CHAPTER II
REVIEW OF LITERATURE

CONCEPT OF SOCIAL FORESTRY:

The intellectual antecedents of SF are neither new nor untried. Indeed there is substantial literature in the field, though often they are not labelled as SF. A survey of some of the literature will provide a conceptual backdrop to a study relating to the working of a SFP in a given setting and its intervention in the fuel economy of villages. Social scientists have made a worthwhile contribution to SF by providing it, a theoretical perspective. As William R. Burch, Jr. (1971) has put it social scientists have had a long and extensive interest in natural resource and forestry issues and various disciplines have struggled to develop integrative models that combine people and nature as part of the same system. With these models, the resource professional can begin to see how certain sylvic or other treatments may affect distributional or socially sustainable factors in the dependent human community.

It is more than fifteen years since the SFP was introduced in India. Several research and evaluation studies have been made relating to the working of and socioeconomic consequences of this programme. A survey of the findings of these studies will provide the right perspective for a study like the present one. The following discussion gives an overview of the theoretical as well as practical ramifications of SFP.

With a holistic viewpoint on the nature of the relationship between Nature and Man, Radhakamal Mukerjee (1929) argued in his Regional Sociology that cooperation in the conservation of land, in the use of water, in forest management, in the training of management of rivers and finally in the reciprocal relations of village
and city must be the keynote of the future. Such cooperation between government, funding agencies, village level institutions and people in general is the hallmark of the SFP in India.

Till 1968 involvement of local people in the development and maintenance of forests was limited and foresters were functioning in isolation. The National Commission on Agriculture (1976) stressed the socio-economic importance of SF in the rural community as well as in the management of forest resource. This fact has been stressed by K.M. Tiwari (1983), when he points out that SF is an umbrella type of arrangement with several components. It may be defined in the Indian context as the science and art of growing trees and other vegetation on all land available for the purpose, mainly outside traditional forest areas, with intimate involvement of people and more or less integrated with other operations, resulting in balanced and complementary land use with a view to providing a wide range of goods and services to the individual as well as the society.

This interdependence between the local population and SF has been highlighted by S.A. Shah (1988), when he says that SF serves as a buffer between the people and the commercial forests. Several instances are known in India when the disappearance of this buffer has resulted in an irresistible thrust on commercial forests so much so that large chunks of such forests have been ruined. The destruction of commercial forests exclusively for meeting the bona fide needs of the rural people is to be seen to be believed.

The conventional forestry is mainly based on long rotations without any involvement of the local community. On the other hand SF implies the involvement and participation of local community and is managed on short rotation for the production
of multiple products. SF warrants different attitudes, approaches and management practices. Thus there is little resemblance between the two. A lack of appreciation of this distribution has done (and is still doing) a lot of harm to SF.

L.K.Jha (1993) defines SF as a plantation outside the traditional forest area (marginal, submarginal private land and community land) and in degraded forest land (provided the above categories of land are not available) by the involvement of individuals below the poverty line or socially and economically depressed people with a view to meeting their requirements in respect of crops, legumes, tubers, fuel, fodder, timber etc.

**ASPECTS OF FUELWOOD SUPPLY AND CONSUMPTION:**

Fuelwood holds the key to non-commercial fuel energy. It constitutes nearly 68.5 per cent of the total energy consumption of rural India and 45.5 per cent of urban India. It constitutes 65 per cent of the total non-commercial energy. Non-commercial energy constitutes nearly 80 per cent of the per capita energy consumption of the rural household and fuelwood is the major source of this non-commercial energy in rural India. (N.G. Basu 1987). SF scheme focuses attention on the rural energy crisis. The worst sufferer of the rural fuelwood crisis is the poorest section of the rural population. The supply of fuelwood from SF plantations to these people will not only enable them to save money and time but also discourage them from senseless destruction of traditional forests.

The impending fuelwood scarcity may force the people to use cowdung as an alternative to fuelwood and thereby deprive the agricultural economy of using cowdung as a useful organic fertiliser. As Banwari Lal Chaudhry (1981) observes, the amount
of firewood, cowdung, leaves and twigs used as fuel by rural households in underdeveloped countries is equal to 50,000 barrels of mineral oil which is one fourth of energy used by these countries and 5 per cent of the energy used by the world as a whole. It is estimated that by the end of this century India will become self-sufficient as far as food grains are concerned. Increasing lack of firewood would ultimately compel people to use cowdung and donkey-dung for fire purpose. Cowdung is a complete and effective fertilizer. Using it as fuel will deprive us of a rich source of fertilizer. This will further mean decrease in agricultural production which will ultimately make the food problem more grave.

In developing countries of the world a crisis of great magnitude is said to be looming large in the horizon. It is the "poor man's energy crisis". Billions of people are caught in this crisis. Several studies have been made to find out the gravity of this crisis. Banwari Lal Choudhry (1981) has calculated that the amount of firewood, cowdung, leaves and twigs used as fuel by rural households in underdeveloped countries is equal to 50,000 barrels of mineral oil which is one fourth of energy used by these countries and five per cent of the energy used by the world as a whole. In the assessment of Food and Agricultural Organisation (1982) the total consumption of fuelwood in the developing world has been growing by about 2 per cent per annum and demand for fuelwood has exceeded its supply. The magnitude of the fuelwood crisis is reflected in the decrease of the forest area by 10 to 15 million hectares a year in countries where population growth is 2 to 4 per cent per annum.

The study by Geoffrey Lean and Don Hinrichsen (1992) has shown that nearly half of the humanity has not yet entered the age of fossil fuels and depends on wood for warmth, light and cooking. More than 90 per cent of the energy used in nations such as Burkino Faso, Tanzania, Nepal and Ethiopia comes from wood. Wood with
dung and crop wastes accounts for 90 per cent of the fuel used by rural dwellers in India. The sample surveys of household and non-household consumers conducted by Openshaw (1978) have shown that in LDCs, 82 per cent of the wood harvested was consumed as fuel. In terms of energy use biomass represented about 40 per cent of the total energy used in LDCs whereas in the case of developed countries it accounted for only one per cent of the total energy supply.

The Working Group on Energy (1979) constituted by the National Planning Commission in its study of the fuelwood situation in the country has estimated that the per annum consumption of fuelwood which is 133.1 million tonnes in 1975-76 was likely to increase to 220 million tonnes by the turn of the century while supply from traditional forests and SF plantations is likely to go up from 0.19 million to 33 million tonnes. A study by S.L Tripathi (1988) has shown that of the present need of wood for fuel, timber and industrial purposes estimated at 133 million tonnes, 49 million tonnes are available through illegal means which has resulted in the destruction of forests in the order 1.5 million hectares per year.

D. Sen ct.al., (1988) in their study of Peoples' Participation in Community Forestry in Aurangabad circle of Northern Maharastra observe that the major requirements of fuel, fodder and timber by most of the villagers in the study area were being met from their own sources. The use of most important among them, the fuel, was very much skewed with the big farmer’s use of this commodity almost four fold than that of the landless people. While the big farmers were able to procure most of such items from their own fields, the smaller categories had to depend on the village common land or forests for such purposes.

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That the fuelwood and agricultural residue continue to account for a major share in the fuel budget of rural households even in the long-run has been well brought out by S.R. Sagar et al., (1985) in their re-survey of two North-Indian rural regions after a gap of about 10 years. During the period 1974-83, the re-survey estimated an increase of 0.16 quintal per head in the consumption of non-commercial fuel. Possibly an increase in income might have induced this increase of fuel consumption per head.

The poorer households, who have neither home-grown sources nor the money to buy fuel, depend for the most part on the fuel that they are able to and allowed to collect from public, community and private lands in and around the village. A large proportion of fuel collection takes place from public lands such as forests, waste lands, grazing grounds, tank bunds and beds, canal banks, road margins and other poromboke lands. This is supplemented to a lesser, but not insignificant extent, with fuelwood, dung and agro-wastes which the poor are allowed to collect from privately owned lands on the basis of customary and informal consent or acquiescence (SF Monitoring Advisory Board, Tamil Nadu, 1982).

In India very little commercial energy is used in rural sector. The traditional non-commercial sources like firewood, animal wastes and vegetable wastes from agriculture form the major sources of domestic energy even today. A.N. Yellappa Reddy (1993) has estimated that over 600 million people cook their food with wood everyday. Another natural fuel is cowdung. Burning and mineralizing this important organic substance deprives the soil of vital ingredient to restore fertility. Taken together the scrapping of tree and shrubs from the land for timber and firewood and burning cowdung as fuel coupled with overgrazing in forest and common lands are the precise
recipe for disastrous desertification that has overtaken the country covering an area of nearly 90 million hectares which have become waste land. This comprises 25 per cent of the geographical area.

The total dependence of the rural population on fuelwood for energy has been brought out by a study made by Tata Economic Consultancy (1995) in Tamil Nadu. The study has shown that in rural area 93 per cent of the households use fuelwood to meet their energy needs. The total fuelwood requirement in Villages is estimated at 110 lakh tonnes. Sources of supply include 58 per cent from Poromboke and common lands, 18 per cent from own agricultural lands, 8 per cent from forests and 3 per cent from SF plantations. The total fuelwood consumption in urban areas of the state is estimated at 40 lakh tonnes of which household use is 28.5 lakh tonnes and the balance by eating establishments, small industrial units, marriage halls, noon-meal centres and temples. The total fuelwood demand in the state is estimated to be in the range of 150 lakh tonnes annually. Only 12.5 per cent of this is met from authorised and unauthorised removals from reserve forests and SF plantations.

The Forestry Sector Study made by the Tata Economic Consultancy Services in Tamil Nadu (1995) has attributed the following reasons to low productivity in community woodlots:

* No proper care is being taken right from seedling selection to maintenance in subsequent years after planting.
* Funds allotted for maintenance are meagre
* There is lack of proper coordination between research efforts and other sections involved under the lab to land transfer process.
N.C. Saxena (1994) in his Study on SF in Village Lands has observed that the extent and magnitude of rural fuel shortages have been overestimated and the role of other gatherable biomass fuels (woody shrubs, agricultural residues, animal dung) have been underestimated. The rural poor do not budget for fuel for cooking. Fuelwood raised in most of the SF woodlot projects is meant to be sold and as such is unlikely to be accessible to the rural poor even at concessionary prices.

An analysis of the data for babul plantations coming under the SFP in Tamil Nadu for the period 1988-89 to 1993-94 by the Tata Economic Consultancy Services (1995) has brought to light the following facts:

* The total area worked out during the six years (1988-94) adds upto 1.14 lakh hectares in various divisions yielding 14.38 lakh tonnes of wood. The average yield for the period is 12.62 MT/hec.
* The total sales realisation amounts to Rs. 45.62 crores. The average revenue per hectare amounts to Rs. 4003 and the realisation per tonne of wood sold is around Rs. 317.
* Fuelwood yield per hectare has shown a declining trend over the years from 17.8 MT/hec. in 1988-90. Before that it was higher at 18-80 MT/hec.
* Sales realisation has shown a consistent increase from Rs. 4.80 crores in 1988-89 to Rs. 9.92 crores in 1993-94.
* Revenue realised per tonne of fuelwood has increased from Rs. 226 in 1988-89 to Rs. 440 in 1993-94.
* Of the twenty divisions from which babul extraction is taking place, Villupuram accounted for 20 per cent. Yieldwise Tiruvannamalai contributed 11.6 per cent of the total yield. Productivity levels were highest at 27.090 MT/hec. in Virudhachalam.
The Tamil Nadu SF Wing of the Forest Department (1992) undertook a Sample Survey on Consumption of Fuelwood, Fodder and Green Leaf Manure in Rural Tamil Nadu in 1990. The following are some of the important findings of the survey:

* 96.3 per cent of the sample households were dependent on wood biomass fuel for their domestic needs.
* The annual per capita consumption of biomass was 353.1 kg and that of firewood alone was 327.5 kg.
* 58.6 per cent of the total consumption of firewood was met from the village common lots and 15.4 per cent from own lands. Only 16 per cent of the firewood consumed was purchased.
* Reserve forests and SF plantations contributed 0.93 per cent and 2.36 per cent of the rural firewood requirements.
* 49 per cent of the households possess cattle including sheep/goat.
* 52.8 per cent of the animals were grazed in village common lands.
* 28.6 per cent of the households were found to use green leaf manure.
* 60.1 per cent of the green leaf manure was harvested from own land and 37.5 per cent from village common lands.
* 60.9 per cent of the respondents expressed non-availability of green leaf manure.

A study of the Household Fuelwood Consumption in Rural Tamil Nadu by the State Department of Statistics (1986) has shown:

* Of the total consumption of fuelwood in Rural Tamil Nadu 46.17 per cent was consumed by the landed and 53.83 per cent by the landless.
* Consumption of fuelwood from own land was of the order of 30.52 per
cent in South Arcot District, followed by 18.65 per cent in Salem District and 12.73 per cent in Tiruchirappalli District. It was as low as 0.38 per cent in Pudukkottai District and 0.073 in Periyar District.

* No consumption of fuelwood from government forest area was reported in the districts of Chengalpattu, Salem, Tiruchirappalli, Thanjavur. Pudukkottai and Tirunelveli.

* Free collection of fuelwood was as high as 24.85 per cent in North Arcot District followed by 14.46 per cent in South Arcot District. It was 0.37 per cent and 1.45 per cent in the districts of Nilgris and Kanyakumari.

* In Pudukkottai District 96.32 per cent of the fuelwood consumption was from free collection and only 3.68 per cent from own land.

* Rural folk in Tamil Nadu managed their fuel needs in some fashion or other and unsatisfied demand is a rare phenomenon.

According to *The Sample Survey on Consumption of Fuelwood, Fodder and Green Leaf Manure in Rural Tamil Nadu (1990)* by the Tamil Nadu SF Wing (Unpublished Report):

* 96.3 per cent of the rural households are dependent on wood biomass fuel for their domestic needs.

* Annual per capita consumption of fuelwood was 327.5 kgs.

* Per capita consumption of fuelwood was found to be high in Chengalpattu, Ramnad, Pudukkottai and South Arcot districts when compared to the average consumption for the State.
* Reserve Forest and SF plantations contributed 0.93 per cent and 2.36 per cent of the fuelwood consumed by the rural household.
* 49 per cent of the households possess cattle including sheep/goat
* 44 per cent of the cattle were cows and 14 per cent buffaloes.
* 42 per cent of the animals were sheep and goat
* 52.8 per cent of the animals grazed in the village common land.

A study of the SFP in Rajasthan by Brahmbhalt (1985) has brought to light the following facts:

* The sample households of Durgapur District consumed on an average 237 kg of fuelwood per annum.
* In Bharatpur district the sample households were found to have consumed only 104 kg of fuelwood per annum.
* About three-fourths of the sample households in both the districts reported that they were experiencing scarcity of fuelwood.

Among the various studies that deal with the dynamics of the demand for and supply of fuelwood special mention must be made of Morgan Robert et. al., (1981), A.K.N. Reddy (1982), Gerald Foley (1984), Y.S. Nagi et. al., (1986), Sharma and Bhatia (1986), Bimal Agarwal (1987), Gerald Leach and Marcia Gowen (1987), Jacob George (1991) and Rita Bowmik and Debesh Chakraborty (1994). The studies have stressed the significance of variables such as land holding, income, cropping pattern, food/cooking habits, household size, time available for fuel gathering and proximity to and availability of public lands.
The fuel gathering by the landless labourers and small and marginal farmers has been, of late, subject to severe constraints partly because of growing commercialisation in village fuel economy (Department of Economics, Bharathidasan University, 1982) and partly because of decline in village common lands that are being privatised by government assignments, encroachments or appropriation by private persons (N.S. Jodha, 1986).

As a result of commercialisation in fuelwood, the rich and middle income landlords tend to use inferior types of fuel such as twigs, brushwoods, loppings and agricultural residues and reserve the fuelwood trees to be sold for a higher price in the market. Thus, what were previously left over in the lands (inferior fuel) to be collected by the landless and poor people, are at present collected and consumed by the richer landlords, on commercial considerations. The concern for making a good return out of selling fuelwood has been brought out by an empirical study which does not support the general expectation of liberal use of fuelwood with the increase in availability from own sources (Y.S. Nagi et al., 1986).

Kedar N. Baidya (1996) in his Study of Community Response to SF and Environment has observed that SFP has failed to realise its objective of augmenting local supplies of fuelwood. The SFP was so designed as to augment supplies of fuelwood, fodder and minor timber and thereby make them available to the rural population especially the disadvantaged sections. But this objective was not realised due to conditions of an acute fuelwood crisis and the poor farmers resorted to the use of alternate energy sources like crop residues and dung cakes. Ordinarily, the rural inhabitant is disinclined to buy fuelwood even at subsidised prices. Under these circumstances the fuelwood supplies available from social forests do not trickle down
to the rural poor but find a ready market in cities and towns. Perhaps what are available to the rural poor are only the lops and tops of trees that are harvested.

There is a strong opinion among the different sections of the rural community that the SFP has the "potential" to mitigate the intensity of the fuelwood crisis. This has been brought out by the survey of SFP in Tamil Nadu by the Department of Economics of the Bharathidasan University (1983). The survey has found that out of 180 respondents in Tiruchirappalli District, 114 comprising farmers, agricultural labourers, rural artisans and service personnel and village officers believe that SFP would increase fuel supply in the villages, 96 respondents think that it would provide more income and 87 believe that it would induce rainfall. The same study has revealed that in Thanjavur District out of 100 respondents 84 hold that SFP would increase fuel supply in villages, 73 maintain that it would provide more income to the rural population and 28 consider that it would increase employment. 83 out of 180 respondents in Tiruchirappalli and 61 out of 100 respondents in Thanjavur have expressed the opinion that SFP would restrict grazing of livestock which would be serious in the absence of alternative grazing grounds for the villagers.

Some of the studies on the need for and performance of SFP have brought out the hollowness of the threat of an impending fuel crisis in rural areas. The Evaluation of the SIDA supported SFPs in Tamil Nadu, India by Mike Arnold et al., (1987) has shown clearly that the rural areas of Tamil Nadu are not in practice experiencing the massive shortage of fuelwood that was assumed at the time of project design. Moreover, the overwhelmingly greater part of fuel supplies is coming from naturally renewable sources like agricultural residues. It, therefore, seems unlikely that the fuelwood situation is worsening rapidly. This is not to say that there are no fuelwood shortages. Certain areas, such as the more intensively cultivated and irrigated
areas, are short of organic matter for use as fuel. Some sections of the population, notably the landless, suffer shortages where they do not have access to the resources that are available locally. What this information does suggest, however, is that such fuelwood shortages as do exist are now seen to be concentrated among the weaker sections of the population. Questions arise about the likely effectiveness of farm level tree growing or of community plantations controlled by the stronger components of society, as solution to these shortages.

IMPLICATIONS ON LAND USE PATTERN:

SF production system has a direct bearing on agricultural production. In a tropical country like India, it is feasible to produce more food and more wood by integrating SF with agriculture. Under harsh climate conditions selected trees in the form of windbreak and shelter-belts provide a protective umbrella to agriculture. Trees help to ameliorate the effects of climatic excesses and erosion. In so far as marginal and submarginal lands are concerned trees help to improve their productivity. Trees, if selected judiciously, have the potential of increasing nutrient status of soil by stimulating bacterial activity. With rainfall pattern becoming more irregular and more unseasonal, trees attempt to stabilise production to some extent.

The concept of SF eschews the artificial dichotomy of agriculture and forestry and is the step in the right direction to evolve an integrated land use pattern. A study by Lundgreen and Raintree (1983) has shown that agroforestry is a sustainable land management system which increases the yield of land, combines the production of crops (including tree crops) and rearing of animals simultaneously or sequentially on the same unit of land and applies the management practices of local farmers.
Pernilla Malmer (1987) in a case study of tree farming in a village in Tamil Nadu has mentioned three main reasons for the rapid change in the land use pattern since the implementation of the SFP.

* The natural conditions of the area make tree planting one of the economically best alternatives for land use.
* The people in the area are only to a limited extent dependent on income from their dry-land for eaking out their living. Hence the lack of income in the first year after tree planting will not be an insurmountable problem for them.
* People in the village have very well understood the reason for planting trees.

Farmers’ decision in favour of growing trees appear to be heavily influenced by a number of overlapping factors related to the poor performance of most dry-land agricultural crops in recent years. A study by Mike Arnold et. al., (1987) has shown that with conditions deteriorating farmers shift to crops such as trees which require low labour inputs. The need to reduce annual operating costs in the face of declining farm revenues also favours tree growing because of its minimal input needs in most years. The deteriorating water situation similarly favours more drought resistant tree crops over alternative dryland agricultural crops. In addition, suitable tree crops can create a capital asset which could enable the farmer in the future to buy better land or improved access to irrigation water thereby reducing his subsequent exposure to drought and other contingencies.

The landless who constitute the bulk of the rural poor in India as a group have the potential to contribute a great deal to waste land development if given access to land, credit and technology. They are now the primary agents of forest destruction,
but this is because they lack alternatives to meet their basic necessities. **S.A. Shah’s (1992)** study of Group Farm Forestry efforts in West Bengal has shown what miracles can be achieved as waste lands are transformed in the process of alleviating poverty. The needs of wood-based industries for raw materials far exceeds indigenous production. Industry should be motivated and encouraged to assist and stimulate production of industrial trees on small farms. This can reduce pressure on government forests, which can then be managed for environmental purposes. To do this, granting tax incentives is justified. Industry should work with the Government to remove various constraints faced by farmers by providing programmes for sustained income generation with attractive prices, quality planting materials delivered at the farm gate, harvesting and accessibility to appropriate technology.

The importance of agroforestry development can be realised if demographic considerations are taken into account. A study by **P.K. Sen, Sarma and L.K. Jha (1993)** has shown that by 2000 A.D. the population of India will touch one billion mark with the projected foodgrain demand reaching a staggering 240 million tonnes. The current production level being around 175 million tonnes, the gap to be bridged is about 65 million tonnes with hardly a decade left. Equal increase will be the cattle population for which grazing land has not only decreased in area but also degraded to the extent that during summer months it is nothing but an exercise ground for them. In India more than 80 per cent of the potential arable land is already under cultivation. This indicates the limited possibility of increasing the average of the present arable land. However, the vast expanse of cultivable waste land and marginal and sub-marginal land available in the country can be put to productive use through various agroforestry systems. Agroforestry systems have built-in advantages.
It is generally assumed that capital, labour, land and commodity markets function perfectly to provide farmers with information and incentives to make optimal land-use decisions. However, market failures and distortions are often underlying causes of many of the land-use problems for which agroforestry systems are the proposed solutions. (Southgate 1985). Market failures and distortions can be classified into three categories:

* Property rights regime, including the problems that arise from insecure land tenure, common property and open access to lands
* Price distortions, including distortions in capital, labour and commodity markets, and
* Macro-economic development policies and strategies that promote industrialization at the expense of rural sector or otherwise distort the agricultural sector.

Accommodating traditional land use pattern in SFP will make its implementation successful. Any effort at extending the programme should proceed with an attempt to involve the community in it. In their study of Group Farm Project in West Bengal D. Sen et. al., (1993), have pointed out that the integration of savoy grass in the interspace of two rows eucalyptus in the Group Farm Project of West Bengal was an attempt, not only towards the recognition of traditional use patterns but also of taking due care of subsistence requirements of the landless tribal population among whom the programme was being implemented.

**INCOME AND EMPLOYMENT GENERATION**

Rural Poverty in India is proverbial. Urban poverty in the country is only a spill over of rural poverty. One of the causes of grinding rural poverty is the excessive dependence of population on agriculture as a source of subsistence and the absence of alternative sources of income for small and marginal farmers and agricultural labourers.
One of the schemes which can help in reducing rural poverty is the growing of trees of commercial importance in wastelands and vacant lands. The SFP has as one of its chief objectives - the generation of income among socially and economically downtrodden sections of the rural population.

In their *Benefit Cost Analysis of Farm Forestry Project in Vadhava Ahmedabad in the State of Gujarat (a Case Study)*, B.P. Srivastava and M.M. Pant (1979) have observed that the farmer’s returns from farm forestry practices show a marked increase against those from his seasonal crops. A farmer, given the technical know-how and the seedlings of the required species, can derive optimum benefits from the trees. The Financial Internal Rate of Return (FIRR) is very high - 89 per cent (78.5 per cent including the cost of seedlings) and surpasses any other fair market investment.

A similar Cost Benefit study was undertaken by B.K. Patnaik (1990) in Orissa. The study has revealed that in spite of the exclusion of some non-monetary benefits of certain forest species and some components, the B.C. ratio of 7.52 shows the high productive potentiality and feasibility of investment in the project. There are several socio-economic benefits of SF like environmental benefit, control of soil erosion, temperature moderating capacity which cannot be monetarily assessed.

The Society for SF Research and Development, Tamil Nadu (1994) has made a study of the viability of selected SFPs from different districts of Tamil Nadu by subjecting them to a social-cost-benefit analysis. The study has identified and quantified social cost in terms of labour cost, material input cost, land cost and environment improvement cost and social benefits in terms of distributional effect and generation of employment opportunities. It has then converted these quantities into a
common time perspective by discounting them at the social rate of discount in order to arrive at Benefit-Cost-Ratio (BCR), Net Present Value (NPV) and Internal Rate of Return (IRR). The following are the main results of the study:

* The life span of Babul, Subabul, Pungam, Cashew and Tamarind are estimated at 10, 8, 20, 40 and 30 years respectively.

* As the social returns for these tree corps are positive sums, it is concluded that SFPs are economically worthwhile.

* The benefit-cost-ratio estimations imply that the rupee invested in raising babul, subabul, pungam, pamarind and cashew crops under SFP will in turn provide Rs. 1.72, Rs. 1.29, Rs. 1.86, Rs. 1.55 and Rs. 2.34 respectively. These results confirm that these species are economically viable at 8 per cent social discount rate.

* Of the wood species (Babul, Subabul and Pungam) Babul plantation has a higher rate of return and of the perennial fruit species Cashew has a higher interest rate of return than Tamarind.

**B.P. Srivastava and M.M.Pant (1979)** in their evaluative study of SF Programme have pointed out the need for evolving new criteria for assessment of SFPs and go beyond the traditional cost - benefit ratios. They have suggested the following indices for comparing different SFPs:

* Their employment promotion potential.
* Extent of release of cowdung from hearth to field as manure.
* Structural timber and firewood resources created annually.
* Availability of fodder, fruits, seeds, bamboos and canes.
* Total income from these sources on an yearly unit area basis.
K.M. Tiwary (1983) in his SF and Development Study concluded that for the economic betterment of the people living below the grinding poverty line in a truly Gandhian way, one of most important schemes that can be thought of, will be the growing of trees of economic importance in the wastelands and vacant lands which at present are not being usefully utilised. This view is shared by Hans Gregersen et. al., (1989). In their study of the dynamics of SF they have pointed out that SF can contribute significantly to the livelihood of rural poor people by improving the soil and providing food supplements, wood for home construction, farm building, fencing, fuel and fibre; and shade and fodder for livestock. SF can provide income for farmers and rural communities and can help to raise people from frightening and fragile condition of subsistence to a better level of living.

Gerald Foley and Geoffrey Bernard (1984) in their Review of Farm and Community Forestry in various States in India have pointed out that in West Bengal the return from a successful eucalyptus plantation of 0.4 hectares is estimated to be as much as Rs.12,000 which makes it an extremely attractive financial proposition, considering that the farmer has to make no financial investment himself. In the light of such potential returns, land owners and panchayats are also beginning to turn over their own waste lands to tree growing.

U.N. Food & Agriculture Organisation (1985) has pointed out that agroforestry increases household income through the sale of wood and nonwood products in areas where commercial markets exist. The adoption of cash crop tree farming is increasing in many rural areas in response to emerging markets. In parts of India, for example, the market for poles has provided a strong incentive for farmers to take up cash crop tree farming on a large scale. However, the Indian experience has also
demonstrated that there can be problems associated with commercial farm forestry with respect to the impact on small farmers and the landless. In the absence of adequate support services designed to reach this target group, the demands of cash-crop tree farming may place it beyond their reach. Moreover, the use of more land for cash crop tree farming and the diversion of supplies to commercial markets can further strain the ability of the poor to meet their needs.

K.Dhanasekaran (1988) in an ex post assessment of Tree Cultivation Incentive Programme in Gobichettipalayam range of Periyar District has observed that the net returns from tree crops was higher as compared to other crops. The yields of tree crops were 140 per cent above the yields of agriculture crops. The costs, however, were only 33 per cent higher due to higher expenses on tree crops. But net returns above costs were 194 per cent due to high price nature of tree crops. In total, the net annual income generated through TCIP was calculated to be Rs.4963 and per household additional income to be Rs.206.79. The income generation through this programme increased by a negligible amount, namely 3.63 per cent of the total income of the households. This lower income generation per household can be attributed to the high mortality rate of tree plants, lack of awareness and non-availability of cultivable land for growing trees.

K.Dhanasekaran has also made an estimate of the socio-economic determinants of failure of plants. He observes that variations in age and education play an important role in fostering social and economic awareness and enables the adopter to pay more attention to tree growing. The percentage of failure of plants differs considerably as between the different farm size groups. The coefficient of total operated area turned out to be positive and highly significant at 5 per cent level. A possible explanation is that the farmers who cultivated small areas paid more attention to tree growing.
The size of farm, age and education thus seem to be important factors which have a significant influence on failure of seedlings at farm level.

S.D. Sen et. al., (1988) observed that in spite of the infancy of the SFP in West Bengal it has been able to create an impact specially in the otherwise barren north western tract of the state dominated by poor tribal farmers due to its orbitration around the weaker sections of the society in helping them to alleviate their poverty. This model of farm forestry has been emphasised by many other states also, but most of them are being criticised for benefiting big farmers and industrial houses. In this regard, the West Bengal Farm Forestry Programme can be considered to be a significant departure.

B.N. Mishra and S.K. Tripathy (1989) in their study of SF in the State of Orissa have come to the conclusion that the project has been able to develop village forests and rehabilitate the denuded forests by providing for people's participation which is a progressive step towards improving agricultural productivity and ameliorating climate.

Suhita Chopra and Deeparkar Chatterjee (1990) who undertook a case study of Community Centred Approach to Individual Farm Forestry in Midnapur of West Bengal observe that laudable achievements have been made in West Bengal SFPs, particularly in farm forestry. This is evident from official statistics which show that the actual achievements in the initial phases (1983-85) have surpassed the targets by more than 42 per cent. West Bengal may also be credited to have initiated many successful community centred programmes like the Group Farm Forestry (GFF). Conceptually, GFF may be considered to inject a communal component to individual farm forestry. Thus, while user rights and decisions are individual, the real management authority is the community. Any successful project of this sort, therefore, has the potential of generating lessons of broader validity for group endeavours which have, so far, not fared very well in the non-homogeneous Indian set up.
The Agro-Economic Research Centres of Andhra Pradesh and Himachal Pradesh in their evaluative study of the Working and Management of SFP in selected districts of Andhra Pradesh and Himachal Pradesh respectively have come to the following conclusions: (1988)

* In Andhra Pradesh eventhough the programme is meant for rural people belonging to scheduled castes and scheduled tribes it has been found that households belonging to forward communities have come to enjoy the benefits of the programme.

* These households belong to farmers who have satisfactory educational and economic background. They have been attracted by the programme as it is capable of yielding better income and as there is no scope for labour problems.

* In Himachal Pradesh more than two-thirds of the selected beneficiary households have been found to be interested in plantation on government and panchayat land for fodder and timber.

In its study of the Forestry Sector in Tamil Nadu the Tata Economic Consultancy Service (1995) has analysed the trend in the growth of forest revenue and expenditure during the three decades from 1960-61. The analysis has shown that during the period while revenue has increased at 10.9 per cent per annum cumulatively expenditure has grown 14.8 per cent per annum. Due to the steep rise in expenditure the forest department which was generating surplus funds till 1980, is now faced with a deficit. It is, however, significant to note that the steep increase in the expenditure of the forest department is mainly due to the steep rise in its capital expenditure which now constitutes half of its total expenditure as compared to one-third earlier.
SF, in addition to its objectives of ecological restoration and supply of basic needs like fuel, fodder and timber has also an important role to play in generating additional employment. Many of the states in India have mobilised additional resources for SF by linking it to National Rural Employment Programme (NREP), Rural Landless Employment Guarantee Programme (RLEGP) and Jawahar Rojgar Yojana (JRY). The different components of the SFP are capable of providing productive employment to small farmers, marginal farmers and agricultural labourers who are suffering from problems of underemployment and unemployment. The services of such people can be used for raising tree plantations, maintaining them and harvesting them.

One of the reasons for the widespread prevalence of unemployment in rural areas in India is the disappearance of small forest patches in the countryside. This has been brought out by K.M. Tiwari (1983), in his study of SFP in India. He observed that one of the factors which has crippled the economy of the landless and other poor cultivators and made them unemployed is the gradual disappearance of small patches of forests which dotted the countryside about 2 to 3 decades ago. In fact, during the last 30 years, 20 million hectares of such forest patches have been lost. They used to provide raw materials for the village industries. The disappearance of such forest patches has adversely affected the rural industries and has increased the rural population's dependence on agriculture as the only source of living.

The employment potential of commercial tree farming in wasteland is the subject matter of a study by B. Agarwala, et. al., (1981). They have estimated that 3.2 man-years is required to rehabilitate a hectare and 25 man-years to manage it on a continuing basis. This suggests that over 25 million man-years of employment is added after wasteland rehabilitation. One man-year of employment per hectare rehabilitated may
be a conservative estimate. If so, at least 100 million man-years of employment can be generated by rehabilitated waste lands. Well before all the waste lands are reclaimed, labor scarcity would derive real wages above subsistence, even for unskilled and part-time workers.

The operation of the employment multiplier in SFP has been studied by Gupta (1982). He estimates that for every person directly employed in forestry, four get employed outside because of forward linkages. With a more developed wood and fibre products industry, these multipliers might be increased. He further estimates that the current level of 11 million man-years of work in non-timber (minor) forest products can be increased to 3.2 million man-years. A much more spectacular increase is likely if waste lands are rehabilitated.

In his review of SF in Orissa, Padmlochan Behera (1984) has made a specific reference to the employment potential of the programme. He has stated that with an investment of Rs 500 crores, five million acres can be covered with trees every year. After the fifth year, a million and a quarter acres can be cropped. Apart from 1,00,000 people who will be required for the purpose, an equal number will be employed in soil preparation, conservation, and harvesting operations. In addition, the collection and processing of forest products will generate a large number of jobs. The total employment created will be around 3,00,000. The benefit from this, in monetary terms, will amount to over a hundred thousand crores of rupees. Though forest is a source of revenue, its real worth lies in being a source of livelihood for millions of poor people.

The study undertaken by Jeelani and Prasad (1985) in Andhra Pradesh has brought to light the following facts.
As most of the farmers are taking up eucalyptus not out of any zeal to solve the future deficit problem of fuelwood but on expected demand from industrialists, the programme is becoming more a commercial forestry than SF. There should be a restriction of plantation on hitherto cultivated lands or at any rate all subsidies for such shifts should be stopped.

The programme, if it is taken up in waste and marginal lands would to some extent create employment. But if hitherto cultivated lands are directed to plantation with the hope of getting more income it would only intensify the problem of rural unemployment.

Instead of weaker section households, the rich and well-to-do farmers are taking up the plantations with the hope of getting more income and avoiding labour problems. This, if not checked, would widen the gap between the rich and the poor.

Providing employment to women is one of the objectives of the SFP. The National Council of Applied Economic Research (1988) in a report prepared for the Government of India and SIDA has pointed out that the proportion of women employed in SF in Bihar, Maharashtra and Gujarat is quite substantial. In Maharashtra, the number of women employed exceeds the number of men. In West Bengal, though less, the proportion of women is quite significant. Only in Jammu and Kashmir the proportion of women is exceedingly low. There is evidence, particularly in those states where emphasis is being laid on people’s participation of woman having received special attention. One example of this is the inclusion of women among contact persons or village forestry workers. In Bihar, particularly, the proportion of women contact persons at 28 per cent is quite commendable. Their involvement in forestry as revealed by employment figures, notwithstanding, women still have a sustained role in community activity.
forestry. Their inclusion among motivators is important. The very substantial proportion of S.C/S.T (mainly S.T.) in the employment figure in Bihar and West Bengal is due to the large population of scheduled tribes in the area where the programmes have been implemented.

Hans Gregerson et al., (1989) made a study of the employment generation under SFP. They hold that while SF cannot solve the problem of rural unemployment, it can contribute significantly to the creation of jobs and larger income for the rural areas. These jobs are diverse and depend not only on wood, but on fruits, mushrooms, nuts, leaves, fibres and forest game. The connection between employment and SF may be indirect also. Many rural non-wood based industries, pottery, tobacco, sugar refining to name a few, often depend on wood for fuel.

The findings of the study by Hans Gregerson et. al., (1989) are in line with those of the World Bank Discussion Paper (1989) “People and Tree”. The discussion paper has pointed out that SF can give rise to significant employment opportunities for farm families and the landless. These income earning opportunities are not only in seedling production and in planting, tending and harvesting trees, but also in complementary activities, such as processing and selling wood and other parts of tree (fruits, barks, resin, branches, leaves) and other forest products grown among trees (fodder, berries, roots and tubers). These activities, in turn, can stimulate service employment, such as transportation and maintenance. In situations of chronic high unemployment, this aspect of SF can be critical in a strategy for sustainable development as in forest-related activities, such as producing handmade furniture, tool handles and carts, often using wood produced by local farmers or local communities. Small-scale investment opportunities in these activities and in farm forestry itself are generating employment income and savings.
There are several studies dealing with the potential of SFP to generate income and employment. Many of them hold that the programme is financially sound and is capable of generating income and employment. Desmond Chaffey et al., (1992) in their evaluation of SIDA supported SFP in Tamil Nadu and Orissa have the following to say about the economic impact of SF:

* Community plantations are financially viable to a village but would need to show above average survival and growth rates to be so in the absence of funding by the project.

* A large proportion of returns from community planting goes on not to the rural poor but to urban traders, retailers and industries.

* The generally low returns indicated for community planting are attributable largely to the project's high overhead costs and the large number of failed plantations.

The Evaluation and Applied Research Department of the Government of Tamil Nadu (1995) in its evaluation report on employment impact of SIDA SF has pointed that out of the 4421 villages in the project area, 9.54 lakhs of working population have been benefited which accounts for 17.68 per cent of total working population of 53.96 lakhs. The enquiry which the department has conducted with sample beneficiaries under SIDA indicates that on an average each beneficiary was able to work under SIDA project for 87 days during 1994-95. On the basis of performance achieved in 1994-95 the Department has concluded that the total number of mandays generated together for phase I and II works out to 830 lakh mandays. Of this, the total number of womendays is 281 lakhs. The study has further estimated the distribution of sample beneficiaries categorywise. Out of 9.54 lakh workers benefited under the project, landless labourers and marginal farmers together constitute 7.44 lakh (78 per cent). This indicates that the weaker section
of the society is the main target group of the scheme. As far as landless labourers are concerned, women workers enjoy a higher share in work participation when compared to the rest of the categories. Villagers in general were able to get employment in SFP for a sizable duration ranging from 30 to 200 days. The study has revealed that the landless labourers are in an advantageous position to obtain employment for a longer duration. Out of 88 landless labourers 65 (74 per cent) were able to participate in SF work for more than three months.

The study by the Evaluation and Applied Research Department of the Government of Tamil Nadu (1995) has further shown that the contribution of SIDA SF works to different categories of workers ranges from 25.5 per cent of household in the case of medium farmers to 50.9 per cent in the case of landless labourers. Above all the study has revealed that the SIDA project has helped all the three hundred sample households to reach the upper income group, namely, Rs. 11,000/= to Rs. 14,000/= per annum and thereby has mitigated their poverty. Agarwal (1986) has accused that the SFP has not benefited rural people in general, let alone the poor, but has brought financial gains to rich large farmers. The trees being grown do not meet subsistence needs. The dominant species is eucalyptus, which is grown as a cash crop for sale to the rayon and pulp industries.

COMMUNITY PERCEPTION AND PARTICIPATION :

SF like many other development programmes was launched with the basic initiative coming from the Government under given ecological and socio-economic compulsion. Several programmes of rural development implemented in the recent past could not come upto the expectation of their planners due to lack of people’s involvement in planning and implementation of the programme. If the SFP
should succeed, there must be proper coordination between the governmental agencies and the general public. Without people’s participation SF or community forestry will have little value.

According to Hobley (1987) the term community forest is used to include in the word the ideologies of empowerment of the poor and women and their complete and active participation in the local decision making. The use of the term gives rise to the notion of an undifferentiated group of beneficiaries. All within the village will benefit from community forestry. It is implied that the local communities are homogeneous entity, united for common action by their need for firewood and fodder, ignoring the differential access to both natural and political resources, within the village, dependent upon caste, class and gender.

R. Swarup (1987) in his study of Management of SF observes that various programmes of rural development started in the recent past could not come upto the expectation due to misconceptionalisation of the programmes both by the implementing agencies and beneficiaries and lack of people’s involvement in planning executing and monitoring of the programmes. As development is an integrated process, it cannot be achieved except through committed coordination between development programmes. SF also envisages motivation of the local people to carry out the programme.

In his study of people’s participation in SFP in Himachal Pradesh, R. Swarup (1987) has found that

* among the sampled non-beneficiaries around 25 per cent have reported that their non-participation is due to ignorance about the programme. The awareness gap is mainly due to lack of publicity extension activities on the part of the implementing agencies.
that around 44 per cent of the households did not participate in SF due to non-availability of waste land.

* only 36 per cent of participant households could utilise their waste unproductive land under the programme. The remaining 64 per cent could not fully use their waste unproductive land mainly due to non-availability of tree species of choice in time.

* the SFP in Himachal Pradesh has not been able to effectively mobilise the people to participate due to limitations in the programme’s delivery and response receiving systems at the grass root level.

Sen and Das (1987) hold that the success of SF programme depends largely on effective people’s participation at various stages of their implementation. People’s direct involvement in the programme is necessary right from the project formulation stage where decisions are taken regarding selection of site and maintenance distribution of benefits and marketing of produce.

N.G. Basu (1987) has concluded that without the active participatory involvement of the local community in the forest area, neither the existing forest can be preserved nor the high-yielding man-made forest can be created. Local community’s participatory involvement would not be possible without re-creating the sense of belonging in them.

The responsibilities which the participants in SF are expected to undertake in farm forestry encompass four major areas, namely pitmaking, planting operation, maintenance and protection. According to D. Sen et. al., (1988) the awareness of the sample participants in Western Midnapore Division of West Bengal was observed to be cent per cent in majority of the plantations. Regarding the benefits
likely to be derived from plantation under farm forestry the awareness of the respondents was mainly focussed on the fulfilment of fuelwood requirement. Monetary benefit after the sale of produce was also another aspect about which majority of the respondents were aware. Poor awareness was observed in the areas of effect of forest on ecology and better utilisation of land unfit for agricultural crops, soil conservation etc.

The World Bank Discussion paper “People and Tree” (1989) observes that afforestation strategies of projects must start with the identification (or establishment) of a viable unit or a group of social organisations capable of sustaining the programme; tend to ensure a match between the sylvicultural technologies they promote and the social group they address; and deal with the issues of social engineering (group formation, leadership, participation in decision making, intra-group structures and so on) with the same scrupulous attention as is given to the technical or financial element of the strategy.

The SFP basically caters to the family needs of fuel and fodder it is reasonable to assume that the entire village community will readily respond to it. At this point the role of village panchayats become crucial. This fact has been stressed by Amitabh Tewari (1983) when he says that in fact, the village panchayat is the most appropriate agency to implement the programme of SF, as it will be able to encourage voluntary participation of rural people and also help in providing necessary guidance in this regard. Its foremost task will be to educate the rural people about the direct and indirect benefits of trees. It will also have to pool available forest or revenue land and privately owned wasteland for this programme. Further being the apex institution at the village level it will have to provide necessary guidance to people

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in the selection of species of trees, in the protection of newly planted saplings and evolve a proper code for the sharing of the produce of trees planted under the scheme.

**D. Sen et al.,** (1988) study of people’s participation in community forestry in Maharashtra has revealed that all respondents belonging to small, medium and big farmer categories and 85 per cent of the landless people were aware of the tree plantation programme taken up in their village. None of the landless category know about the objectives of the programme while majority of the medium (83 per cent) and big (67 per cent) farmers and one fourth (25 per cent) of small farmers expressed knowledge about the objectives of the plantation taken up in their village. However, they did not know it as ‘Community Forestry Programme’. For most of the people knowing about the plantation, the usual sources of information are fellow farmers and forest officials.

The study undertaken by **D. Sen, A. R. Pandare and P.K. Das** (1993) that to rescue households from the grinding poverty line in a truly Gandian way, one of most important schemes that can be thought of will be people’s participation in Forestry Programme. In the five states selected for the study:

* The level of awareness of the respondents towards the purpose of raising community plantations indicates that the benefits have been uniformly perceived by them.
* Most of the respondents have come to know about them only after the initiation of plantation activities.
* Majority of the respondents could not perceive their roles as anything beyond that of labour either free or paid.
* At no point of time people have felt their very important role in decision making because their options have been seldom sought.
* The poorer categories of villagers regard community plantations as encroachments
over their traditional rights of grazing, cultivation or other kind of economic utilization of the common lands.

- Panchayats or VSFC in one of the states has been found to be ploughing back the income from community plantations for improving the existing ones or for establishing new ones.

- The participation of village people in the states has been found to be passive in as much as the management of the community plantation has been the prerogative of SF Department.

- In raising farm forest, economic profitability has been the supreme concern of both male and female members of the family even though they are intended to reduce the drudgery of women in collecting fuelwood by raising fuelwood species.

D. Sen et al., (1993) further observe that three dimensions of people's participation in SFP appear to have maximum significance. These are:

- Participation in decision making regarding the choice of site and species, mechanism of benefits distribution etc.,

- Participation in programme implementation like establishment, maintenance and protection of plantation.

- Participation in sharing of benefits.

There are several studies which are critical of the SFP, because of its failure to promote community participation. In his review of SFP in Rajasthan, B.L. Verma (1982), is critical of the SFP when he says that the project has brought about no social change. The resource is not being utilised for the people nor for the community. It has no element of permanent resource creation. Nobody has considered the socio-cultural dimension of the project nor examined its ecological compatibility and the villagers are given no credit for intelligence and cooperative spirit.
In her study evaluating the participation of people in the SFP Cathy Nesmith (1991) holds that opportunities for participation were more limited for women than men; that short term fuel benefits are likely to be controlled by men; and that women from richer households have gained more than women from poorer households. She further maintains that the implementation of the SFPs has left little scope for “People’s Participation”, despite the participatory aims of the planning document. There has been pseudo participation but not authentic participation. Women were excluded even from limited dialogue that took place between the forest department and villagers. Although ostensibly concerned with women’s issue - fuel - the project failed completely to involve women or take any steps towards improving their position in society.

Desmond Chaffey et. al., (1992) who have completed an evaluation of the first two phases of SIDA Supported SFPs in Tamil Nadu and Orissa have highlighted the following facts about people participation in SFP:

* People’s participation has throughout been a problem in the matter of representation of bodies at the village level. This has adverse implication for the sustainability of the community plantations.
* Community plantations have been planned and managed with little participation by the community. Panchayats have had little incentive to take over their management as they receive their 60 per cent of revenue in any event.
* Interface Forestry programme which provides for people participation has tended to employ labour through contractors.
* In the agroforestry components a third of the beneficiaries have been large or medium farmers.
* The decrease of women’s involvement in the project has been low throughout. Women beneficiaries have been employed as labour. A few of the project staff and only 6 per cent of the village SF workers are women.
OTHER BENEFITS:

In the words of William R. Benthey (1984) in his Supply and Demand Relationships, the central focus of micro economics, is often overlooked by applied economists who are expected to concentrate on production economics applied to agroforestry and other technologies. There are substantial lags between investment decisions about capital intensive forms of agriculture such as agroforestry, horticulture and livestock and production for market. Misunderstandings of markets are strongly influenced by public agencies, such as forest services that manage public timber or policy-makers who determine property rights, taxation and other critical institutional factors.

In West Bengal SF has been more successful because the village panchayats were actively involved in identifying land and beneficiaries. This has been well brought out by Kamala Chowdry (1989) when she refers to the revitalization of village panchayats in West Bengal. This was based on the implementation of land reforms and distribution of surplus lands. A group scheme of SF emerged in these villages as a result of the efforts the landless people who were distributed surplus land. Fuel, fodder and also cash incomes increased. The forest department negotiated with several village communities to protect forests on the basis of an agreed sharing of income. The protection of forest by village communities has been quite successful in West Bengal.

In rural areas, demonstration has proved to be a most successful method as rural people are guided by the principle of 'seeing is believing'. Although this method has not been used for motivating people in SF, there are cases where the demonstrative impact of successful plantations has triggered off multiplier effects in the community.
A study made by D. Sen et al., (1983) has shown that in West Bengal the farm forestry programme gained momentum only after the rural people came to know of the success of the programme in adjoining villages. The tank foreshore plantations taken up by the Tamil Nadu Forest Department started receiving encouraging response once the benefit percolated to the people belonging to the villages concerned.

There is a general feeling that agroforestry programme is favourable to large farmers. L.K. Jha and Renu Rajan (1990) in their study of farm forests under agroforestry programme in Chotanagpur of Bihar have observed that, in general, farmers showed awareness regarding social/agroforestry programmes. They are acquainted with most of the components of the programmes. Large farmers adopted more social/agroforestry programme and the landless showed the least interest. Respondents adopted more social/agroforestry programme on wastelands. Farmers saw more benefit on these than agricultural land. The extent of adoption of social/farm forestry and agroforestry depends on appropriate technological inputs. This is particularly very relevant in rainfed farming. Adoption of the above programmes helped in the creation of employment opportunities in the village.

The Tamil Nadu SFP is targeted towards five groups: poor and marginal farmers, landless labourers, women and scheduled castes. Mike Arnold et al., (1987) made a mid-term evaluation of the project implementation. Their observations in the field have led them to conclude that there is very little positive impact on the target groups. The negative impact on these groups is, on the other hand, neither very
dramatic. Therefore the overall conclusion is that the target groups are on the whole left outside the project.

Further, forests play an important role in supporting and subsiding the livestock economy of a region. M.V. Nadkarni et al., (1987) in their study on forest dependence in Karnataka state have observed:

* the dependence of the livestock economy on the forests can be seen in Uttara Kannada where there are many forests;
* 67 per cent of the total fodder cost in the region is accounted for by free grazing, indicating the enormity of dependence on the forests;
* though in absolute terms the richer sections of the rural society, the landlords and capitalist farmers, exploit the forests very much more than the poor classes, in relative terms the dependence on forests is vital to the livestock economy of the poor peasants and agricultural labourers;
* it is only the dependence on free grazing which makes the livestock economy viable;
* it is paradoxical that in spite of the vital role that the grazing lands play in supporting the livestock economy, they are poorly managed and the village community shows little interest in making them productive and sustainable.

Marketing Aspects:

Raintree and Hopkins (1988) noted the importance of market links in tree-planting projects. It cannot be assumed, as in the past, that tree products will be easily absorbed in the market. Even where positive market demand exists, it is simplistic to assume that marketing has a zero cost and thus can readily be performed by any farmer.
The traditional view that production and marketing are separate decision processes may help to explain past inattention to market considerations. This perspective is now recognised as a major limitation to optimising farm-business profitability. **Harrison and Shevedel (1974)** showed that activities usually identified as either production or marketing are more correctly viewed as an integrated whole. Farmers need to consider economic issues along with such agronomic ones as cultural practices and selection of planting materials.

**Arocena-Francisco and Pabuyon (1991)** have found that for the small farmers in Asia, marketing is seriously constrained by diversity of products, farm size and subsistence orientation of the production of the system. These constraints result in high marketing costs that limit farmers ability to trade tree products. Some type of collective trading is needed. With sufficient volume to trade, large scale trading may significantly reduce the per unit marketing costs of the product, which creates a surplus that can be used to buy inputs.

Marketing of farm forestry and agricultural produce has posed a major constraint to the development of rural economics. Small producers are denied a fair price for their efforts, receiving only a fraction of what the consumers ultimately pay; the middleman has enjoyed the lion’s share. **Vinayak Patil (1992)** has made a study of the impact of cooperative marketing of the farm forestry products in Nasik District of Maharashtra State. His study has shown that the society helps to ensure less privileged farmers quick economic returns by promoting scientifically proven cultivation of fast growing trees as alternatives to growing conventional crops. The society also sets up processing units to organise marketing of tree products on a co-operative basis for maximum economic returns to farmers. The society began evolving a marketing
system in 1988-89. During the first year sales amounted to Rs.1.2 million. The sales increased to Rs. 4.5 million in the next year. Farmers who are members of the society, are compensated fairly for their produce. Success in Nasik District has revived the confidence of financial institutions including NABARD. They now realise that, with proper management and efficient marketing, agroforestry and farm forestry projects can be economically viable.

GENERAL APPRAISAL OF PERFORMANCE OF SF:

In his critical review of the SFP in Rajasthan B.L. Verma (1982) states at the end of the project period all that the people of Rajasthan will have from SF is 50,000 tonnes of corroded barbed wire stretched on termite eaten pullies, across the heart of the state for over 1,00,000 km. The state will be poorer by a few hundred thousand trees cut to make the upright for barbed wire fencing and saddled with the permanent liability of 2043 forest officers and guards costing Rs. 2 crores annually to the exchequer.

The Centre for Research, Extension and Integrated Rural Development, Gandhigram Rural Institute (1983) in its evaluation of Farm Forestry Programme in Madurai, Ramanathapuram and Tirunelveli districts of Tamil Nadu has highlighted the following facts about cost benefit of sample plantations:

* The average cost of raising a plantation per hectare is found to be maximum in Madurai (Rs. 423.87) followed by Ramanathapuram (Rs. 395.97) and Tirunelveli (Rs. 382.07) districts.

* The cost of establishing younger plantations is higher than that of establishing older ones.
* The establishment cost has been steadily increasing over years, the cost of maintaining is decreasing in all the districts.

* Totally 10 out of the 48 sample of plantations have been felled in the three districts. These plantations have taken 9 to 17 years for “maturity” before felling.

* The maximum biomass yield is 369 tonnes per hectare (in Ramanathapuram) while the maximum is 32 tones (in Madurai).

* The average revenue per hectare is the highest Rs. 3711.34 (in Ramanathapuram) while the lowest is Rs. 73.41 (in Madurai).

* The maximum revenue is Rs. 9.38 times higher than the average cost in Ramanathapuram district while the minimum revenue is 5.8 times more than the average cost in Madurai district.

In an evaluation of Farm Forestry Project in Chengalpattu District of Tamil Nadu the Madras Institute of Development Studies (1983) has observed the following:

* Out of the 280 respondents 63.9 per cent are not aware of the work done in the first decade of farm forestry. This group consists mainly of 54 illiterates, 56 primary level educated and 58 secondary level educated. There appears to be a relation between awareness to farm forestry and illiteracy.

* 171 (61.1 per cent) of the respondents have no land to offer due to many reasons, long-term investment and delayed returns and joint property and the balance 40 (14.2 per cent) are prepared to offer their land for farm forestry.

* 174 (62.1) are prepared to plant if seedlings are given by the department.

* 184 (67.5 per cent) do not want institutional assistance.

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* 174 (62.1 per cent) respondents feel that there will be no decrease in land or land output due to farm forestry.

The Department of Economics of Bharathidasan University (1983) in its survey report of SFP in Tiruchirappalli, Pudukkottai and Thanjavur districts of Tamil Nadu has made the following observation about the benefits cost ratio of selected plantations:

For most of the plantations the establishment cost represents a major component of the total cost. For a few older plantations the establishment cost is less than the total maintenance cost.

In the case of the 14 felled plantations selected for study, their respective benefit cost ratios reveal that except for one plantation in Thanjavur West division, all the other plantations are profitable. One cashew plantation in Pudukkottai district is found to be highly profitable.

Iyyam Pillai (1988) made an evaluative study of a number of old and new SF plantations in Tiruchirappalli district and arrived at the conclusion that SF, in general, has yielded an economically reasonable return. His analysis is based on the net return per hectare per harvest, ignoring the time period involved. He has also examined the problems of implementation of the SFP and has concluded that its failure has been due to lack of cooperation between implementing authorities and the local people.

Swarup Singh (1988) has made a comparative study of the cost benefit of agroforestry and crop production in Haryana. He observes that benefit-cost ratio and the average annual benefits are greater in the case of agroforestry plantations than in the case of other crops raised on the same land. Even then farmers prefer
agricultural crops because of the large gestation period in the case of tree crops. Swarup Singh has advocated the planting of trees along field boundaries.

Many evaluative studies have brought out the lacune in SF. B.L. Verma (1982) maintains that SF should be based on long term management rather than doubtful short-term expediency. It should create a self-propelling self-reliant movement and self-sustaining economic life for development of village and people. Then the village forest will be really social; it will cut out overheads and generate employment in the villages. The integration of tree culture through external service with farming would result in much sounder ecological balance and greater productivity.

D.M. Chandrasekhar et. al.,(1987) in their study of the impact of SF in Karnataka have expressed their wonder at the way in which the World Bank and the Overseas Development Administration have accepted and adopted the name “SF” for a project essentially, intended to promote tree planting of incredible density (5000 saplings per hectare) on private farm holdings.

Chatha et. al., (1988) have made a detailed analysis of production and marketing patterns in respect of eucalyptus plantations in Punjab, using the average net return per annum as a measure of profitability. They have found that trees planted in blocks do not give adequate returns as other seasonal crops. But the plantation of such trees on field boundaries has led to better returns. The study team should be restricted to marginal lands only and elsewhere the trees should be planted along boundaries of fields.

In his study of the relative economics of tree and agricultural crops in Pondicherry Union Territory, Radhakrishnan (1988) has compared the annual returns
from the short rotation tree crop of casuarina with agricultural crops like paddy, sugarcane and gingelly. He has found that the returns from casuarina which have been grown with intercrops have been lower than those from the agricultural crops. Yet the area under casuarina has been increasing due to scarcity of water and labour in the area.

Rawat (1988) in his study of economic considerations in eucalyptus farming has developed a model which he maintains will enable cultivators to solve problems relating to rotation age and density with regard to tree cultivation. His model is based on the spacing trials of hybrid eucalyptus in the Terai region. He holds that for a reasonable level of discount of 12 to 15 per cent, the optimal rotation is more than ten years.

The National Council of Applied Economic Research (1988) in their review of SF observed that as a result of SF there is diversion of labour from crop culture to forestry resulting in a drop in the production of some crops which is detrimental to rural economy, employment and income. In reality both crop culture and forestry provide seasonal employment and therefore, diversion of labour from crop culture to forestry would occur only if crop culture and forestry demand labour at the same time and their joint demand exceeds the total supply of labour. This is generally not the case.

With regard to the recent controversy that SF has led to shift of land from crop culture to forestry and has proved to be detrimental to workers, NCAER (1988) points out that by and large farmers tend to allocate only that land to tree crop which is relatively poor and usually unirrigated. On such land normally those crops are grown which have a low value. Transfer of land adds to the demand for labour
and also makes up, at least in part, the shortfall in the production of the crop substituted by tree cultivation.

The study by Krishna Rao (1988) in Khamman district of Andhra Pradesh has shown that a substantial area taken under SF belongs to big farmers. In fact out of the area which is taken up under SF 64 per cent comes under big farmers. This only goes to show that in the name of SF we are subsidising the big farmer by extending him liberal bank loans as well as by supplying him seedlings at a subsidised rate by the forest department. The manner in which the forest department is implementing the programme, it is certain that in the long-run there will be employment displacement from regular crops to wood lot which will be absentee landlordism as it is easier for a person engaged in any profession to start SF as it does not require as much supervision as is required in growing other crops.

In their evaluation of people’s participation in farm forestry in West Bengal D. Sen et. al., (1988) opine that the achievement under the programme exceeded the target by 48 per cent during this period. A large proportion of the participating families in the farm forestry programme in West Bengal belong to small and marginal farmer categories.

The paradigmatic shifts in the arguments advanced in favour of the SFPs by the funding agencies and the forest departments themselves speak volumes about the net effect of the programme. This has been brought out by S.R. Ramaswamy (1989). At first the programme was made out as being beneficial to the rural poor and as serving a most necessary and timely ecological function. When the poor masses were justifiably cool towards the programme, farm forestry acquired dominance. This naked aberration of the programme was justified by the World Bank on economic grounds.
In fact, farm forestry was considered by the World Bank and Forest Departments as the most effective approach to afforestation.

The foregoing review of literature relating to various aspects of SF has served to highlight the theoretical and practical ramifications of the programme as well as the conclusions arrived at by previous studies in this area. Some of the findings of previous studies, it is hoped, will serve to bring out the significance of the present study. The problems caused by wilful and wanton destruction of forests leading to a clearcut formulation of a National Forest Policy, the evolution of the SFP and the performance of the programme in various States, especially the state of Tamil Nadu to which the study area belongs are dealt with in the next chapter.