason that the number of trees in farm lands in Bijapur division were far less than in Dharwad and North Kanara divisions. Therefore resorted to purchase of timber for making heavier agricultural implements like wooden ploughs, bullock carts, seed drills, harrows etc. They could procure only small timber, sticks, poles etc. from the trees existing in their farms.

But, in Dharwad division, due to favorable climatic conditions and comparatively less biotic pressure, more number of trees could be seen in the cultivated lands, which could meet most of timber requirement of their owners. Nevertheless, farmers purchased timber for making heavy implements like bullock carts. Some of the medium and large farmer beneficiaries did not purchase timber and grown in their farm lands could meet their timber requirement. But in

Bijapur division all beneficiaries belonging to all farmer categories purchased timber. This shows that, in Bijapur division even the medium and large farmer beneficiaries, with large land holdings, could not meet their own timber requirement, due to few or no trees with suitable timber existing in their farms. Some farms did not have even a single tree also. The situation in North Kanara division was not comparable, because of its peculiar geographical features, where, nearly 80 per cent of the total land area is under forests. Farmers or the other rural people never felt it difficult to meet their timber requirement. Some times as it was revealed by many of the beneficiaries themselves that, they bribed local forest officials to procure the required quantity of timber. In North Kanara large quantities of timber, poles and bamboo were used for fencing, agricultural implements, construction of watch towers etc. Then moreover most of the farmers used valuable timber like teak (Tectona grandis) for the above mentioned purposes. Collection of dead wood was also allowed from the Forest Department.

An emerging picture, especially in Bijapur division, is that of wide spread and luxuriant growth of Prosopis juliflora (Bellary jali) in most of the country side. Most of the farmers with initial hesitation on pretext of poor



quality, have started procuring timber, sticks and poles from Bellary jali trees and using them extensively for making various agricultural implements especially for beams, harrows etc. But ofcourse, this timber is not used for making bullock carts and seed drills. This is because Bellary jali is easily available at cheaper prices, often at throwaway prices, in their villages only. This phenomenon was observed in some parts of Dharwad division also. Timber procured from neem (Azadiricta indica), Kari jali (Acacia nilotica), Matti (Dalbargia sissoo) etc. is used for making bullock carts and seed drills etc.

Therefore, the situation calls for giving a thought for better utilization of and more research on Prosopis juliflora (Bellary jali), which is a hardy and drought resistant tree species, to meet the fuel and timber requirement of the rural people, among other objectives of the Social Forestry.

#### 5.4.3.7 Per capita annual income of the sample beneficiary and non beneficiary households

Because of the longer gestation period for accrual of benefits from tree cultivation, the beneficiary has to wait quite a long period to enjoy the benefits. But a

beneficiary's capacity to wait for realization of returns from investments, mainly depends upon his financial position (Bhattacharya, 1986 and Swarup and Chand, 1987). The greater the income the greater would be his capacity to invest on plantations, which have longer gestation period. Thus, it is imperative for a researcher to know the income levels of the beneficiaries for better assessment of the performance of developmental projects, especially like that of social forestry project. Therefore, here an attempt has been made to study the income level of the beneficiary as well as of non-beneficiary households to enable better evaluation of the performance of the state social forestry project.

It could be noted that average per capita income of beneficiary households in all categories and divisions was found to be higher than that of the non-beneficiary households, even though the difference was observed to be marginal, except in case of non-beneficiary households belonging to medium category in North Kanara, who had higher income than that of their counter parts in the same division. Beneficiary and non-beneficiary households in North Kanara have highest per capita annual income than their counter parts in other two divisions, least was in Bijapur division.

This might be due to the climatic conditions (rainfall) and the change in cropping pattern in the three divisions. Bijapur, with less than 550mm annual rainfall, with no assured irrigational sources, often experiences drought. Farmers hardly get bumper crops even though soil is fertile (black cotton soils). Even farmers with sufficiently large holdings often experience financial hardships and it would be difficult for them to maintain permanent labourers and livestock.

Whereas, Dharwad division coming under transitional belt, receive enough rains to raise commercial crops like chilli, hybrid cotton etc. The rainfall is almost assured for at least one crop. Therefore, the sample households get higher income than their counter parts in Bijapur division, but less than in North Kanara.

North Kanara, coming under Malnad belt, receives heavy rainfall (often more than 2500mm per year). Here, in North Kanara, the climatic conditions are favourable for raising arecanut, cocoa, pepper plantations and paddy cultivation. Due to higher price for arecanut, cocoa and pepper farmers are better off than their counter parts in many other districts including those in Dharwad and Bijapur divisions.

However, it could here be mentioned that, whenever a farmer is diverting cultivated land for tree cultivation or for raising tree plantations, forgoing the income from field crops, his annual income influences his decisions and sustaining abilities. Nevertheless, if the income from the such cultivated land is meager i.e., if the productivity of cultivated land is low, it does not help pull him out of the self-sustaining agriculture, and this does not discourage him from taking such a decision to divert cultivated land for tree cultivation. Therefore, only when the productivity of the cultivated land is high and cultivation of such land is economically viable, the income derived from the piece of land has greater impact on his decisions to adopt tree cultivation (i.e., social forestry practices).

In Bijapur division (district )many large and medium farmers (among the beneficiaries and many others who have been contacted, but not for the present study) have started taking up tree cultivation in their marginal and sub marginal cultivated lands, whose cultivation is economically not viable, thanks to low productivity of land, scarcity of labourers as well as high wage rates, wide fluctuations in the prices of agricultural produce etc. Moreover, most of the beneficiaries utilised hitherto uncultivated (unutilised)

waste lands, bund space, farm boundaries and backyards for planting seedlings. Therefore, this practice did not alter their income level either positively or negatively.

Hence, at this juncture, in conclusion, it can be said that, income level of a farmer (beneficiary) does not influence his decisions to adopt social forestry programme, as long as he takes up tree cultivation in hitherto unutilised waste lands, cultivated marginal and submarginal lands under rainfed conditions in dry belt, bund space, space in backyards / frontyards, farm boundaries etc.

#### 5.4.3.8 Farm Forestry : Average number of seedlings planted and their survival rate

It is necessary to study the number of seedlings planted by each beneficiary and their survival rate, in order to modify the present policies or to suggest measures to make the Social Forestry project more successful, and to arrive at the benefits obtained by the beneficiaries, under farm forestry component of the project.

The results indicated that the average number of seedlings planted in Dharwad division by medium and large farmer categories was observed to be highest (209 and 247

respectively) and it was highest in Bijapur division for small farmer category beneficiaries (175).

This can be attributed to the favourable climatic conditions, better marketing facilities (wood marketing) and heightened awareness of prospectus of tree cultivation among the farmers. And, due to more intensive cultivation practices, the wood requirement for agricultural purposes is more, which in turn, might have influenced the decision of farmers, in favour of planting more number of seedlings.

But in fact, if the availability of land space for planting seedlings under farm forestry, is taken into consideration, the average number of seedlings planted by each beneficiary should have been highest in Bijapur division among the sample divisions. However, due to adverse climatic condition and other field level practical problems like excessive grazing, might have dampened the interest of and or discouraged the beneficiaries from planting more number of seedlings.

As the results indicated the survival rate of seedlings was observed to be highest in N.Kanara (more than 95%) and least in Bijapur division (37.25%), and in Dharwad it was found to be 73.64%.

The significant difference observed in the survival rate of seedlings, is definitely attributed to the prevailing climatic conditions. The survival rates would have been much lower than the observed ones in Bijapur and Dharwad division, had all the seedlings been planted under rainfed conditions, without any protective irrigation. Thanks to the protective irrigation provided by some of the beneficiaries.

Even under drought prone (low rainfall) Bijapur division also some drought hardy species like ber, neem, tamarind and eucalyptus had better survival rate (63, 36.23, 55.19 and 37.93 per cent respectively). Therefore, it would be imperative for diversion of physical and financial resources for raising more number of seedlings of these species for better performance and impact of the project. Problem of excessive open grazing was observed to be a serious threat to the survival of seedlings, especially during summer season in drier areas.

#### 5.4.3.9 Resource potential for Social Forestry among sample households

As it has been mentioned in the results, potential of idle land resources viz., culturable waste, permanent waste, farm bund space, back yards etc. for adoption of Social

Forestry, was observed to be more in Bijapur division and negligible in North Kanara division, for the reasons put forth while discussing the resource utilisation by the beneficiaries.

However, when compared to the resource potential with beneficiaries, small farmer non-beneficiaries in Dharwad and non-beneficiaries belonging to medium and larger categories in Bijapur division, possessed more land resources, which could be diverted for tree cultivation (Table: 4.17) as such, no special reasons could be attributed to this variation which could be an incidental phenomenon.

It could be, however, concluded that vast idle land resources are available in Dharwad and Bijapur divisions, and ofcourse, also in other low and medium rainfall areas, with the farmers, efficient utilisation of which should be encouraged on war foot.

#### 5.4.3.10 Place of planting the seedlings

As it is evident from the results that, place of planting the seedlings is definitely influenced by the availability of suitable type of land, perhaps culturable waste or permanent waste, enough space on farm bunds, farm boundaries, in backyard or frontyard etc.



In North Kanara, where there is a great demand, due to scarcity, for the cultivated land and due to high rainfall, no culturable waste or permanent waste lands were available with the farmers. The hard working farmers have brought every piece of land under cultivation, probably under Arecanut or paddy. Arecanut cultivation has recently become most profitable, thus an attractive venture, leading for high demand for cultivated land, in North Kanara. Even farm bunds in paddy fields or arecanut orchards in North Kanara are not wide enough to accommodate more number of trees. Therefore, none of the beneficiaries planted seedlings on farm bunds, in culturable waste, in permanent waste lands, or in cultivated lands. But, every beneficiary had both backyards and frontyards with sufficient space to accommodate more number of trees. Therefore, every farmer beneficiary planted trees in their backyard and front yards. Some times arecanut plantations are damaged due to high wind velocity in North Kanara, especially in coastal areas of the division. So, to minimise such damages, all of the beneficiaries planted seedlings along their farm boundaries, to create shelter/wind breaks, which made clear by the results obtained to evaluate S.F.P. through proxy variables, for the present study.

Availability of culturable waste, permanent waste lands and marginal cultivated lands with very low productivity, was rather in large proportion in Dharwad and Bijapur divisions. In Bijapur division, with often below normal rainfall, most of the areas experienced drought frequently. This has not made cultivation of marginal and sub-marginal lands profitable. Nowadays, large farmers with irrigational facilities are facing the problem of labour scarcity. To compound the problem, vast tracts of cultivated lands have been subject to massive soil and water erosion. These all factors have made cultivation of marginal and sub-marginal lands and even fertile lands, unprofitable under rainfed conditions. Therefore, it could be seen from the results that, 6.67 per cent beneficiaries in Bijapur division, diverted part of their cultivated land for tree growing (block plantations), apart from making use of culturable waste and permanent waste lands for "tree cultivation".

In Dharwad division, even with sufficient rains, cultivation of marginal lands is not profitable, according to the beneficiaries. Therefore, 10% of them converted their cultivated (marginal) lands into tree plantations. Every farm family in Dharwad division had backyard when compared to those in Bijapur division, where only few of them had such

backyards. Therefore, all beneficiaries in Dharwad division and 16.67 per cent of beneficiaries in Bijapur division planted seedlings in backyards. Farm bunds in both Dharwad and Bijapur divisions, are wide and large enough to accommodate more number of trees. But 50 per cent of small farmers, being afraid of the 'shade effect' on their crops, in Dharwad division didn't plant seedlings on farm bunds.

Therefore, finally it can be concluded that, more emphasis should be given to bring more and more culturable waste, permanent waste lands and marginal cultivated lands, available with the farmers in Dharwad and Bijapur divisions under tree cultivation, which would not only be profitable to farmers, but more than that, it would produce huge quantity of 'bio-mass' to meet local needs and needs of the region as well.

#### 5.4.3.11 Farm Forestry : Employment generation

Since the beneficiaries planted seedlings, under Farm Forestry component, on farm bunds, farm boundaries, back yards, front yards etc. mainly. Therefore the Farm Forestry component could not generate much employment opportunities for the beneficiaries. Only for pruning, to collect loppings, leaves etc. and mainly for planting the seedlings some time

was spent, but not exactly in the form of gainful employment (Dhanasekaran, 1990).

#### 5.4.3.12 Benefits derived from the trees planted under farm forestry programme

In the present study, the benefits derived from the trees planted in 1987 Kharif by the beneficiaries in their fields or backyard or any other place of their choice are considered. The results are discussed in brief as follows :

It is evident from the results that beneficiaries in the Dharwad division obtained benefits more than that obtained by their counter parts in other divisions viz., Bijapur and North Kanara.

Another interesting thing to mention here is that, the quantity of fuelwood, fodder, poles/small timber and heavy timber for construction purpose was found to be negligible. Beneficiaries belonging to medium and large categories also obtained timber in negligible quantity in North Kanara division.

The probable reasons which could be attributed to the above mentioned results are as follows : Firstly, in North Kanara, due to existence of dense evergreen forests and soppin

betta lands, beneficiaries simply did not bother much to get fuelwood, fodder, poles/small timber and timber for construction purposes from the trees planted in their fields, mainly along the farm boundaries. They could get all these benefits from the nearby forests. Secondly, they planted trees mainly to create wind/shelter belts around their orchards and not to get fuelwood, fodder, poles/small timber and timber. This was not the case in Dharwad and Bijapur divisions where, virtually no forests existed.

However, small farmer beneficiaries in Bijapur division obtained negligible quantity of fuelwood from the trees planted. This might be because of the fact that, which has already been made clear while explaining sources of fuelwood, most of the small farmer beneficiaries took care of the trees planted in their fields and did not cut them for obtaining fuelwood. But they obtained fuelwood by cutting prosopis juliflora available in sufficient quantity, around their fields and residential areas. However, in the absence of proper quantification methods, it can be said that the beneficiaries could derive benefits from the trees planted under farm forestry to some extent.

The main reason put forth by the beneficiaries for the meager benefits derived from the trees was that, they

intended to sell eucalyptus, casurina, bamboo, sissoo, acacia trees to some wood depots to earn large profits, instead of cutting trees often for fuelwood, fodder, poles and other minor produce.

Thus, keeping the basic objectives of promoting the farm forestry in mind, it could be concluded that the farm forestry has not succeeded to a greater extent to provide fuelwood, fodder, poles/small timber, timber etc. to the rural people. This is largely due to the fact that, for tree species like eucalyptus, casurina, Acacia auriculiformis, bamboo etc. there is a great demand from the wood based industry and for other commercial uses. They neither yield fodder, fuelwood nor good timber for construction purpose (Achaya, 1989). Therefore, planting multipurpose tree species should be encouraged under farm forestry in particular and social forestry programme in general.

#### 5.4.3.13 Kissan Nursery Scheme

Kissan nurseries are raised under decentralised nursery scheme. The kisan nurseries are planned to raise seedlings near to the farmers' fields in the rural areas, and simultaneously to generate income to weaker sections of the society in rural areas, through generating more employment,

thus alleviating the unemployment and or under employment problem.

The average number of seedlings raised by an individual under kissan nursery scheme was highest in Bijapur (15,000) followed by in Dharwad (13,691) and in N. Kanara (10,000). The number of seedlings to be raised by a beneficiary, usually, is decided based on the total expected demand for the seedlings in the area, this is also influenced by the availability of funds with the department.

The total number of Kissan nurseries in Bijapur division is less when compared to that in Dharwad division. Therefore, they had to cover more average area. This might be the reason for the average number of seedlings raised being highest in Bijapur division. In N.Kanara, nevertheless, the number of kissan nurseries being small, the average number of seedlings raised is also less. This might be attributed to the fact that, the demand for seedlings is not high in the region.

In contrary to the above made discussion the average number of seedlings accepted was highest in N.Kanara (94.74%), and least in Bijapur (91.54%), though the difference between the figures in Bijapur and Dharwad is observed to be marginal. Probably, the higher rate of acceptability of the seedlings in

N.Kanara and Dharwad is because of favourable climatic conditions in these regions.

As far as the employment generation is concerned, it is more or less same in both Dharwad and Bijapur division (159 and 152.5 mandays respectively), but for less in N.Kanara division (108 mandays).

This could be attributed to the regions firstly, more number of mandays were required for filling the polythene bags, dibbling of seeds and watering. In fact, employment generation was considerably less in Bijapur division, in relation to that generated in Dharwad division, since average number of seedlings raised per nursery was more in Bijapur.

In Bijapur division all beneficiaries had assured supply of irrigation (well irrigation). But in Dharwad division many of the beneficiaries, especially women, did not have such kind of irrigation facilities (where the nurseries were raised in the backyards). However, they got water supply from the nearby public water taps. However, the nature and method of raising seedlings being the same in Bijapur and Dharwad divisions, employment generation was more or less same. Whereas in North Kanara division, all sample kisan nurseries were raised by voluntary organisations and schools.



Due to favourable climatic conditions, easy availability of water and small number of seedlings, the labour requirement was less. Then addition to this, as much care as that was taken in Bijapur and Dharwad, was not taken in N.Kanara division, since profits and losses did not bother the members of the organisation much. Nevertheless, due to favourable climatic conditions, rate of acceptability of seedlings was higher in N.Kanara.

The welcome change that was brought in the families of the beneficiaries was that, women and children used their leisure time more than that by the men. More than 90 per cent of the total mandays of employment generated were made use of by the family members only (91.95% in Dharwad and 93.57% in Bijapur). Among which, more than 95% were women and children.

Thus, it can be concluded that kissan nurseries generated sufficient employment opportunities for the beneficiaries. If higher fund allocations are made to promote kissan nursery scheme, it can generate more employment in rural areas, where the incidents of unemployment and underemployment is quite higher.

Average cost of raising a seedling was found to be highest in N.Kanara (25 paise per seedling), and least in

Dharwad (12 paise per seedling). In Bijapur division it was observed to be 15 paise per seedling. However, material cost is observed to be least in N.Kanara (12.49% of the total cost) and highest in Bijapur (30.75% of the total cost).

This is due to the reason that in N.Kanara, only Rs.311 was spent on materials required including soil, sand, manure and equipments, which accounted for only 12.59% of the total cost incurred. They could procure soil, sand and manure (leaf manure) from the nearby forests, and generally soil is rich with humous and good of raising seedlings. Whereas in Dharwad and in Bijapur, most of the beneficiaries had to transport suitable soil and sand from, often, distant places, especially sand from the village nalla. They had to purchase costly dung manure for the purpose, thus incurring the cost of Rs. 594.5 and Rs. 580.0, accounting for 28.86% and 30.75% of the total cost, respectively.

Higher average cost of raising seedlings in N.Kanara could be attributed to the higher imputed cost of labour, where, average wage rate was Rs. 20 per day.

Imputed family labour cost was almost similar, in relative terms, in Dharwad and Bijapur divisions (64.44% and 65.74% of the total cost respectively).

Raising of seedlings being labour intensive, 69.25%, 71.14% and 87.41% of the total cost was contributed by the labour cost in Dharwad, Bijapur and in N.Kanara.

Cost  $A_1$  was highest in Dharwad (Rs. 706.4) and 1st in N.Kanara (Rs. 311). Since none of the beneficiaries leased-in land for raising seedlings, no rent for as paid, hence cost  $A_1$  was equal to cost  $A_2$ .

However, if net profit per seedling raised, is considered, it is observed to be highest in Bijapur (24 paise per seedling) and least in N.Kanara (6 paise per seedling). When comparison between net profit per seedlings in Bijapur and Dharwad divisions is made, due to higher wage rates and higher material (soil, sand and manure) cost, net profit in Dharwad was less (16 paise) than in Bijapur (24 paise). This is also due to higher overhead cost per seedling in Dharwad than in Bijapur and due to variation in average number of seedlings raised.

The least net profit per seedling is attributed to higher wage rate and lower average number of seedlings raised (10,000) in North Kanara. If the imputed labour cost is not considered, since the members of the respective organisations worked voluntarily, without expecting any wages, the net

profit per seedling would be highest i.e., 28 paise per seedling in N. Kanara.

#### 5.4.3.14 Awareness/knowledge of Social Forestry

A scientific enquiry would be helpful to have better understanding and awareness of the Social Forestry Project, where people's participation has not only helpful but essential too, and the present part of the study is an attempt in that direction, which aims at assessing the extent of knowledge of concept of Social Forestry among the rural people for whom the social forestry project is meant for. The respondents included beneficiaries as well as the non-beneficiaries. The results also help us in providing a yard stick to measure the efforts hitherto made by the concerned organisations/departments.

Majority of the respondents (58.34%) in North Kanara division, were found to be aware and possessed knowledge to a greater extent, about the concept of social forestry. The figures were low for Dharwad (48.33%) and Bijapur (28.33%) divisions. If the location of the only publicity (among the three divisions) wing at Dharwad taken into consideration, number of people possessing knowledge of concept of social forestry, should have been more in Dharwad division, than in Bijapur and North Kanara divisions.

Majority of the people (58.34%) being knowledgeable of the concepts of the Social Forestry Project, could have been due to the impact of higher concentration of Forest Department Offices and officials in North Kanara division, and due to close contact between people and the officials. Then again, many mass movements to create awareness among the people about the importance of protection of the Forests for maintaining favourable ecological balance, must have made people more aware and knowledgeable, about the different issues related to the forests and about various Forest Development Programmes, including that of Social Forestry Project. Ofcourse, the basic motive of these mass movements was to protest the indiscriminate felling of trees and submergence of large tracts of rich, natural and evergreen forests in the division.

The results make it obvious to conclude that, the Forest Department has not made any integrated and comprehensive efforts to give wider publicity to the Social Forestry both in Dharwad and Bijapur divisions. Most of the beneficiaries themselves were not fully aware of the correct concept of the Social Forestry. They obtained seedlings and raised nurseries, without bothering to get themselves acquainted with the basic concept of the project. It seems,

neither officials nor policy makers took it serious to explain the various components and objectives of the Social Forestry Project, which could have improved the over all performance of the project considerably.

Therefore, findings call for an integrated and comprehensive awareness campaigns in the rural areas, for successful Social Forestry Project. It appears from the results that, during the initial period of the implementation of the project, especially during the first year, the publicity given to social forestry was wide, which made more number of people (54.32%) aware and knowledgeable about the social forestry, than in the later period (36.42%). Thus, it can be said that the initial spirit evaporated very early, leading to partial success of the project.

Regarding the awareness/knowledge of various objectives of social forestry project, most of the respondents (68.5%)\* quoted the broad objective to supply fuel wood, fodder, timber etc. to local people. More than 72%\* of the respondents mentioned the objective, related to greening of wastelands (creation of plantation in waste lands). However, 92%\* of the respondents came out with a conclusion that the implementation of social forestry project was to maintain

ecological balance, by taking up tree plantations in areas where, forest cover was least. An objective aimed at reducing the biotic pressure on the existing forests was put forth by 66.05<sup>\*</sup>% of the respondents. Soil and water conservation was quoted as an objective of social forestry by 37.03%<sup>\*1</sup> per cent of the respondents.

The above mentioned results imply that majority of the people who knew something about the social forestry, had some basic knowledge about importance of forests in general and trees in particular. Therefore, they took the specific objectives of the Social Forestry Project synonymous for the general objectives of preservation and conservation of forests. So, it meant, people had some basic knowledge utilising which, with an integrated approach, the concept of the social forestry, could be made known to a majority of the rural people in a short period effectively.

#### 5.4.3.15 Awareness/knowledge of Farm Forestry

For quick and successful promotion of farm forestry, especially in dry regions, it is very essential to study the farmers' attitude towards, awareness/knowledge of farm

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<sup>1\*</sup> Out of the 162 respondents who had knowledge of concept of social forestry to a greater or to some extent.

forestry. The planners and policy makers should be equipped with such data on awareness/knowledge of Farm Forestry among the farmers. So that, it would be easy to formulate the objectives and workout the strategies to achieve these objectives successfully. For an evaluation and monitoring of an ongoing project/programme/schemes, such results could prove as a yardstick for the researchers. In this direction, here an attempt has been made as a prelude to an Economic evaluation of the various components of social forestry, of which farm forestry is one.

Among the different sub components of farm forestry, planting trees on farm bunds and in wastelands, and or in marginal lands of a farmer, were found to be more popular with 75.28 and 59.17 per cent of respondents, accepting them as synonymous for farm forestry. This could be easily defended and justified on the following grounds : first of all, farm forestry is not a new concept for our farmers. Since times immemorial, farmers have been growing trees in their farms, perhaps on farm bunds in most of the cases to meet their requirements of fuel wood, fodder, fruits, green manure, timber, gums etc. Ofcourse, without any specificity. Many times trees are grown in farms for asthetic purpose, and to provide shade and shelter to animals and human beings as well.



Usually, multipurpose trees were preferred on farmlands. The farmers also knew very well that, trees could prevent soil and water erosion effectively, thus maintaining the soil fertility. Even trees are worshiped in many parts of the country. When compared to the awareness/knowledge of other components of social forestry, farm forestry was well understood and received by the farmers, for which the above made discussion holds good.

It could, without much hesitation, be concluded that, the modern concept of "Farm Forestry" is like "Old wine in new bottle" for majority of the farmers.

The objectives of farm forestry like efficient utilization of land, to create employment opportunity and to maintain ecological balance, appeared new for majority of the farmers, when these objectives were made known to them, but later with little explanation by the researcher, they could catch the point immediately.

Among divisions, Bijapur stood first with 46.67 per cent of respondents with no idea of farm forestry (Dharwad stood second with 18.33 per cent and North Kanara third with 9.17 per cent of the respondents). This phenomenon could be probably, due to the fact that, in recent years most of the

trees in farm lands have either been sold to ward off financial crisis by many of the small and medium farmers, or cut to feed ever increasing number of sheep and goats. Even in many cases, as it was reported by the respondents themselves, trees belonging to some species like Acacia nilotica, Ficus bengalensis, Ficus religiosa, etc. have been cut to avoid loss of crop yields due to their shade effect and in some instances to deny shelter to a large number of birds, feeding on the crops. In many other cases, land reforms (land ceiling Act) resulted in extensive felling of trees standing in the farms, before transferring the land ownership to others (tenants). Division of land holdings also resulted in felling of a large number of trees in farm lands. Due to all these above mentioned reasons, many a young farmers might not have seen trees on their farms at all. This might have made them unaware of the benefits of trees if grown in their farms. This, ultimately might have influenced their mentality, where farm forestry, has not, so far, carved a place. Adverse climatic conditions, illicit felling, indiscriminate grazing etc. might have further moulded their mentality discouraging them in adopting Farm Forestry fully.

But, respondents in Dharwad and North Kanara divisions, had better chance to expose themselves for modern

ideas, due to the reasons mentioned while discussing the results of awareness/knowledge of concept of social forestry among the respondents.

#### 5.4.3.16 Sources of information for obtaining freely distributed seedlings

The results could reveal that, the motivators did well by informing 30 per cent of the beneficiaries under small farmer category in Dharwad, and 25 per cent in Bijapur division. Their performance was poor, as far as their contact with the medium and large farmers were considered. However, this could have happened because of the fact that the motivators, working at the lowest level of hierarchy of the social forestry organisation, could influence only small farmers. And many of the medium and large farmers did not consider motivators' point worth of adoption, because of their low status in the organisation (which was in fact revealed by motivators themselves).

Because of higher concentration of forest department officials in North Kanara division, people could, almost daily, come in contact with them, which resulted in extraction of more information in all spheres of forestry, including that related to social forestry. Therefore, Forest

Department official, became the largest source of information on availability of seedlings.

Publicity wing of the social forestry department as it appears, was almost non-existent in Bijapur division, where much publicity was, in fact, required than in North Kanara. It could reach only 6.67 per cent of the beneficiaries, which is regrettable. Its efforts were mainly concentrated in Dharwad taluka only, as it was revealed by the results. All the beneficiaries who received information through the publicity unit, were from Dharwad taluka (range) only. Probably, this could be due to the reason that the publicity unit, under an A.C.F. is located at Dharwad (another at Bellary out of two in the State). Another reason put forth by the publicity wing for its poor performance was that of lack of staff, vehicles and materials, of course, which was acceptable, since a publicity wing situated at Dharwad, could not cover far away places like Bijapur, North Kanara and even border talukas of the Dharwad district itself. Hence, there is an urgent need to strengthen the publicity wing of the social forestry.

The information of availability of free seedlings was also not spread effectively in the rural areas by the farmers who had already obtained the seedlings earlier.

Kissan nursery raisers were more enthusiastic, as it appeared, to inform other farmers in their localities, about the free distribution of seedlings since they themselves raised the seedlings, and were more aware of purpose of raising the seedlings. Another matter, which stimulated them to motivate the people to avail the facility of availability of the seedlings at free of cost was that, they wished to get rid of the seedlings raised in their fields, as early as possible, so that they could divert their attention to other issues.

Panchayat members/office bearers were also a source of information for 25 per cent of the medium farmer category beneficiaries in all the divisions. Perhaps this could be attributed to the reason that majority of the panchayat members (who were personally interviewed to elucidate their opinions on various aspects of social forestry for the present study), themselves belonged to medium category of farmers. Therefore, they could influence the medium category of beneficiaries well. Panchayat members were kept informed by the forest department officials about the raising of kissan nurseries in their locality, which enabled the members to motivate other farmers.

Agricultural Department officials, especially Agricultural Assistants and Assistant Agricultural Officers did better job by influencing 20 per cent of the beneficiaries in Dharwad division and 16.67 per cent in Bijapur division respectively. In Bijapur division 30 per cent of the large farmer beneficiaries were informed by the Agriculture Department officials which was not a mean job, when compared to that carried out by the forest department personnel. Therefore, they should also be given much weightage and involved actively in the decision making process of the social forestry project.

Mass media viz., radio, television and newspapers could not influence or motivate any of the beneficiaries. This implies that the forest department, government in general, has failed to utilise the potential of these mass media in reaching the people easily and more quickly, which calls for some corrective measures.

#### 5.4.3.17 Sources of information : Kissan nursery

A perusal of the results, which throws light on the sources of information of the kissan nursery holders in Bijapur, Dharwad and North Kanara divisions (Social Forestry Divisions), pointed out clear cut variation in the flow of

information from different sources, mainly based on the administrative structure of the Forest Department as a whole, and that of social forestry in particular, in the respective divisions.

In Bijapur division, where, as such there is no forest area worth of its name, number of forest department personnel is also considerably less when compared to their counter parts in Dharwad and North Kanara districts. Hence, there is no close contact between the people and the Forest Department personnel. This might be the reason for none of the respondents being informed by the forest department personnel about the kissan nursery scheme in the district.

But people's contact with their local elected representatives was observed to be close. Then it was an obligation on the respective mandal panchayats to recommend the names for allotting kissan nurseries, to the motivator and the Forest Department, based on which only beneficiaries were selected. There fore, naturally as it happens in many cases, members and office bearers of respective panchayats influenced the selection of beneficiaries. Thus, they themselves formed a major source of information for majority of the respondents (75%).

Most of the motivators, as it was expressed by the majority of the respondents, were inactive and did not have close contact with people to discharge duties efficiently and effectively. Hence they could not influence or motivate majority of the respondents in the district.

Agricultural Department personnel, since they did not have any obligation to inform the people about the kissan nursery scheme. Hence they did not form the source of information.

In Dharwad district too, as it was observed in Bijapur district, majority of the respondents (65%), were informed by their elected representatives at mandal level, for the above mentioned obvious reasons. Here too, motivators could motivate only 25 per cent of the respondents to raise the nurseries. Forest Department personnel could influence 10 per cent of the respondents' decision to raise the nursery. Dharwad district, with more forest area, has more concentration of Forest Department personnel, when compared to the Bijapur district, making them relatively easily available for the people for consultation. More over it is the Head Quarters of Canara Forest Circle. Hence, they could, influence at least 10 per cent of the respondents to raise nurseries.



North Kanara district, with nearly 80 per cent of its geographical area under forests, has five forest divisions and a number of forest ranges, therefore, has highest concentration of forest department personnel, when compared to that in Bijapur and Dharwad districts. Hence, people have close contact with the Forest Department personnel, even more than that with their elected representatives. Thus, majority of the respondents (65%) received information on the kissan nursery scheme by the Forest Department personnel directly. Then, 25 per cent of the respondents, as usually, received information from their elected representatives. The remaining 10 per cent of the respondents were informed by the motivators.

When enquired by the researcher, about their performance, most of the respondent motivators complained that, they were underpaid and working purely on temporary basis, without any job security and incentives for better performance, which in turn affected their performance adversely.

Coming to the role of publicity wing of the Forest Department (social forestry) and other mass media viz., newspaper, radio and television, it was, to our dismay,

noticed that they could either inform nor motivate any of the respondents to make use of the kissan nursery scheme. This pathetic situation, mainly as it was pointed out by the respondents (beneficiaries of the kissan nursery scheme), that the pamphlets, posters, hoardings etc. distributed or put up by the Forest Department did not contain any clear cut and detailed information, that could clear the doubts of the illiterate or less educated farmers. Most of the slogans confined themselves to only tree growing and maintenance of ecological balance. These publicity materials were distributed or put up in towns and cities only and not in villages. Films on forest conservation, ecological aspects, and social forestry were seldom shown in the rural areas. Such shows/exhibitions never came out of the urban centers. Some of the respondents who were just 10 - 15 Kms. away from the district head quarters of the social forestry wing, were also not aware of many facts about the necessity of growing trees and different components of social forestry.

Thus, necessity of strengthening the publicity machinery and restructuring of the administrative machinery, as it would articulated be in 'summary and policy implications chapter of the present study, was felt.

#### 5.4.3.18 Publicity for Social Forestry Programme

In S.F.P. Publicity assumes greater importance, since the programme envisages the active initiation and participation of the various social groups, sufficient efforts have to be made to publicise the programme. The programme was started in 1983-84 and completed its initially programmed period by 1988-89. Even after the first stage of implementation of the programme total lack of publicity, inadequacy of publicity, untimeliness and lack of knowledgeability in the publicity, were reported by majority of the respondents. A programme which calls for active initiation and participation of people, if fails to involve people, it is bound to result in unsatisfactory results. This is also evident from the fact that the North Kanara division was different from the remaining two divisions where, public awareness was total due to the efforts of voluntary organisations and environmentalists.

The results regarding adequacy, timeliness and content of publicity for Social Forestry, as expressed by the respondents, are given in the results.

In Bijapur district as it has been presented in the results, literally the whole publicity wing of the Social

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Forestry Programme was not functioning properly. The basic 244  
concept of the Social Forestry Programme, its objectives and  
components, its necessity etc. have not percolated to the  
grass roots level i.e. village level. Because of this  
reason, 85% of the respondents complained that no publicity  
was given, worth of its name, in their areas. Whatever the  
little publicity was given around the urban areas, was not  
only inadequate, but was untimely. All of the respondents  
felt that exhibitions and film shows should be arranged  
rather than distributing the pamphlets at village level, to  
make the people aware of the facts and figures.

The above mentioned situation was more or less same  
in Dharwad district also, where 60% of the respondents  
reported that, no publicity was given to promote Social  
Forestry in their areas. Among those who reported that  
publicity was given, majority were from Dharwad Taluka  
(range), where the District Head Quarters (Social Forestry  
Division) is located. Thus, indicating that publicity was  
just given around the Head Quarters which is also the  
District Revenue Headquarters, but not in the far away places  
like Savanur (a Social Forestry Range which has been selected  
for the present study). Forty per cent of the respondents  
pointed out that the publicity given was untimely and

suggested that, wide publicity should be given just before the monsoon season i.e. in the 2nd half of May month.

No doubt, adequate publicity was given around Dharwad city and nearby villages, that is why 15% of the respondents living in neighbouring villages of Dharwad city agreed that, publicity given was not only adequate but knowledgeable, and for 25% respondents that it was timely also.

In contrast to the nature of publicity given in Bijapur and Dharwad districts to promote Social Forestry, North Kanara exhibited different picture. All respondents reported that publicity was given in their areas, and 40% of them also agreed that it was knowledgeable as far as environmental factors were concerned. But, I hope, it would not be out of relevance to mention that, because of many Development Projects implemented and being implemented in the district and, hues and cries raised by many environmentalists and other voluntary organisations, against these big projects and large scale destruction of the virgin forests in Western Ghats, made people aware of various facts about the ecological balance and harmful effects of destruction of forests on large scale. Many agitations were organised and

house to house campaigns were carried out by many environmentalists, including some religious heads. This certainly, might have forced the government to give wide publicity to promote Social Forestry, as an alternative for maintaining ecological balance and probably, also to divert the attention of the people. Thus, the publicity given was adequate for 40% and timely for 75% of the respondents. Sixty per cent of the respondents observed that publicity given was inadequate only, because it gave more importance for planting trees, but not for conservation of the present forest wealth, and it never made mention of reckless and arbitrary decisions of the Government, taken to implement many big projects, submerging thousands of hectares of virgin and rich forest land, which in turn had caused ecological imbalance, not only in the Western Ghats, but in the whole state itself.

The experiences of the above three divisions, amply indicate the necessity for promoting social groups, voluntary organisations and local institutions, to promote a programme like social forestry, which calls for active public participation. Even higher allocations to promote such activities will be able to muster or ensure better final results (Datta and Singh, 1986 and Tewari, 1985).

#### 5.4.3.19 Economic viability of village woodlots

The basic aim of creation of plantations (village woodlots) in revenue waste lands (C and D class lands) and panchayat lands (Gomal lands), plantation under reforestation in degraded forest lands i.e., rehabilitation of degraded forest lands, plantations under Forestry Farming for Rural Poor etc. is to ameliorate the sufferings of the rural poor and landless through supply of fuelwood, fodder, timber, poles and other such daily requirements. Increase in supply of above mentioned forest produce, thus, can meet the basic requirements of the rural population, could generate gainful employment opportunities giving special opportunities to women head loaders, and can also create a self reliant production system, where, villages can actively participate both as "Producers" and "Consumers" (patnaik, 1990).

Therefore, it could be safely assumed that investment in such projects (village woodlots), would change the 'status quo' of the rural poor. Hence, the products originating due to this change are called benefits. However, in this study, non-monetary benefits accrued due to these plantations have not been taken into account. Only the direct benefits in terms of fuelwood, fodder, timber, poles,

fruits etc. obtained from the plantations have been taken into account.

The analysis is in terms of actual cash returns and cash costs. The question of economic significance like optimum density and optimum life span of trees for timber etc. are ignored here. These questions are difficult to answer in social forestry projects with mixed species and where, the trees are mainly raised to support the livelihood of the rural poor.

For the calculation of present values of benefits and costs, a predetermined social discount rate of 10%, has been adopted for the present B-C study (Patnaik, 1990). The discount rate adopted is based on the social opportunity cost on capital investment, which normally varies between 8 to 12 per cent in Indian conditions.

The results indicate that with fairly high B-C ratios, village woodlots are the project which are worth investing in, and are financially viable. Mixed plantations (mixed species) showed higher B-C ratios. For instance the mixed plantations, with species of eucalyptus, acacia, tamarind, sissoo and sirsal, at Mamadapur (I plantation) in Bijapur division, exhibited higher B-C ratios of 12.83,





Photograph 1(a) : A village woodlot in Dharwad division.



Photograph 1(b) : A village woodlot in Bijapur division.



Photograph 1(c) : A village woodlot in North Kanara division.

11.66, 11.55 and 10.5 under different assumptions as it has been presented in the results. This could be attributed to the reasons that, tamarind trees start yielding fruits after 10 years of planting throughout their life span. On an average, a well grown tamarind tree could yield 25 to 50 kg of fruits per annum. However, under social forestry projects, where watch and ward is not so strict, a fairly large quantity of fruits are harvested prematurely and wasted. Then, 'sissoo' timber a timber yielding tree, which has higher demand in the wood market. Therefore, the mixed plantations consisting of timber and fruit yielding trees, exhibited higher B-C ratios than the plantations with fast growing tree species such as eucalyptus, casurina, subabul etc.

However, the II plantation (Dammur) indicated lower B-C ratios of 2.71, 2.47, 2.44 and 2.22 under respective assumptions, than the I plantation, where, some fruit yielding tree species were raised, and also than the other plantations (III, IV, V and VI plantations) with fast growing species. This can be chiefly attributed to poor productivity of the site, where, the plantation has been raised. The ground is rocky with shallow red soils, leading to poor growth of the trees.

The sample plantations raised in Dharwad division (III and IV plantations), consisted mainly fast growing tree species of eucalyptus, casurina and Acacia auriculiformis, and had very small proportion of fruit yielding trees. Due to productive soils and congenial climatic condition, tree growth was observed to be better than that in Bijapur division. Nevertheless, indicated lower B-C ratios in comparison with the I plantation, due to absence of fruit yielding and valuable timber yielding tree species like sissoo.

Fifth and sixth (V and VI) Plantations which were raised in degraded forest lands in North Kanara division, also consisted mainly fast growing commercial trees species of eucalyptus and casurina. Biomass production in North Kanara was observed to be best among all three sample Social Forestry divisions, due to congenial climatic conditions and rich soils.

As it was ascertained by the local people, for whom the plantations were raised, there was no market for the timber produced in these plantations. People never purchased fuelwood, but purchased timber (of teak, acacia, sissoo etc) in small quantities for mainly agricultural implements. The

present system of allowing only one shoot to grow, led to the production of timber and poles only with little loppings. Fuelwood, fodder, timber and poles are not allowed to be collected on daily basis or frequently. Thus, the supply of wood either timber or fuelwood or both, is expected only after felling the trees raised in these plantations, in much contrary to the basic objectives of the Social Forestry project, which was vividly made clear by the local people, who did not derive any assigned benefits, so far from these plantations. Absence of use of fodder yielding species in raising plantations was also conspicuous from all counts.

Especially in North Kanara division, where, rural people could obtain sufficient quantity of fuelwood, fodder, timber and poles from the near by forests and the Soppinabetta lands, the plantations raised under Social Forestry project, have little or no relevance at all.

Therefore, under the existing situation, prices for wood products prevailing in the commercial wood markets, are taken for the above discussed B-C ratio study.

Thus, at this juncture it is cautioned that, the researchers and other concerned people should not mistake the fairly higher B-C ratios for plantation raised (village

woodlots) under Social Forestry project in C and D class lands, Gomal lands and other such lands, for increased supply of daily requirements of fuelwood, fodder, timber, poles etc. to the rural poor.

Therefore, higher B-C ratios of village woodlots, do not necessarily mean that respective local people are enjoying the benefits satisfactorily. No amount of economic and financial analysis would indicate the benefits enjoyed by the local people, under prevailing conditions.

However, the study establishes the financial worthwhileness of plantations (village woodlots) raised under Social Forestry projects, even under fairly rigorous assumptions.

#### 5.4.3.20 Performance of Social Forestry Training Institutions

Two social forestry training institutions were established, one at Kadugodi near Bangalore, and other at Thathihalla in North Kanara district.

In the above mentioned institutions apart from departmental staff motivators, representatives of voluntary organisations, farmers, teachers and others are trained in raising kissan nurseries, raising of block plantations and their management and other aspect of social forestry.

The very basic purpose behind the establishment of these two social forestry training institutions, as it seems, has not been fulfilled. As per the results presented only 36 per cent of the RFOs working under SFP, have been trained in the institutions so far (1990 - 91). About but only 11.5 per cent of the foresters, 27.6 per cent of the forest guards, and only 40 per cent of the motivators in the State have been trained upto 1990 - 91.

Planning and implementation of social forestry is unique when compared to that of other forestry projects, implemented in Territorial Forestry, since Social Forestry involves persons from all sections of the society. For successful implementation of the project, proper understanding and technical skill is very essential. Training of local village leaders, farmers and members of voluntary organisations is very essential. But, unfortunately, a very small number of them have been trained in social forestry aspects. For instance, none of the kissan nursery holders and panchayat members, received training, whom the researcher contacted personally for the purpose of the present study. It is evident from the results that, out of thousands of mandal pradhans and kissan nursery holders just 65 and 47 of them have received training so far,



respectively. It is regrettable that none of the members of hundreds of mahila mandals throughout the State, have been trained in social forestry aspects. This needs urgent corrective measures which otherwise, would undermine the objectives of the social forestry, where women are expected to play important role, as a weaker section of the society. While formulating the Social Forestry Project, much importance was given for the involvement of voluntary organisations, youth mandals and such other organisations, but only 51 and 70 members of voluntary organisations and of youth mandals were trained in social forestry, out of thousands of them in the State, respectively. The lack of training facilities might have affected the social forestry project badly in the State. Training not only provides necessary know-how, but also instills confidence and a sense of belongingness among the participants. Apart from this, none of the higher officials (ACF and above) have been trained in the above mentioned social forestry training institutions, which needs clarification.

Therefore, it seems, there is lack of training facilities in the State in social forestry, which needs to be strengthened for the success of the project.



The National Commission on Agriculture, in its Interim Report (1972) on production forestry and man-made forests, recommended that training in extension methodology and technology should be imparted to selected officers engaged, or to be engaged, in implementing the programme, at various agricultural universities and research institutes, where, a department of extension exists. It also reported that the Agricultural Universities should include, in their syllabi, a course on social forestry for the Agricultural graduates.

#### 5.5 Evaluation of the Forest Development Programmes through proxy variables

##### 5.5.1 Evaluation of the Forest Development Programmes through proxy variables by higher, middle and field level officials

###### 5.5.1.1 Evaluation of impact variables by officials

It is clear that the evaluation made by three different levels of the officials i.e., higher level (D.C.F and above), middle level (ACF and RFO) and field level (below the rank of RFO) differed significantly, as far as Kruskal-wallis statistic (H value) was concerned for all the seven impact variables, as presented in the results, leading to the conclusion that, even though, the three groups of

officials belonged to the same department (Karnataka State Forest Department), did not have uniform and consistent views, about the impact of various Forest Development programmes, including Social Forestry Project.

The above mentioned results could be attributed to the fact that the higher officials (DCF and above) have lost touch with the field reality, as far as the impact of various Forest Development Programmes, including Social Forestry Project was concerned, and they heavily depended on their subordinates and believed their fixed targets and achievements, well on the papers only. This in turn, might be because of the fact that frequent transfers effected in the department, often pre-matured ones, of these higher officials might not have given them enough time to visit far away locations/sites, often inaccessible, especially during rainy season, and supervise at the field level. Similar type of hostile conditions were faced by the middle level officials (ACF and RFO), but not by the field level officials viz., Foresters, Guards etc. whose official jurisdiction was found to be conveniently small, at least to keep them aware of the field reality, unlike in case of higher and middle level officials. Then, these field level staff, under normal conditions as it was observed, were not transferred

frequently resulting them to be more knowledgeable about their localities where they work. In addition too this field level staff usually live nearby the project sites. Therefore, evaluation made by higher and middle level officials differed insignificantly, but evaluation made by higher and middle level officials differed significantly, when compared to that of field level staff, due to the above mentioned reasons, in case of first variable i.e., impact of Regular Forest Development Programmes.

But it was some what interesting to note that, evaluation of impact of Social Forestry Project variable and its related variables ( $V_3, V_4, V_5$  and  $V_6$ ) by higher and field level staff differed significantly at 0.05 level of significance. This obviously leads to the conclusion, often expressed by many researchers that, higher officials due to the earlier mentioned reasons and/or the other reasons, do not visit far away localities/sites wherever the project has been implemented, and most of the times go by their official documents and versions, rather than by the existing field reality.

Unlike in case of Regular Forest Department, the evaluation made by middle level and field level staff

differed insignificantly for variables  $V_2$ ,  $V_3$ ,  $V_4$  and  $V_5$ , which could be attributed to the fact that, most of the areas/sites are situated amidst dense forests, making them more inaccessible, when compared to the sites/localities under Social Forestry Projects wherein, they are situated mostly near by the villages/towns. But significant difference evaluation made by the three groups of staff existed in case of the variable, 'Adoption of Farm Forestry by the farmers'. This could be justified by the fact that, majority of the higher and middle level officials were more enthusiastic in visiting easily accessible, often roadside, village woodlots and Kissan Nurseries than, often far away and isolated farmers' fields, often without proper accessibility by vehicles.

#### 5.5.1.2 Evaluation of Technical feasibility and Problem variables by officials

When the opinions of three classes of officials were sought regarding the technical feasibility of Regular Forest Development Programmes ( $V_8$ ) viz., Teak plantations, match wood plantations, cashew plantations, sandal regeneration/intensive cultivation of sandal, fuel wood plantations, soil and water conservation, tending in ever green forests, fire tracing, fencing, sub-component plan for

SC people, and communication and building, all the three classes with common 'H' value, differed by their opinions significantly among each other. The probable reason for this significant difference of opinions was mainly due to the fact that, only higher officials (in most of the cases) were responsible and involved in working out the technical feasibility aspects of various programmes eg. teak plantations, match wood plantations etc. which were in many cases worked by previous officials, including many British, serving during the pre-independence period. This process is more static with minor changes even over longer periods of many decades. Many a times, technical feasibility of mono culture plantations is being continued with varied success. In most of the cases, as it was expressed by middle level and field officials, they were kept out of this field. However, Assistant Conservators of forests of I.F.S. cadre, were involved to some extent in this process and many non-I.F.S ACFs were only aware of the technical feasibility aspect. Most of the field level staff, even could not understand the concept of technical feasibility aspect. Thus, their opinions differed significantly.

As it is mentioned in the results chapter that, in case of variable ( $V_p$ ) related to the technical feasibility

aspect of Social Forestry Project, overall difference in the evaluation made by the three classes of officials was significant, but whereas, difference between the middle and field level classes was observed to be insignificant.

Before going into the details for discussion purpose, it would not be out of context or relevance to mention briefly, the technical functions of officers of various levels, which would be of great help in understanding and discussing the opinions of officials of the given three classes.

#### Additional Chief Conservator of Forests (S.F)

1. Is the authority to issue guidelines for all works and the authority to sanction annual plan of operations for all works in which technicalities are involved,
2. he is the authority to approve all research and training programmes,
3. monitoring and evaluation cell, communication and publicity and extension units will work under his over all control and guidance.

#### Conservator of Forests (S.F)

1. He is responsible for giving the necessary technical advise and guidance to the D.C.Fs regarding project works,

2. he has to coordinate and consolidate annual plan of operations of all the divisions and submit the same to the ACCF (S.F) well in advance every year for approval,
3. monitoring evaluation, communication and extension, checking and maintenance of the quality of work is the responsibility of Conservator of Forests (S.F).

#### **Deputy Conservator of Forests (S.F)**

He, being the head of a Social Forestry Division, he holds a key position as far as execution of works is concerned in the division. The responsibility obtaining feed back of supply-demand position and to asses the needs of the local community and to plan the project work on this information, is on his shoulders, He is required to submit, after vetting to the Conservator of Forests, all data of his division required by the monitoring and evaluation cell as and when required.

Similarly, the ACFs and RFOs are responsible for planning, execution, monitoring and evaluation, checking and maintenance of work in their respective jurisdictions.

#### **Extension Range Officers**

He is in charge of extensive activities in his jurisdiction. He shall work directly under the jurisdictional DC.F and AC.F, whenever the post exists.

**Forester**

Being a hobli level officer, he is responsible to the respective RFO and will assist him in the execution of all the works.

**Foresters-cum Surveyors**

Shall carry out the survey and prepare maps/sketches of nurseries and plantations as per the directions of the higher officers.

**Extension Forester**

He works under the guidance of the RFO (extension) and assists in all publicity and extension activities.

**Forest Extension workers**

They are the contact men between the department and the people at the grass roots level. They help the RFOs and Foresters in micro planning, in passing on technical know-how to the motivators for transmitting to the farmers, in conducting publicity campaigns, in raising nurseries, creation of plantations and in free distribution of seedlings. They are responsible to supervise the work of the motivators.

**Motivators**

They are responsible for the above mentioned functions in their jurisdictions. They are expected to do



all types of groundwork for the successful implementation of the project.

From the results it could be made out that the views of higher and middle level and higher and field level officials differ significantly, which was not the case between the middle level and field level officials. This phenomenon, could again, due to similarities existing and other obvious reasons, as it was expressed while discussing the opinions of officials on technical feasibility of Regular Forest Development Programmes, be attributed to the same reasons, in the case of the variable ( $V_9$ ) i.e., technical feasibility of Social Forestry Programmes.

The opinions of officials also differed significantly on the hypothetical problems faced by them, in promotion of Decentralised nursery schemes ( $V_{10}$ ) such as people are not interested, no cooperation from the local elected bodies etc. The average scores obtained by the field level personnel were in fact highest followed by that obtained by middle and higher class personnel. This was due to the fact that, higher scores indicated more number of problems faced. This clearly showed that higher officials, working at the Divisional/district levels, were more idealistic than

realistic in their approach i.e., many ground realities escaped their attention. But the middle and field class officials, who worked at field level, certainly had close encounters with the problems. Higher officials, as it was expressed by one of the three DCFs (S.F), with whom the researcher had in depth discussion on Social Forestry Project, that most of the times did not take up extensive tours in their areas. Often, as it was expressed by some of the officials, for higher officials of I.F.S. cadre and even for ACFs belonging to state cadre, Social Forestry wing was not as attractive as that of the regular/territorial forestry wing. This attitude of higher officials towards Social Forestry wing, might be because of the fact that, in implementation of Social Forestry Project clashes with local and regional political interests were, often unavoidable. According to a D.C.F. (S.F), who was frank enough to complain about the repeated political interferences in establishing the village woodlots, roadside plantations etc. and confessed that, many a times officials had to yield to the political pressures, undermining their own technical expertisation acquired through advanced trainings. This certainly, had a negative impact on the successful implementation of the whole Social Forestry Project, which would again be criticised by

the same political interests, by passing the blames on the officials.

The above made discussion equally holds good for the opinions of officials on variable ( $V_{13}$ ) i.e., "problems in establishing plantations in C and D class lands".

The problems faced by the officials in adoption of farm forestry ( $V_{11}$ ) and in establishing village woodlots ( $V_{12}$ ), which are in the form of constraints rather than in the form of problems, were not only few but lesser in magnitude also, which was indicated by the lower scores obtained by the three respective classes of officials. It is important to note that, in contrast to the results obtained in case of all other variables, the opinions of officials did not differ significantly between and among themselves. The observed 'H' value (Kruskal-wallis statistic) was not significant leading to acceptance of the null hypothesis ( $H_0$ ) i.e., there was no difference in the evaluation made by the three classes of officials, in both the variables ( $V_{11}$  and  $V_{12}$ ). This could be attributed to the reason that, most of the problems/constraints considered for the study (in  $V_{11}$  and  $V_{12}$ ) were not only hypothetical but, were misconceptions and myths, that prevailed in the rural (farming community)

communities, which could not be proved/established scientifically.

Difference of opinions of officials on the variable ( $V_{13}$ ) i.e., problems in establishing plantations in C and D class lands, was found to be significant between the higher and field level officials, only. A keen observation of the attitudes and line of thinking adopted by the field level personnel, at the time of personal interview, has led to the conclusion that, the views of these personnel necessarily stemmed from their frustration over lack of infrastructure facilities, higher magnitude of work, inadequate incentives and indifferent attitude of many a higher officials and law makers, which calls for immediate attention for successful implementation of Social Forestry Project.

The above made discussion, very much holds good for the results obtained for variables  $V_{14}$ ,  $V_{15}$ ,  $V_{16}$  and  $V_{17}$ , i.e., reasons for high mortality rate of seedlings, problems in raising kissan nursery, problems in distribution (freely) of seedlings, and problems in lifting the freely distributed seedlings.

According to the approach adopted for the achievement of various objectives of Social Forestry Project,

involvement of various organisations/departments, people's representatives, local people and others was thought to be very essential. But the ground realities appeared to be deviating from this principle. The analysis of the opinions of officials implied that the difference in the evaluation made by them was significant, (for variables  $V_{18}$ ,  $V_{19}$ ,  $V_{20}$ ,  $V_{21}$  and  $V_{22}$ ) as indicated in the results.

The higher scores obtained by the higher level officials indicated that they were too idealistic, and in a habit of turning a blind eye towards this aspect on one or the other pretext and even arguing that the involvement of various agencies/people would upset the planning and implementation of various components of the project. However, they (higher officials) could obtain higher scores by stressing the point that members of local elected bodies, other Government and non-government organisations were involved, wherever necessary. But the middle level and field level officials, who revealed that, they would not bother much about involvement of others in the process. For instance, Village Forest Committees have been formed very recently and even in many ranges they have not been yet. Then again, many village woodlots have not been handed over to the local bodies (village panchayats/mandal panchayats),

because of absence of effective steps by the both Forest and Revenue departments, which has in turn made the mockery of the whole Social Forestry Project, which heavily depends upon the involvement of local people.

The number and extent of problems encountered by the officials in implementation of Forest development programmes ( $V_{31}$ ) including the Social Forestry Project, varied for different classes of officials, significantly. The opinions of higher and middle class officials did not differ significantly, but in other combinations (higher & lower and middle & lower) it did. This could be, probably attributed to the practice existing in almost all Government departments that, higher officials depend heavily on their subordinates for the implementation of programmes, where the State Forest Department is not an exception. Of course, this was not true, wherever, the higher ups were more enthusiastic and result oriented. The field level staff who work at field level are expected to face many problems, often in the absence of proper cooperation and coordination within or outside the organisation. They often had to depend heavily on many decisions, which need urgent attention. thus, the problems faced by the field level staff were not only more in number but in magnitude also. Therefore, difference of

opinions of field level staff was significant with that of higher and middle level officials.

All the officials belonging to the higher, middle and field levels believed that, education and training to officials and policy makers, would help in the successful implementation of the programmes.

#### 5.5.1.3 Evaluation of Communication and Coordination variables by officials

It could be easily observed that a definite trend of results for two sets of variables related to communication and coordination in Social Forestry Project and Regular Forest Department ( $V_{23}$ ,  $V_{24}$ ,  $V_{25}$ ,  $V_{26}$ ,  $V_{27}$ ,  $V_{28}$ ,  $V_{29}$  and  $V_{30}$ ), emerged from the analysis. That is, for Social Forestry related variables ( $V_{23}$ ,  $V_{24}$ ,  $V_{25}$  and  $V_{26}$ ) the difference of opinion was found to be insignificant only between the higher and middle level officials, but not in other two combinations i.e., 1 & 3 and 2 & 3. Whereas in case of variables related to the Regular Forestry Department ( $V_{28}$ ,  $V_{29}$ , and  $V_{30}$ ) except for the variable  $V_{27}$  the difference between higher and field level officials was significant.

Due to its some what different organisational setup and mostly Social Forestry Project is being implemented in

localities near by villages/towns/cities, communication is not a major hurdle. Then again, officials (working under Social Forestry Project) are placed at the Revenue Head quarters, which have better chance and infrastructure for good communication and coordination, both within Social Forestry wing as well as with other departments/organisations, which are often working at the revenue head quarters. But, good communication and coordination is hampered between field level officials (Foresters, motivators etc) and other two levels of officials (higher and middle), mainly because these officials (field level) are mostly working in far away villages often remote, without good communication facilities. Another communication facility which promotes good communication and coordination among officials is the existence of wireless network provided for the management of Regular/Territorial Forest Department. Such facilities are almost non existence in management of Social Forestry. Thus, communication in the Regular Forestry Department was not a problem, as it was implied by the insignificant difference evaluation made by the three levels of officials, however, due to want of more extensive network of such communication facilities, both in case of Social Forestry and Regular Forestry wings, the overall difference



was observed to be significant. Nevertheless, due to some operational difficulties good coordination was a vogue, as it was expressed by field level officials working in both the wings of the Forest Department and with other organisations, which was expressed by all three levels of officials.

#### 5.5.2 Evaluation of Forest Development Programmes by officials, policy makers and beneficiaries through proxy variables

##### 5.5.2.1 Evaluation of Impact variables by officials, policy makers and beneficiaries

As it has been already made clear that the policy makers considered for the present study, even though not involved directly, could influence indirectly as peoples' representatives through legislation. Therefore, they were contacted personally to evaluate the various forest development programmes implemented in the natural forests. Their evaluation indicated that the impact of these works was only to some extent. The officials, who scored almost double than the policy makers (7.51 out of 8), were of view that the impact in terms of reduced biotic pressure on the existing forests, increase in the area under forests, efficient management of natural resources and effective regeneration of degraded forests, was to a great extent. But after comparing

and contesting the opinions of officials and policy makers it could, however, be concluded that according to most of the policy makers the developmental activities carried out by the Forest Department were just an 'eyewash' and was an effort to convince the people and environmentalists, who were much concerned about the loss of vast areas of rich natural forests, due to implementation of many developmental works, in the State. On the other hand, officials were also not exceptional to the idea that their efforts had met with a greater success, in saving the forests. But, in fact, as it was opined these efforts made by the Forest Department neither could increase the total forest area nor could match the increasing biotic pressure on the existing forests to a greater extent. The officials did not take the ever increasing biotic pressure, population, vast areas of natural forests being either submerged or cut, due to many developmental works into consideration, which could make mockery of their opinions, driving home the point that the impact of Regular Forest Development Programmes is to a greater extent. Thus, both sets of opinions of officials and policy makers did not give the correct picture of impact of Regular Forest Development Programmes.

Opinions of officials, policy makers and beneficiaries gave some what different impression of the impact of Social Forestry Project ( $V_2$ ). In general officials believe that, the different components of the project have made a point in meeting the fuel wood, fodder, poles, timber etc. of the rural people and increased area under tree cover considerably. But the policy makers, who were also involved to some extent in the policy making process in their respective areas, felt that the impact was not that much which could be said to be of 'greater extent '. It was also their opinion that size of village woodlots was not sufficient to meet even the local needs.

The beneficiaries, whose opinions did not differ significantly with those of policy makers, opined that the impact of Social Forestry Project was not substantial for a villager apart from the fact that, virtually there was no impact on the rural people, wherever the plantations had not been established. Many of them even expressed during the survey that, the benefits were being cornered by few farmers. This concern of the respondents could well be supported by a report of 'Centre for Science and Environment '(Anon. 1986), that, though the planting activity under various components of Social Forestry has on the whole been satisfactory, the

programme has failed to achieve its broader objectives on three counts:

- It has subsidised the rich farmers.
- It has not produced wide ranging social and environmental benefits.
- In some cases it has worsened the position of the poor.

Because tree planting could be an attractive financial proposition where there is better market for wood. It is also said that, the initial success of the social forestry in Gujarat, U.P., Haryana and Punjab was because of the good response from medium farmers (with more than two hectares) and large farmers (with more than four hectares), coupled with the rising price of wood.

The failure of social forestry to fulfill the basic needs of the poor was highlighted by a study in Kolar district, Karnataka, that although the social forestry programme was expected to make a variety of tree species available to rural communities, the only seedling that the Forest Department liberally distributed was that of Eucalyptus, a tree which hardly fulfills the objectives of Social Forestry (Anon. 1982). It is also reported that, Eucalyptus was in great demand from the pulp and rayon

industry. Mills in Karnataka were prepared to make advance payments every year to the growers, until harvesting of the trees. The prices offered were high. One acre of Eucalyptus, when ready for felling could fetch up to Rs. 50,000. Moreover, since it is not a fodder yielding tree and its leaves are not relished by cattle and even by sheep and goats. As a result many farmers, particularly in Karnataka, have started growing Eucalyptus, instead of food crops.

The term 'Social Forestry', is loosely interpreted (Nadakarni et al 1992) in official parlance to include both community forestry on common lands and farm forestry on private holdings. Strictly speaking, the latter cannot be considered as Social Forestry, since it is undertaken mainly with the motive of making private profits by meeting the needs of the markets. This means meeting the needs of industry for raw material and of urban buyers for fire wood, timber, poles etc. but not local needs outside the market process.

It is also often said that even the Social Forestry components of raising plantations in gomal lands and C and D class lands had often been timber oriented, and proposed to sell part of the timber at profit in the market to provide

some income to village panchayats, and to enable the Forest Department to recover its initial investment and costs, though of late, attention has been paid to raise mixed species in order to meet the local needs of fodder, poles etc.

Most of the village woodlots raised under Social Forestry programme were not able to meet demand for any of the fuel wood, fodder, timber and poles of the respective village population effectively. There are very few woodlots in the rural areas. Thus, it would not be exaggerated if it is said that woodlots have become just symbolic in nature and extent.

The field situation, in comparison to that depicted by the three groups of respondents, was much closer to that depicted by the policy makers and beneficiaries. The reason which could be attributed here is that, number and size of village woodlots were meager when compared to the magnitude of the needs of the rural people. Moreover, the village woodlots, road plantations, kissan nurseries and other components of the Social Forestry Project, were not well conceived, planned and implemented, which called for an immediate corrective measures from all quarters.

Impact of village woodlots ( $V_g$ ), as it was expressed by the three groups of respondents, was not much, but only to some extent. The opinions of the three groups differed significantly, nevertheless, the scores obtained by each group made it clear that, the impact of village woodlots was not to the greater extent. The reasons which are attributed for no greater impact of Social Forestry Project could also be attributed for 'some what' impact of the village woodlots (this is only in the villages where woodlots have been raised).

The views of officials and policy makers on the variable 'kissan nursery Vs employment and income of the beneficiaries' were similar, but differed significantly in statistical terms, if not in absolute terms. This might be due to a common tendency among the beneficiaries that, they often, if not always, had a tendency to undermine their personal benefits derived out of the projects/programmes implemented by the Government agencies. As it has already been made clear that, kissan nurseries had provided an opportunity to the beneficiaries for better utilization of their leisure time and to increase their income substantially.

The policymakers' group scored least (3.73 out of maximum 16) among the three groups, in evaluation of adoption of farm forestry. The probable reason for this could be attributed to the fact that, the policy makers considered for this study were not involved as far as farm forestry was concerned, where the individual farmer was the final decision maker. Better scores were obtained by individual policy makers who incidentally happened to be the beneficiaries under farm forestry component. The lower scores obtained by the beneficiaries in comparison to that scored by the officials, might be due to the reason that, the farmers did not, in many cases, bothered to assess the impact on scientific basis, which might have led to the undermining the impact of adoption of farm forestry. Due to adoption of farm forestry no change in cropping pattern of beneficiaries was observed. This is mainly attributed to the fact that, most of the beneficiaries planted trees in permanent wastes, farm bunds, farm boundaries, back yards and front yards. Thus, this neither changed the cropping pattern nor reduced the total cultivated area. Then again, none of the respondents planted trees to check soil and water erosion. Therefore, these factors might have lowered the scores obtained by individual respondents, leading the evaluation indicating



lesser impact of adoption of farm forestry. However, as it was observed during the field visits, impact was good in irrigated lands, but poor in dry lands, especially in Bijapur Social Forestry division. As usually, the officials stuck to their documents rather than to the ground reality existing, which should be avoided for the better success of Social Forestry Project.

Development of infrastructural facilities had showed some impact on the labour force through creating more employment opportunities. This was true especially with the Regular Forest Development Programmes, even though they failed to provide employment opportunities throughout the year. The policy makers could observe some impact of development of infrastructural facilities on employment and income of local people. The opinions of the three groups, however, differed significantly from each other.

#### 5.5.2.2 Evaluation of Technical feasibility variables, Problem variables, and other variables through proxy variables by officials, policy makers and beneficiaries

In the background of establishment of elected local bodies viz., mandal panchayats, taluka panchayat committees and Zilla parishads, with wide ranging powers over the

matters concerned to their areas, it was thought better to contact members and office bearers of these elected bodies, for evaluation of Forest Development Programmes with the help of proxy variables. It is essential to mention here that, the above mentioned policymakers (elected representatives), had no direct roles whatsoever, in formulating policies for implementation of the Regular Forest Development Programmes, even if they were implemented in their areas. But as it has been made clear that, these policy makers being representatives of the people in the respective areas with good feedback on the impact of the programmes implemented in their jurisdiction, could influence the decisions/policies of the Government through legislation and/or making use of their political connections. They could also act as mouth piece of the intended beneficiaries of the programmes

Most of the policy makers argued that, it was better to leave the nature alone to regenerate and conserve the forest wealth and human interference would be detrimental to the maintenance of ecological balance.

Scientific forestry in India has meant raising trees in order to get sustained yields of timber for commercial purposes (Saxena, 1992). Right from the first

plan in 1952, emphasis was laid on the conversion of low value mixed forests into high value mono culture plantations of commercial species like teak, eucalyptus and bamboo. This practice deprived millions of people of their livelihood. The neglect of peoples' demands during 1960-80 exacerbated biotic pressure, making the regeneration of natural forests even more difficult.

The scientific forest management in India, as Dr. Madhav Gadgil, a well known environmentalist (Madhav Gadgil, 1992) put it, was largely shaped and wholly administered by a tightly knit bureaucracy, which claims to manage the forest wealth in the broad national interest on a scientific basis. But the national interest is largely equated to the short term commercial interests of a narrow segment of Indian society, which he called it - the omnivores. Commercial tree felling and the raising of mono culture plantations like teak plantations, match wood plantations, cashew plantations, fuel wood plantations etc. so widely prevalent in the past, was most incompatible with the ecological function of natural biological communities. These should therefore be stopped gradually, out of all public land especially in reserved forests.

Many environmentalists and researchers have severely criticised the scientific forest management adopted by the Forest Department, by calling it dubious one. They blamed the Government for converting a diverse forest eco-system into a single species "timber mine". At this juncture, to evaluate the technical feasibility of various forest development programmes implemented by the State Forest Department, it would not be out of context to discuss the nature of tropical forests of the Western Ghats.

The tropical forests of the Western Ghats represent one of the most diverse, fragile and complex eco-systems in the world (Panduranga Hegde, 1993). A large number of species of flora and fauna are found in these forests. It is very difficult to assess the damage, caused by human interference in the form of forest development programmes, to the symbiotic relationship existing between hundreds of species of flora and fauna. By felling a matured tree in thick forests, many more plants and other trees forming the second story of the multistory vegetative growth in the thick ever green forests, thus causing an immense loss to the diverse forest ecosystem.

The present practice of raising mono culture plantations after clear felling the forests, has its origin



Photograph 3 : A mono culture teak plantation raised by the Karnataka State Forest Department after clear felling the natural forests in Kanara Forest circle.



Photograph 4 : A fuelwood and miscellaneous species plantation raised by the Karnataka State Forest Department in Kanara Forest circle.

in the colonial forest policy adopted by the British rulers. The environmentalists and local people (in Western Ghats region) pointed it out that the destruction of the ecosystem of the Western Ghats started with the colonial policy, in the pretext of encouraging scientific forest management.

The British saw income earning prospects through exploitation of some valuable species found there. Large tracks of dense tropical forests were clear felled and teak plantations established in their stead. Apart from this, to establish tea and coffee estates, vast areas of evergreen forests were clear felled, especially in Kodagu (Coorg), Hassan and Chikmagalore districts. This forest policy adopted by the British Government in India during the colonial rule, and continued by the subsequent Indian Governments till recent times, which was motivated by commercial interests, and diversion of forest lands for non-forest purposes has caused an immense damaged to the diverse and fragile eco-system of the Western Ghats.

Many large scale wood based industries like paper mills, plywood factories etc. were given many concessions and were allowed to exploit the forest produce at highly subsidised rates, leading to over exploitation and gradual

decimation of the forest cover of the State in particular, and of the Country in general.

The technologies adopted by many of the temperate countries, especially by European countries, for the development and utilisation of their forest wealth, were blindly adopted by the Indian Government. For instance, even today, many higher forest officials and scientists are sent to European and other Western countries for higher education and training in scientific forest management. This technology adopted for management of temperate forests (single species forests) was of no relevance for the management of tropical forests, with wide diversity, hence, has become counter productive. Of late, in recent years, the policy makers have begun to understand the inherited lacunae in the commercial oriented forest policy and are attempting to understand the interlinkages existing in the eco-system of tropical forests.

The Forest Policy adopted so far, considered timber as the only major forest produce, which was commercially valuable, but not other non-timber products, which are major in the views of the forest dwellers and other common people. More emphasis had been given for harvesting of timber and

raising commercially valuable trees like teak, bamboo, cashew etc.

Many research studies conducted on cane (bamboo) have revealed that it was very difficult and a slow process to regenerate it by human efforts. Similarly, hundreds of species of medicinal trees and herbs found in tropical forests of Western Ghats, are invaluable in terms of their medicinal qualities and genetic diversity, were neglected largely by subsequent forest policies. However it could be concluded that, commercial tree felling and the raising of monoculture plantations, so widely prevalent in the past, were most incompatible with the ecological function of natural biological communities (Madhav Gadgil and Ramachandra Ghua, 1992).

Thus in total, according to the policy makers, considered for the present study, many forest development programmes were not technically feasible and sound, which is confirmed by the above made discussion.

However, many of them approved 'to some extent', the technology adopted by the Forest Department on one or the other reasons. The officials strongly defended the technical feasibility of the Forest Development Programmes on the basis



that, technology had been developed out of the many in depth and prolonged research studies on scientific basis. Quoting the examples of many developed countries like Japan, America, Australia, Canada, Russia etc. they further opined that, the scientific management of forests was very essential not only to conserve and increase the area under forests, but also to increase their productivity, under the present circumstances of fast dwindling forest wealth, ever increasing demand for various wood products and need to maintain ecological balance, for the very survival of the life on this planet.

Technical feasibility of the Social Forestry Project ( $V_p$ ), quite naturally, attracted many sharp reactions from different quarters of policy makers and beneficiaries. But the officials almost accepted the technical feasibility aspect without hesitation, in spite of many criticisms from different social groups. The beneficiaries, who scored least (7.96 out of 14), attacked the technical feasibility of the Social Forestry Project arguing that, many of the tree species being grown under Social Forestry were not multipurpose, trees but could produce timber for many wood based industries like paper industry, rayon industry etc. For instance, to confirm the views of the beneficiaries, the Forest Department's present management of village woodlots

and other plantations raised under Social Forestry, seemed to be oriented towards timber extraction and hence only one shoot is allowed to grow (Saxena, 1992). With this type of management of village woodlots, the people will get fuel wood only after felling the matured trees, i.e., after waiting a period of a decade or more, which defeated the very purpose of raising village woodlots to meet the fuel wood and other requirements of the people. Therefore, many shoots should be allowed to grow, which could be pruned occasionally to get fuel wood and fodder, and to maximise the biomass. Moreover many of the tree species, for example Eucalyptus, Casurina etc. do not yield any fodder but yield only timber and poles mainly used by paper and Rayon industries. Therefore, these lacunae should be removed by growing grasses, shrubs and bushes to yield fodder as well as fuel wood in the shortest possible time.

The lack of correspondence between the implementing agency and the beneficiaries, largely led the beneficiaries to conclude that, the Government was not acting in their interests, despite claims to the contrary. It was also blamed that size and number of village woodlots was not only insufficient to meet the local needs, but the species mix was also not desirable keeping the needs of local people in mind.

But, the beneficiaries too, agreed with the technical feasibility of kissan nurseries scheme, free distribution of seedlings and other components of the project. Contrary to this, the villagers in Rajasthan (Reeta Brar, 1992), pointed out that the indigenous flora could be propagated by vegetative means or by seeds, that were easily available in the villages themselves. The various native grasses and herbs that offered green pasturage at different points of calendar, too had not been considered, by the Government under Social Forestry Programmes. The Government, on the contrary spent a lot of money in raising of seedlings in nurseries and transporting them to afforestation sites.

During the course of study, it could be observed in many villages of Bijapur division (SF) that, the native multipurpose tree species like Ficus bengalensis, Ficus religiosa etc. are propagated widely by vegetative methods by planting large branches of such trees in the place of choice, resulting in a growth of a matured tree within a short period of few years. Other multipurpose tree species like Tamarindus indica (Tamarindus), Acacia nilotica, ber, Azadiricta indica (Neem) etc. are propagated by dibbling seeds on roadsides, field bunds and other places of choice. However, the effort of the Social Forestry wing of the

Forest Department to raise and distribute seedlings free of cost, was commendable.

The preference for angle-iron and barbed wire fencing, too, was seen as facilitating the interests of the sellers. From villagers' point of view, tree guards of local material were adequate to protect newly sprouted or planted saplings. At the same time, as it was argued, the pasturage was utilisable and the protected trees disbursed over a significant expanse of land. The Government, by contrast, undertook strip plantations and spent a high proportion of its forestry budget on fencing, even though indigenous fencing materials were available and villagers had a wealth of know-how on the construction of fences and tree guards.

Arguments of policy makers were almost on the lines of argument of beneficiaries, but they approved the technical feasibility of Social Forestry Project to a greater extent, with a mean score of 10.53 out of 14. Perhaps this might be due to the reason that they were also involved in the decision making process to some extent.

The officials experienced few problems in promotion of the Decentralised Nursery Scheme ( $V_{10}$ ), which is indicated by lower scores obtained by them (7.22 out of 22) than the

other two groups of respondents. Beneficiaries claimed that, they faced more problems than the officials and policy makers.

The officials mainly complained that, people were not interested, local bodies were not cooperating well, voluntary organisations did not play their role as it was expected and lack of irrigation facilities discouraged many interested people, organisations and institutions from taking up plantations. But the policy makers and beneficiaries ignoring the officials' views pointed out that, scheme was not attractive, raising of nursery affects the management of other farm activities by consuming lot of time and requiring skillful management continuously, lot of risk was involved and lack of adequate extension programmes/activities from the Forest Department, among other things.

Thus, a conclusion based on the opinions of the three groups of respondents could be drawn is that, there was lack of common understanding and mutual trust among three groups of respondents. The Forest Department should have given more attention towards clearing some misunderstandings/doubts, deep rooted among the policy makers and beneficiaries, by taking up active publicity campaigns

through arranging film shows, exhibiting posters, conducting mass contact meetings at village levels and the meetings of policy makers time to time.

All policy makers and beneficiaries were one to point out that, they never came across the film shows and mass contact meetings at village levels or at town levels for promotion of Social Forestry, Therefore, it would be better to strengthen the publicity machinery of the Social Forestry wing involving all sections of the society.

It was heartening to mention here that, none of the groups of the respondents scored more than one third of the maximum score (22) for the variable ( $V_{11}$ ) 'problems in adoption of farm forestry', where, higher scores meant more problems faced. Nevertheless, the views of officials deviated significantly from those of the other two groups. This could indicate that, officials need to establish close contact with members of other two groups, to find out the exact problems faced in adoption of farm forestry. Non-congenial climatic conditions and absence of assured wood markets, were the two important constraints highlighted by the officials.

The main focus of the farm forestry was to generate biomass for various uses viz., firewood, timber,

fodder and fruits (Kareemulla et al, 1992). The intensive cultivation of trees brought in the commercial dimension necessitating the market infrastructure for the farm forestry sector. Marketing of farm forestry produce, unlike other agricultural produce, involved peculiar problems. The bulky nature and distant location of consumption centers (wood based industries) called for unique methods of marketing.

Due to promotion of Social Forestry, especially the farm forestry component of it, a silent green revolution has taken place in India (Anon. 1982). Farm forestry in Karnataka has achieved a dramatic success in Southern parts of the country resulting in the glut in the industrial wood market. Market structure for timber and poles in the State was not an organised one, with many uncertainties, therefore, there was some concern that the existing marketing structure might fail to protect vulnerable smaller farmers with little experience. This is in confirmity of the apprehensions of many beneficiaries as well as of officials.

Whereas, the policy makers (who were also farmers by profession) and beneficiaries felt that, trees would harbour large number of birds, planting of trees on common bunds would invite boundary disputes, it was difficult to

protect trees (especially saplings) from stray cattle, sheep etc. and from possible thefts, and legal problems while harvesting. They, however, in contrast to the official version, were optimistic about the climatic conditions. However, all the groups agreed that, a lot of marginal and submarginal land could be utilised by taking plantations. This changed attitude of the rural people could indicate that, they too had become aware of the necessity of efficient land utilization and management, and tree conscious to some extent, which should be harnessed by the Forest Department to promote Social Forestry effectively.

Problems mentioned by the three groups of the respondents, in establishing village woodlots ( $V_{12}$ ) and plantations in C and D class lands, were not only multifaceted but also similar, more or less, in nature and magnitude.

The officials laid more emphasis on stressing the points that, most of the suitable land had already been encroached, political interference and unsuitable climatic conditions, among other things. Even when the political will was there and the funds were allocated, implementing a large scale afforestation campaign, was an unexpectedly complex



and difficult process (Erik Eckholm, 1975). Planting millions of trees and successfully nurturing them to maturity was not a technically clear task like building a dam or a chemical fertilizer plant. Tree planting projects almost always became enmeshed in the political, cultural and administrative tangles of a rural locality. They were touched upon and influenced by the daily living habits of people, and the village politics could undermine a programme as well.

But, on the other hand, the villagers and other beneficiaries and the policy makers, even though their opinions differed significantly (statistically), stressed the point that, size and number of village woodlots and tree species, would not be able to meet the requirements of the entire population of the respective village and the benefits would mostly be cornered by few influential ones. They sarcastically pointed out that, the village woodlots were one of the eye washing gimmicks of the Government and were only symbolic in their gesture. The situation, thus called for a thorough review of means and goals of establishing village woodlots and establishing plantations in C and D class lands.

The reasons claimed by the three groups for high mortality rate of seedlings ( $V_{14}$ ), were more or less similar,

nevertheless differed significantly (statistically) between groups of officials and policy makers, and policy makers and beneficiaries. The results could be attributed to some of the most common constraints (problems) in achieving high rate of survival of saplings planted in field conditions viz, non congenial climatic conditions, poor soil, lack of irrigation facilities, uncontrolled grazing etc. Reasons of poor quality seedlings, pests and diseases and mismanagement were not endorsed by any of the respondents belonging to any of the three groups considered for the study. The problems were of serious proportion in Bijapur and Dharwad Divisions rather than in North Kanara division. Many of the policy makers contacted, had irrigational facilities and hence, might not have given more emphasis for the problem of lack of irrigation facilities leading to high mortality rate of seedlings. This perhaps, resulted in their opinions differing significantly from the other two groups. However, in general, all the three groups had similar views on the reasons for high mortality rate of seedlings.

Successful raising of kissan nurseries ( $V_{15}$ ) also posed many problems for officials, policy makers and the beneficiaries, which varied in nature and magnitude. Officials complained that, beneficiaries did not attach much

importance for the better quality sand, soil and manure, as ingredients for filling up of polythene bags to raise seedlings, which could result in poor quality seedlings. Lack of irrigation facilities hindered the better management of nurseries, since nurseries were raised, almost in summer season, beginning in the month of December or January. These views of the officials were also shared by the policy makers, without any significant difference. But, beneficiaries, raised many problems being faced by them viz, legal delay in sanctioning nurseries, inputs were not supplied in time, seedlings were not lifted at once, even the payments for delivered seedlings were not paid properly etc. However, after careful analysis of the opinions and the actual facts, officials' and policymakers' views could be better justified than those of the beneficiaries. Because, even under normal working conditions, some delay in sanctioning the nursery was inevitable and also unavoidable for better management and control over the working system adopted. While pointing it out that inputs were not supplied in time, beneficiaries failed to understand that, here, inputs meant only polythene bags and seeds, which were supplied by the Forest Department. There was as such no delay in their distribution, which could affect the successful raising of seedlings under kisan

nursery scheme. Blame for unsuccessful raising of kissan nursery, could well be passed on to the beneficiaries rather than on officials and policy makers. This was for the simplest reason that, it is a growing tendency among the people, to which the beneficiaries considered here were not exceptional that, all the programmes/schemes/projects implemented by the Government were just politically motivated gimmicks and thus did not require much emphasis. Loss to the Government was not considered as loss to themselves, by most of the people. Thus beneficiaries often blamed the official machinery only to undermine some of their own failures.

Officials, when interviewed to evaluate the problems faced by them in free distribution of seedlings (V<sub>16</sub>), confirmed that, even though lakhs of seedlings were raised and made available at free of cost to the public, people simply ignored the importance of planting trees and were not prepared to take any sort of trouble to lift the seedlings and plant in place of their choice. One of the Deputy Conservators of Forests gave an instance where, out of 15 lakh seedlings raised in the Department nursery, they could distribute only around eight lakh seedlings. This was only because of the "who bothers ?" attitude of the people, he added further. They also did not agree that the number of

seedlings, fixed for free distribution per family was inadequate. They pointed out that, the people failed to lift and plant even the allotted 50 seedlings. On demand and based on situation, the Department distributed more than 50 seedlings per family, only not to dampen the interest and well being of the people in general. Some of the officials were indeed frank enough to express that, many of the Foresters, Motivators and other Staff belonging to the extension wing, were not carrying out their duties properly, which in turn affected the distribution of seedlings. Policy makers also endorsed many of the views of officials, but did not agree that, it was difficult to convince the people to plant more trees and people demanded only fruit trees. However beneficiaries opined that, number of nurseries allotted, was inadequate, which made it difficult to establish nurseries in many of the potential areas, where irrigational facilities were available. It was made clear that most of the farmers were either unable or not interested in incurring expenditure in lifting the seedlings from the far away nurseries, which was noticed during the survey carried out for the study in Bijapur and Dharwad divisions. Many of the interested beneficiaries with large land holdings mentioned that the Forest Department did not allow them to

lift more than 50 seedlings under free distribution of seedlings scheme.

Efforts of different sections of the people (including officials) did not orchestrate to go together in an harmonious way in a desired direction. Every section has claimed their concern and efforts for promoting kissan nursery, but they did not have a commonly understandable programme. Specifically the problems faced were in the areas of; (a) selection of beneficiaries, (b) provisions of materials, (c) choice of species, (d) lifting of seedlings, (e) matching of demand for and supply of seedlings, (f) in time payment, (g) poor quality of seedlings, (h) restrictions on number of seedlings distributed and so forth.

Based on the facts and figures available with the Forest Department it could concluded that, there was lack of publicity and most of the farmers were unwilling to bear the cost of transporting the seedlings from nurseries to their fields. Non-availability of seedlings in time and lack or absence of desired tree species, were not found to be valid reasons for poor performance of free distribution of seedlings.

The above made discussion holds good for explaining the results of opinion survey on the variable ( $V_{17}$ ) i.e., problems in lifting the freely distributed seedlings.

Opinions on involvement of various people in selection of kissan nursery beneficiaries, did not differ much in absolute terms, but differed statistically. Higher scores, here, indicated involvement of more number of people. It was opined by all the three groups that, local representatives of people like mandal panchayat members/office bearers, motivators, Foresters and R.F.Os were involved in selection of the beneficiaries. Development Department personnel were not involved in the selection process. Village Forest committees were involved wherever they were in existence. In management of local kissan nurseries also, except the beneficiaries and the Forest Department personnel, no other persons were involved. Local leaders were just contacted by the Forest Department officials, whenever they visited the nursery, but were not assigned role of any significance in management of kissan nurseries. Even the Village Forest Committees were also not involved.

Involvement of different people/ organisations/ departments /institutions, in establishing village woodlots

(V<sub>20</sub>), roadside plantation- tank fore shore plantations etc. (V<sub>21</sub>), and in management and distribution of benefits of village woodlots, was not to a greater extent, as it was expressed by the officials of the State Forest Department. Involvement of members of local elected bodies and personnel of other line departments was only to clarify some issues, often related to ownership of lands where the plantations were established. This limited involvement of people other than local people and Forest Department personnel might have resulted in high and medium scores obtained by officials, policy makers and beneficiaries, respectively.

The National Commission on Agriculture, in its Interim Report (1972) on production forestry - man made forests, suggested the involvement of the three basic village institutions, namely local panchayats, cooperative societies, voluntary organisations and village school staff, in the field demonstrations. It also suggested the extension organisation to work closely with Agricultural Department and village panchayats in the implementation of mixed forestry programmes in the above mentioned manner.

It is also argued by some of the researchers, environmentalists and others that, the forest department had



traditionally fulfilled the role of policing the forests and collecting revenue. The general public, particularly villagers did not get along with officials. It is therefore imperative that, a change of implementing agency in lands outside reserved forests is required. A part of the work must be carried out by the panchayats, which could motivate villagers and ensure that their fuel and fodder needs are met and the forest department could play the role of an advisor (Achaya, 1989).

## VI SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

### SUMMARY

The dominance of agrarian structure in Indian Economy, with majority of the poorer section being part of the eco-system, has rendered 'Status of natural resources' as the 'deciding' factor for Economic development and its sustainance. Over time, due to increasing biotic pressure, the natural resources are being depleted at alarming pace, causing adverse impact in many more ways in India involving even basic needs.

There is already heavy pressure on the natural resources to satisfy the needs of both human and bovine population. Therefore, a detailed and careful study for preservation, conservation and development of natural resources is very essential.

The forest cover of the country is fast dwindling. The recorded forest cover is far less than the recommended 33% for an ideal eco-system. Degradation of forests is most alarming in the arid and semi-arid regions, without proper restoration.

Shortage of major and minor forest products like fuelwood, fodder, timber poles and so forth, is acute, causing considerable damage to the productive forests.

By the turn of the century, our deficit of food, fuelwood, and fodder would be 75; 140 and 110.04 million tonnes, respectively. Timber requirement of the country would be of order of 65 m. cu.mt. These requirements cannot be met unless at least one third of the country's land mass is put under effective forest cover.

Karnataka State, with the total geographical area of 19.2 m.ha. and with a population of over 44 million, has 20% of its geographical area under forest cover (3.86 m.ha.), against 23% of the All India average and 33.33% as envisaged in the National Forest Policy.

The direct and indirect benefits of the forests to the country and the State are not only enormous, but also very essential.

Karnataka, quickly realising the importance of preservation, conservation and development of forests, brought in several measures in the interest of ecology and environment and also to meet the various basic needs of the population in

the form of several Acts, Rules and Regulations and Forest Development Programmes.

Nearly 70% of the State's population lives in rural areas. The State is facing problems of catering to the need of above mentioned basic requirements of the rural and semi-urban population and of bovine population. All the traditional sources like common grazing lands and village forests, being rendered bereft due to over exploitation, villages are not self sufficient in respect of their needs of fuelwood, fodder, timber, poles and so forth. Therefore, to make the villages self sufficient, the Government have embarked upon a massive Social Forestry Programme, both at the National and the State level.

Social Forestry Programmes in India have grown in importance and scale, and now constitute a major element in India's overall rural development.

The primary objective of the World Bank and Overseas Development Agency aided Karnataka Social Forestry Programme is to increase the supply of fuelwood, fodder, small timber, bamboo and other minor forest products, to rural and semi-urban areas of the State.

The present study mainly attempted to examine whether the various Forest Development Programmes / Projects/ Schemes with special reference to Social Forestry, have achieved their objectives.

**The Specific objectives :**

- 1) to identify and quantify the different components / factors of Forest Development Programmes,
- 2) to evaluate the impact of the Social Forestry Programme on income and employment of the beneficiaries,
- 3) to evaluate the performance of the Social Forestry Programme,
- 4) to evaluate the performance of the Forest Development programmes through opinions and
- 5) to suggest policy measures on the basis of the findings of the study.

**METHODOLOGY**

For evaluation of the above mentioned specific objectives of the study, Karnataka State and the three Social Forestry Divisions viz., Dharwad, Bijapur and North Kanara were selected purposively, along with the Canara Forest Circle.

The above mentioned three Social Forestry Divisions were selected to represent three distinct agro-climatic zones. Bijapur comes under Northern dry zone, Dharwad under transitional belt and N.Kanara under malnad (heavy rainfall) belt.

Two Social Forestry Ranges, with highest number of kissan nurseries, from each of the Divisions were selected to study the impact/implications of the Social Forestry Programme.

Twenty beneficiaries coming under small farmer category, 20 under medium category and 20 under large farmer category were selected randomly from each of the divisions (15 from each Range), from the list of beneficiaries available with the Forest Department. (Social Forestry wing) at the respective Divisional Head Quarters. Similar number of non-beneficiaries, representing all three categories of farmers, were selected randomly, to obtain primary data and informations for the study purpose.

Totally six village woodlots, two from each division were selected (from 5 or more years old area), to know their Economic viability, under different assumptions, made for the study purpose.

For the purpose of evaluation of the Forest Development programmes through opinions, with the help of the proxy variables identified for the study purpose, 15 officials (representing the Higher, middle and field level categories), 15 policy makers and 15 beneficiaries, were selected from each of the three Divisions.

Primary data, to assess the impact/implication of the Social Forestry Programmes, were obtained from both beneficiaries as well as non-beneficiaries, through personal interview method, employing a pretested and ~~statistical~~ questionnaire.

Secondary data, to assess the performance of the Forest Development Programmes, with special reference to Social Forestry Project, were collected from the available Annual Reports of the State Forest Department, Administrative Reports of the Department, State Forest Statistic books and such other official documents, over a period of 20 years.

Appropriate analytical tools and techniques were employed to analyse the data to achieve the objectives of the study.

To study the trends in specieswise plantations raised under different Forest Development Programmes,

including Social Forestry Project, by the State Forest Department, Orthogonal Polynomial regression analysis was employed, up to 5th degree function. Similarly, to study the trends in Revenue and expenditure of the State Forest Department, Polynomial regression analysis technique was employed.

To examine the performance of the State Social Forestry Programmes tabular analysis technique was made use of. Cluster analysis technique was used for the purpose of regionalisation of the State Social Forestry Programme.

For the analysis of the primary data tabular analysis technique was put to use.

To know the Economic viability of the village woodlots, Benefit-cost Ratios were worked out and 'sensitivity analysis' technique was applied to workout the robustness of the results.

## CONCLUSIONS

### Forest Development Programmes and their performance

The efforts of the State Forest Department could be summarised into a few definite components, viz; (a) taking up of departmental plantations, especially in reserved



forests, (b) raising and distribution of seedlings, (c) conservation of the existing forests, and (d) educational and training programmes.

The State Forest Department has implemented several programmes for the development of the Forest wealth. All of them had above components in varying proportions. Development of forests has many facets and a special programme was initiated, whenever a specific objective was taken up on priority basis. The objectives of their Programmes ranged from providing basic amenities like fuel, and fodder and to create export potential.

Due to limitation in the availability of data, it was not possible to make any analysis for each of the programme. However, an attempt was made to examine the pattern of specieswise plantations raised by the State Forest Department over a period (1976-77 to 1990-91), by combining all programmes. Since a prior information regarding the pattern was not known, a more flexible technique namely Orthogonal Polynomial Regression analysis was used. Even when the function was attempted up to 5th degree, the  $R^2$  was very low for four species viz., teak, softwood, cashew and Eucalyptus. This was clear indication of the lack of a

definite pattern in the specieswise plantations raised. Only species related to fuelwood and miscellaneous and bamboo showed appreciable  $R^2$  but, the trend was uniform. The situation regarding the total species was not much different from the above.

Allocation of funds was the major factor which decided the activities. Therefore, the adhocism in the allocation of funds directly reflected the irregular behaviour in the physical activities. Plans, targets and achievements were determined by outlays provided and allocations made.

#### Regionalisation of Karnataka State Social Forestry

Five distinct clusters of districts (Social Forestry Divisions) in the State emerged against the null hypothesis that the total achievements (plantations raised) are in proportion to the total area available for raising plantations.

Targets (and achievements) were not fixed based on the population density, a bovine population density, per capita availability of the forest area and the total area available for raising plantations under S.F.P., in each district.

### Pattern of fuel consumption and sources of fuel

The pattern of fuel consumption indicated the influence of the extent of vegetation, cropping pattern, livestock population and promotion of alternative fuel sources. Among the six sources of fuel considered fuelwood, agricultural wastes, dung cake and to some extent, natural gas appear to be the major ones. Electricity and kerosene did not form significant sources.

Taking share of different sources of fuel in the total fuel consumption, it could be concluded that the respondents from North Kanara, due to easy availability of fuelwood from the nearby forests, used fuelwood to the maximum extent (85%). Even though Bijapur district which is almost devoid of much tree cover, respondents used 21.67% of fuelwood, mainly collected from Bellary jali (Prosopis juliflora), which grows in abundance in the district, almost solving the fuelwood problem. Respondents also used higher quantities of agricultural wastes mainly cotton stalk, sunflower stalk, stubbles (68.33%). In Dharwad district, with large areas under DCH-32 cotton, most of the respondents used cotton stalk, to meet their fuel requirency.

### Livestock maintained by beneficiaries

The pattern and number of livestock maintained by respondents in the studied divisions, indicated the

different patterns and preferences for maintaining livestock, because of different agro-climatic settings. The patterns indicated the preference of small animals over large animals in drier divisions. Due to higher average number of goats/sheep maintained in dry areas, demand for leaf fodder was considerable, leading to further depletion of existing vegetative cover.

#### Sources of fodder

Open grazing is the most common practice in all the three divisions. Agricultural by-products like jowar stalk, maize stalk etc. formed the backbone of the fodder supply system.

Leaf fodder was mainly used to feed sheep and goats in Dharwad and Bijapur divisions, whereas in N.Kanara it was mainly used to feed cattle and buffaloes.

Most of the respondents belonging to small and medium farmer categories in Bijapur and Dharwad divisions, depended upon roadside trees, bushes/trees in village common lands and trees in others fields, to obtain leaf fodder. Fodder, mainly leaf fodder, in N.Kanara was obtained from the Soppina betta lands and the nearby forests.

There is acute shortage of green and dry fodder, especially of leaf fodder, in studied areas of Bijapur and Dharwad divisions.

#### Timber requirement of the beneficiaries

Most of the beneficiaries, belonging to all three categories, from Bijapur and Dharwad divisions, faced with acute shortage of suitable timber, even for making agricultural implements.

Beneficiaries in N.Kanara division, obtained timber from the nearby forests, to meet their agricultural requirements.

#### Per capita annual income of the sample beneficiary and non-beneficiary households

Income level of a farmer (beneficiary) did not influence his decisions to adopt farm forestry component, as long as he took up tree cultivation in hitherto unutilised waste lands, cultivated marginal/sub-marginal lands under rainfed conditions in dry region, bund space, space in backyards/frontyards, farm boundaries etc.

#### Farm forestry : Average number of seedlings planted and their survival rate

Survival rate was low in Bijapur (dry region), medium in Dharwad (transitional belt) and high in N.Kanara

(malnad) divisions. The significant difference observed in the survival rates of seedlings could be attributed to the prevailing climatic conditions. The survival rates would have been much lower than the observed ones in Bijapur and Dharwad divisions, had all the seedlings been planted under rainfed conditions without any protective irrigation. Survival rate of native tree species was comparatively high. Excessive open grazing was observed to be a serious threat to the survival of seedlings planted, especially during summer in drier areas.

#### Resource potential for Social Forestry among sample households

When compared to the resource potential with beneficiaries, small farmer non-beneficiaries in Dharwad and non-beneficiaries belonging to medium and large categories in Bijapur division, possessed more land resources, which could be diverted for tree cultivation. Vast idle land resources were available in Dharwad and Bijapur divisions calling for efficient utilization of these idle resources.

#### Place of planting the seedlings

All beneficiaries in Dharwad and 16.67 per cent of beneficiaries in Bijapur division planted seedlings in backyards. Farm bunds in both Dharwad and Bijapur divisions were wide and large enough to accommodate more number of

trees. But 50 per cent of small farmers being afraid of the shade effect on their crops in Dharwad division did not plant seedlings on farm bunds.

#### Benefits derived from the trees planted under farm forestry

The farm forestry did not succeed to a greater extent to provide fuelwood, fodder, small timber, poles etc. to the rural people. This was largely due to the fact that for tree species like eucalyptus, casurina and other fast growing species there was great demand from the wood based industries and for other such commercial uses. These species neither could yield fodder nor good timber.

#### Kissan nursery scheme

Kissan nursery scheme could generate employment opportunity and income for the sample households. Imputed family labour cost was observed to be higher in all the divisions, than that of hired labour cost material cost (sand, soil, manure etc.) was a major cost.

#### Awareness/knowledge of Social Forestry and Farm forestry

Majority of the farmers in Bijapur and Dharwad divisions, were not aware of the Social Forestry and farm forestry concepts due to lack of publicity for Social Forestry Programme. Respondents in N.Kanara division were

aware and possessed better knowledge about Social Forestry Programme and its components due to their involvement in environment related issues.

#### Publicity for Social Forestry Programme

Relatively more publicity was given in villages around the divisional head quarters of Social Forestry wing. In dry belt, i.e., in Bijapur division no publicity worth mentioning was given for Social Forestry Programme whereas in N.Kanara division, mainly to divert the attention of the agitating masses and due to higher concentration of Forest Department personnel, considerable publicity was given.

#### Economic viability of village woodlots

The study established the financial worthwhileness of raising village woodlots, even under fairly rigorous assumptions. Benefit cost ratios (Economic viability) of village woodlots were determined by climatic conditions, site quality and species planted in the respective village woodlots.

#### Performance of Social Forestry training institutions

Most of the officials of the State Forest Department working under Social Forestry Programme were not at all trained in any of the institution/s established for the



purpose. Members of voluntary organisations like mahila mandals, did not get the due preference. Policy makers i.e. members/office bearer of Zilla Parishads, mandal panchayats, and other local elected bodies were trained to a very limited extent.

**Evaluation of the Forest Development Programmes through proxy variables.**

**By officials**

Evaluation made by the three levels (Higher, middle and field) of officials working under Social Forestry Programme differed significantly from each other for most of the variables. This would be mainly attributed to the lack of communication, coordination, proper mutual understanding and non-availability of proper infrastructural facilities in many cases the policies of the Governments compounded the problem. Middle and field level officials evaluation, for most of the variables, was based on the ground realities rather than on the official documents, on which higher officials relied to a greater extent.

**By officials, policy makers and beneficiaries**

Officials evaluated most of the variables based on their official documents rather than on the existing ground

realities. Policy makers too, whenever, involved directly, orchestrated with officials for some variables. But the beneficiaries, at the grass roots level, differed in their opinions. Therefore, for most of the variables mentioned and used in the present study, evaluation made by officials, policy makers and beneficiaries differed significantly among each other. Involvement of other organisations/institutions / non-government organisations/departments was not significant.

#### POLICY IMPLICATIONS

Based on the findings of the study the following policy implications are suggested to improve the overall performance of the various Forest Development Programmes, with special reference to Social Forestry Programme, for the development of forest wealth of the State.

1. Forest Development is suffering due to want of effective planning, Monitoring and Evaluation. This is mainly due to non-availability or non-accessibility of the data. Therefore, there is need to bifurcate the existing method of documentation into,
  - a) Physical and financial performance
  - b) Confidential reports, comments etc.

The former should be accessible freely for administrators, planners, academicians etc.

2. The planning, Monitoring and Evaluation cell need to be<sup>320</sup>  
made more effective at the State level. The cell should  
have independent existence and report directly to the top  
administration. This cell should have a mandate for  
Monitoring as well as concurrent and final evaluation.
3. There should be a perspective plan for all the available  
areas for the State. Based on the ownership of land and  
class of land.

Master plan in detail must be prepared as and  
when the development projects are proposed. While  
implementing the project there should be proper project and  
annual action plan.

4. There should be proper identification of priorities and  
phasing whenever the development programmes are sponsored,  
they should be fitted in properly within the perspective  
plan, duly recognising the priorities and phasing.
5. The present information on the revenue of the Forest Sector  
do not reflect the real income since, major portion of the  
forest products are being heavily subsidised. A rational  
plan for fixing the prices of the forest products appears  
to be necessary.

6. The comprehension and understanding of the Social Forestry Programme is diluted from top to grass roots level. Since, the Social Forestry Programme envisages to ensure people's participation and make it a people's programme ultimately, it is necessary to strengthen the Human Resource Development activities among different levels of officials and non-officials at the grass roots levels, by making use of existing infrastructural and institutional facilities.
7. Planning details, resource allocation and other physical activities should match the agro-climatic settings and the areas available for promoting plantation/planting activities under Social Forestry Programme.
8. Extent of village woodlots, mix of species need to be fixed based on the local demands, for fodder, fuel, small timber etc. with a due recognition to the local species and methods of propagation.

**CHAPTER - VII**

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## APPENDICES

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# APPENDIX -1

Some important statistical informations of Kanara circle, Dharwad.

| Sl.no.                    | Name of the Taluka (Range) | Geographical area | Forest Area in Sq.M.M. | Population | Normal Rainfall (M.M.) | No. of cattle Buffaloe | Sheep, goats | Total Road Length in K.M. | Hobbies | Village inhabited uninhabited | Towns | Mandal Panchayat |
|---------------------------|----------------------------|-------------------|------------------------|------------|------------------------|------------------------|--------------|---------------------------|---------|-------------------------------|-------|------------------|
| 1                         | Ankola                     | 1301              | 1177.05                | 21329      | 3406                   | 35254                  |              | 382                       | 4       | 36                            | 1     | 9                |
| 2                         | Bhatakai                   | 349               | 259.96                 | 128915     | 4016                   | 30130                  |              | 324                       | 2       | 64                            | 1     | 10               |
| 3                         | Haliyal                    | 847               | 598.47                 | 146993     | 1317                   | 56383                  |              | 613                       | 4       | 133                           | 3     | 10               |
| 4                         | Honavar                    | 755               | 576.30                 | 145707     | 3686                   | 55997                  |              | 416                       | 3       | 97                            | 1     | 16               |
| 5                         | Karwar                     | 732               | 554.27                 | 139640     | 3126                   | 28610                  |              | 377                       | 4       | 58                            | 1     | 12               |
| 6                         | Kumta                      | 583               | 396.87                 | 134019     | 3754                   | 44760                  |              | 410                       | 4       | 119                           | 1     | 14               |
| 7                         | Mundgod                    | 668               | 505.03                 | 74904      | 1296                   | 43403                  |              | 435                       | 2       | 91                            | 1     | 8                |
| 8                         | Siddapur                   | 859               | 682.45                 | 91403      | 2983                   | 67388                  |              | 789                       | 3       | 196                           | 1     | 12               |
| 9                         | Sirsi                      | 1322              | 036.34                 | 152792     | 2535                   | 88358                  |              | 790                       | 4       | 227                           | 1     | 16               |
| 10                        | Supa                       | 1911              | 752.30                 | 46525      | 2381                   | 23316                  |              | 864                       | 3       | 140                           | 1     | 10               |
| 11                        | Yellapur                   | 1301              | 177.05                 | 66111      | 2699                   | 44767                  |              | 579                       | 2       | 127                           | 1     | 9                |
| <hr/>                     |                            |                   |                        |            |                        |                        |              |                           |         |                               |       |                  |
| Total of U.K.District     |                            | 10246             | 3292.95                | 1218367    | 2835                   | 517366                 |              | 5984                      | 35      | 1338                          | 13    | 126              |
| <hr/>                     |                            |                   |                        |            |                        |                        |              |                           |         |                               |       |                  |
| 1                         | Dharwad                    | 1118              | 141.35                 | 160186     | 813                    | 114744                 |              | 518                       | 4       | 111                           | 1     | 13               |
| 2                         | Kalaghatagi                | 687               | 187.73                 | 99507      | 914                    | 69712                  |              | 345                       | 3       | 82                            | 1     | 9                |
| 3                         | Hangal                     | 775               | 84.74                  | 170476     | 904                    | 114119                 |              | 583                       | 3       | 145                           | 1     | 14               |
| 4                         | Hubli                      | 737               | 20.33                  | 623864     | 669                    | 102607                 |              | 419                       | 3       | 58                            | 1     | 3                |
| 5                         | Shiggaon                   | 589               | 99.51                  | 121844     | 689                    | 63390                  |              | 396                       | 3       | 93                            | 1     | 2                |
| 6                         | Kundgol                    | 648               | -                      | 127513     | 778                    | 57484                  |              | 326                       | 2       | 57                            | 1     | 9                |
| 7                         | Savanoor                   | 539               | 8.01                   | 104477     | 676                    | 64010                  |              | 292                       | 2       | 62                            | 1     | 6                |
| <hr/>                     |                            |                   |                        |            |                        |                        |              |                           |         |                               |       |                  |
| Total of Dharwad Division |                            | 5093              | 542.17                 | 1407867    | 700                    | 586068                 |              | 2872                      | 20      | 608                           | 7     | 66               |
| <hr/>                     |                            |                   |                        |            |                        |                        |              |                           |         |                               |       |                  |
| Total of Circle           |                            | 15339             | 3835.12                | 2626234    | -                      | 1103422                |              | 8862                      | 55      | 1946                          | 20    | 192              |

## Appendix - 2

### Socio-Economic Characteristics of the beneficiary.

| EDUCATION           | DHARWAD NI=60 |             |             |               | BIJAPUR NI=60 |             |             |               | NORTH KANARA NI=60 |             |             |               | Total/AVERAGE N=180 |               |               |               |
|---------------------|---------------|-------------|-------------|---------------|---------------|-------------|-------------|---------------|--------------------|-------------|-------------|---------------|---------------------|---------------|---------------|---------------|
|                     | SP            | MF          | LP          | Total         | SP            | MF          | LP          | Total         | SP                 | MF          | LP          | Total         | SP                  | MF            | LP            | Total         |
| 1. Illiterate       | 8<br>(40)     | 6<br>(30)   | 2<br>(10)   | 16<br>(26.67) | 8<br>(40)     | 6<br>(30)   | 10<br>(50)  | 24<br>(40)    | 10<br>(50)         | 3<br>(15)   | -           | 13<br>(21.67) | 26<br>(43.33)       | 15<br>(25)    | 12<br>(20)    | 53<br>(29.44) |
| 2. Primary          | 7<br>(35)     | 8<br>(40)   | 2<br>(10)   | 17<br>(28.33) | 7<br>(35)     | 8<br>(40)   | 5<br>(25)   | 20<br>(33.33) | 6<br>(30)          | 12<br>(60)  | 14<br>(70)  | 32<br>(53.33) | 20<br>(33.33)       | 28<br>(46.67) | 21<br>(35)    | 69<br>(38.33) |
| 3. Secondary        | 3<br>(15)     | 2<br>(10)   | 7<br>(5)    | 12<br>(20)    | 3<br>(15)     | 3<br>(15)   | 3<br>(15)   | 9<br>(15)     | 4<br>(20)          | 5<br>(25)   | 3<br>(15)   | 12<br>(20)    | 10<br>(16.67)       | 10<br>(16.67) | 13<br>(21.67) | 33<br>(18.33) |
| 4. Higher secondary | 2<br>(10)     | 3<br>(15)   | 5<br>(25)   | 10<br>(16.67) | 2<br>(10)     | 3<br>(15)   | 2<br>(10)   | 7<br>(11.67)  | -                  | -           | 2<br>(10)   | 2<br>(3.33)   | 4<br>(6.67)         | 6<br>(10)     | 9<br>(15)     | 19<br>(10.55) |
| 5. College & above  | -             | 1<br>(5)    | 4<br>(20)   | 5<br>(8.33)   | -             | -           | -           | -             | -                  | -           | 1<br>(5)    | 1<br>(1.67)   | -                   | 1<br>(1.67)   | 5<br>(8.33)   | 6<br>(3.33)   |
| Total/Averages      | 20<br>(100)   | 20<br>(100) | 20<br>(100) | 60<br>(100)   | 20<br>(100)   | 20<br>(100) | 20<br>(100) | 60<br>(100)   | 20<br>(100)        | 20<br>(100) | 20<br>(100) | 60<br>(100)   | 60<br>(100)         | 60<br>(100)   | 60<br>(100)   | 180<br>(100)  |

# APPENDIX - 3 Plantations Raised specieswise for the period 1976-77 to 1990-91, in Karnataka under various Forest development programmes/schemes. (Area in hectares)

| Sl. Species             | 1976-77 | 1977-78 | 1978-79 | 1979-80 | 1980-81 | 1981-82 | 1982-83 | 1983-84 | 1984-85 | 1985-86 | 1987-88 | 1988-89 | 1989-90 | 1990-91 | Total  | Average  |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|----------|
| No.                     |         |         |         |         |         |         |         |         |         |         |         |         |         |         |        |          |
| 1 Teak wood             | 4058    | 37085   | 2753    | 2818    | 1907    | 2366    | 2267    | 1889    | 2279    | 1762    | 1832    | 676     | 255     | 155     | 30054  | 2003.60  |
| 2 Soft wood             | 3157    | 359     | 2628    | 2311    | 4765    | 1949    | 22933   | 2826    | 837     | 1391    | 1680    | 753     | 807     | 436     | 0705   | 2047.00  |
| 3 Cashew                | 2131    | 2830    | 1870    | 1613    | 2356    | 952     | 1408    | 1984    | 610     | 651     | 305     | 33      | -       | 20      | 16898  | 1126.53  |
| 4 Eucalyptus            | 2747    | 15000   | 3000    | 3012    | 4704    | 3879    | 5460    | 2745    | 3574    | 5136    | 5085    | 4939    | -       | 95      | 67522  | 4501.47  |
| 5 Fuelwood & misc.      | 20810   | 19700   | 17070   | 13033   | 13931   | 23231   | 22284   | 24421   | 29904   | 29461   | 40038   | 37491   | 38554   | 27247   | 387534 |          |
| 6 Bamboo                | -       | 376     | 415     | 312     | 517     | 384     | 937     | 568     | 280     | 515     | 443     | 557     | 689     | 482     | 6942   | 25835.60 |
| 7                       | 50      | 705     | 16      | 16      | 205     | 446     | 844     | 24800   | 1266    | 1927    | 2964    | 4865    | 3419    | 1777    | -      | 462.80   |
| 8 Lavender              | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | 9      | 0.60     |
| 9 Red palm oil          | -       | 9       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | 685    | 45.73    |
| 10 Cocoa                | -       | 306     | 14      | 14      | 172     | 180     | -       | -       | -       | -       | 258     | 258     | -       | -       | 516    | 34.40    |
| 11 Rubber               | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | 74     | 4.93     |
| 12 spices               | -       | 74      | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | 314    | 20.93    |
| 13 Coffee               | -       | 314     | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | 8      | 0.53     |
| 14 Tea                  | -       | 2       | 2       | 2       | 2       | -       | -       | -       | 53      | 101     | 319     | 313     | 233     | 141     | 1953   | 130.87   |
| 15 Friut                | -       | -       | -       | -       | 31      | 44      | 75      | 449     | 406     | 316     | 180     | 236     | 154     | 36      | 3477   | 231.80   |
| 16 Sandal               | -       | -       | -       | -       | -       | 110     | 531     | 451     | -       | -       | -       | -       | -       | -       | 50     |          |
| 17 Bursera              | 50      | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -      |          |
| 18 Avenue planting (km) | -       | -       | -       | -       | -       | -       | 238     | 978     | 141     | 1226    | 1448    | 2179    | 1918    | 855     | 10543  | 702.87   |
| 19 Planting canal side  | -       | -       | -       | -       | -       | 112     | -       | 602     | 666     | 284     | 195     | 258     | 112     | 215     | 3142   | 209.47   |
| 20 School forestry      | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | 564     | 1621    | 1002    | 530     | 5764   | 384.27   |
| Total                   | 33047   | 45912   | 27752   | 23115   | 28385   | 33207   | 35493   | 36833   | 38750   | 40843   | 52347   | 47314   | 43824   | 30202   | 566201 |          |



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