

**A STUDY ON FARMERS' PARTICIPATION
IN FARM FORESTRY PROGRAMME**

**A Thesis
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in
AGRICULTURAL EXTENSION**

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INDIA
1993**

**DEDICATED
TO
MY PARENTS**



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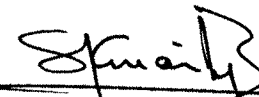
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CERTIFICATE

This is to certify that the work recorded in the thesis entitled 'A Study on Farmers' Participation in Farm Forestry Programme' submitted by Krishnendu Bhattacharya for the award of the Degree of Doctor of Philosophy in Agricultural Extension of the Bidhan Chandra Krishi Viswavidyalaya, is the faithful and bonafide research work carried out under my personal supervision and guidance. The results of the investigation reported in the thesis have not so far been submitted for any other degree or diploma. The assistance and help received during the course of investigation have been duly acknowledged.


(S. K. MAITY) 27/8/92

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CHAPTER I

INTRODUCTION

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INTRODUCTION

The survival of human civilisation depends to a great extent on the existence of adequate forest cover on earth. Forests are important not only because they supply the much needed fuel, timber and other forest products, but also for the development and maintenance of a sustainable ecosystem. An adequate forest cover may be achieved by extending forests beyond their 'legal' boundaries, to the rural masses. The need for interaction between the rural people and the forests led to the planning and implementation of Social Forestry Programmes.

Social forestry has two main components - extension forestry and farm forestry. Though community involvement is essential for both, the returns from extension forestry accrue to the community say Panchayat, whereas the returns from farm forestry accrue to the individual farmers. Individual motivation is important in farm forestry, and as such its spread has been much more in the rural society in comparison to extension forestry.

The farm forestry programme is being implemented in West Bengal in some areas having large concentration of uncultivable land and weaker sections of the people. Commercial growing of trees by the farmers in their own land is a new idea not only for the farmers but for the forestry extension personnel as well.

Statement of the Problem

Forestry had long been the domain of Govt. forestry officials, in which the local people were generally kept out of planning, management and benefit sharing, except some occasional employment here and there. This made the local people hostile to the forests and forestry officials, which in many places led to the deterioration and destruction of forests. It was gradually realised that unless the local people could be involved in forestry activities, the development of forests would be a distant reality. The role the local people could play in their own situations to meet their urgently felt needs relating to forest products became a matter of great concern to the forestry officials. This gave rise to various social forestry projects involving the local community and the individual farmers.

Need for the Study

In farm forestry, the individual farmer becomes the owner of the plantation and its return goes to the farm family. Successful implementation of farm forestry programme depends on the involvement of individual farmers and also of the farming community. To derive the benefits of farm forestry by the farm family, the society and the nation, it is essential to motivate the farmers to adopt this new technology at a rapid rate.

In this context, a study has been taken up to investigate some aspects of farmers' perception and participation in farm

forestry programme, so that the knowledge could be used in enhancing their participation in the programme.

The U.N. Economic and Social Council have defined popular participation as voluntary and democratic involvement of people in contributing to the development efforts; sharing equitably the benefits derived therefrom; and decision making in respect of setting of goals, formulating policies and planning and implementing economic and related programme.

Objectives of the Study

The general objective of the study was to find out some aspects of farmers' perception and participation in farm forestry programme. More specifically, the objectives of the study were to investigate the following dimensions of the participants under farm forestry programme -

1. Socio-economic profile of the participants;
2. Prior status, communication and motivation;
3. Farmers' participation in farm forestry programme;
4. Management factors in farm forestry;
5. Benefits of farm forestry;
6. Role of Panchayat in farm forestry; and
7. Problems in farm forestry as perceived by the farmers and measures suggested by them for improvement.

Limitations of the Study

The present study had the limitations of time and resources usually faced by a student researcher. However, considerable care and thought were exercised in making the study as objective and systematic as possible.

The study involved collection of data from the farmers about various aspects of farm forestry programme. The correctness of the responses, which were based on recall, might in spite of best efforts of the researcher, leave margin for error to creep in.

It may, however, be recognised that the findings of the investigation should not be generalised beyond the limits of the study area and areas having similar agro-climatic and socio-cultural conditions. In spite of the limitations, it is hoped that the findings of this study would be useful to the scientists working on forestry, forestry extension workers, planners and policy makers of Department of Social Forestry and various organisations engaged in farm forestry or agro-forestry programmes.

Layout of the Study

The thesis has been divided into eight chapters. The second chapter, following the first of introduction deals with the review of literature related to the present study. The third chapter deals with the methodology used in this investigation. The fourth chapter deals with the research setting and the fifth with

findings and discussion. The summary, conclusion and recommendations have been presented in the sixth chapter, followed by future scope of research in the seventh and bibliography in the eighth chapter. Lastly, the appendices, including the interview schedule have been presented.

CHAPTER II
REVIEW OF LITERATURE

CHAPTER II
REVIEW OF LITERATURE

The technology of farm forestry has recently been introduced in the rural social system. Availability of literature on the topic is rather few. In this context, Mercer and Hyde (1991) have stated that 'there are no rigorous empirical studies known to us that specifically examine the adoption of agro-forestry innovations'. However, the limited number of studies which were available to the researcher are reviewed in brief under the following sub-heads.

- A. Forest and farmer,
- B. Farmers' participation in farm forestry, and
- C. Problems in farm forestry.

A. FOREST AND FARMER

In this section, different dimensions of forest technology with which the rural people, particularly the farmers are involved are presented.

Forest is an area in which woody perennials like trees, shrubs, palms, bamboos, grasses etc. are naturally grown or planted for the purpose of deriving economic, social and natural benefits. Till the introduction of social forestry, forests were mainly managed by the State through its own specialised line agencies at

its own cost, to earn a revenue for the government. Protection of these forests gradually became a problem as people living in the neighbourhood started exploiting them to meet their urgently felt needs of fuel, timber, leaves, grasses etc. and often to earn a cash money by selling them.

According to Rao (1991), traditional forest management practices concentrated on three basic functions -

Establishing a 'legal curtain' between people and forests in order to reinforce efforts to police the forest estate,

Establishing targets and increasing forest output for commercial log production without reference to such questions as who benefits, and

Earning revenues for the State overlooking various socio-economic issues which ought to have been an integral part of forest development. As a result, in many places this perception led to gradual erosion of forest resource base.

To fulfill the above objectives, sectoral activities have been implemented on government-owned lands by exclusively using strategies and programmes developed by government forestry officials without consulting the local people. This isolation of the local people from the government managed forest system made them hostile

to it and these people became a major factor in the gradual deterioration and destruction of forests.

People's participation on a decentralised, self-help basis for conservation and rational utilisation of existing forest resources as well as for establishing tree cover on degraded forest lands and introducing trees into traditional agricultural systems became an urgent necessity, for achieving increased forest coverage in the country and maximising the benefits out of it. This gave rise to the concept of social forestry.

The National Commission on Agriculture (1976), stressed the socio-economic importance of social forestry in the rural community as well as in the management of forest resources. It was stated that by taking up the programme of raising of trees, grasses and fodder in the farmers' own lands, village commons, wastelands and degraded forests close to habitations, it would be possible to meet the requirement of fuelwood, fodder, small timber for rural housing and agricultural implements etc. It was also stated at the same time these programmes would remove a serious impediment in the practice of production forestry. The Commission adopted the following as the objectives of social forestry, being the basic and economic needs of the community aimed at bettering the conditions of living.

- i. Fuelwood supply to the rural areas and replacement of cowdung,
- ii. Small timber supply,
- iii. Fodder supply,
- iv. Protection of agricultural fields against wind, and
- v. Recreational needs.

Accordingly, the scope of social forestry programme was defined by the Commission to include farm forestry, extension forestry, reforestation in degraded forests and recreation forestry.

Even though the idea of Vanamahatsava and farm forestry had been accepted in the planned development, it had not caught on with the farmers except in a few pockets of the country. The crux of the matter is motivating the farmers to take to this practice.

Social Forestry as Supporting Agricultural Production System

According to Shah (1988) social forestry production system has a direct bearing on agricultural production. In a tropical country as ours, it is feasible to produce more food and more wood by integrating social forestry with agriculture in the form of a three dimensional mixed production system. Under harsh climatic conditions, selected trees in the form of wind-breaks and shelter-belts provide a protective umbrella to agriculture. Trees help ameliorate the effects of climatic excesses and erosion.

In so far as marginal and sub-marginal agricultural lands are concerned, trees help improve their productivity. In the uplands, they have an added advantage of protecting the watersheds against floods and deposition of sand and boulders on the fertile agricultural bottom lands. Trees, if selected judiciously, have the potential of increasing nutrient status of soils by stimulating bacterial activity in the soils. The release of cowdung which is an excellent organic manure, improves soil productivity considerably. In addition, the costs of providing chemical fertilisers would be reduced proportionately.

With the rainfall pattern becoming more irregular and more unseasonal, trees attempt to stabilise production to some extent. For example, dairying which is practised as supplementary to agriculture, derives a great deal of support from social forestry, particularly during the lean period when grass is in short supply.

One of the most important benefits that social forestry brings about is restoring, to some extent, ecological diversity in otherwise ecological (agricultural) monotony. Various unforeseeable and unquantifiable advantages such as biological control of pests and diseases, preservation of gene pools and improvement of nutrient status of soils accrue. Thus, social forestry protects and promotes agriculture.

Social Forestry as Supporting
Forest Production System

Shah (1988) further stated that, social forestry production has a great impact on the forest production system in the country. Social forestry serves as a buffer between the people and the commercial forests. Several instances are known in this country 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 most effective as well as economic way of controlling illicit fellings is to augment production as well as to establish a mutually reinforcing relationship between the forest department and the people so that they feel as much concerned about the protection of forests as the forest department. People should be made partners in the management of forests, i.e., growing, protecting, harvesting and marketing.

Production potential of the forests should be harnessed and in the process, employment opportunities should be generated to the extent of leaving little time to the people for being exploited by unscrupulous middlemen. Commercial forests are located in ecologically vulnerable areas where they serve a very important function of environmental protection. If these commercial forests are not maintained in good health, agriculture in the bottom lands would suffer considerably. Proper maintenance of such upland forests depends upon an adequate area under social forestry. Thus, it may be seen that social forestry is supportive of forest production system.

Farm Forestry

Sharma (1959) defined farm forestry as the practice of raising small woods on farm, in addition to normal cultivation. Its aim is to make the farmer self-sufficient in fuel, small timber, grazing facilities, fodder and manure leaf. Farm forests should be so laid out that all indirect benefits like protection of crops against high winds and control over erosion are also realised.

According to Foley and Bernard (1984), farm forestry is the name commonly given to programmes which promote commercial tree growing by the farmers on their own land. Programmes of this type are restricted to areas in which there is an existing market for wood or other tree products or where one can be created as part of the programme. The approach has been described as turning peasants into entrepreneurs and producers of timber and other forest products, and has been used successfully in a number of parts in the world.

Farm forestry is very much similar to agriculture except that the period of gestation is fairly long. The scarcity of fuelwood and timber is so great that the return of land (of relatively low fertility level) from timber and fuelwood outstrips that from agriculture. So long as this situation prevails, land would be diverted to tree farming. The type and the quality of land that would be so diverted would be governed largely by the

relative economics of alternate use of such lands. By better and scientific use of poor lands, the land owners would benefit financially so that they would be able to afford to purchase foodgrains required by them. Indian agriculture leans heavily on tree and tree products. By growing commercial tree crops, these farmers would be at least self-sufficient for their own needs and to that extent the pressure on limited forest resources would be reduced (Shah, 1988).

Different designs of planting are adopted by farmers. These are peripheral planting, block planting and agro-forestry. Peripheral planting consists of one or more lines of trees along the field boundaries in all directions. Block planting means planting trees in blocks of uncultivable land which may be interspersed with plots where crops are cultivated. Agro-forestry implies the combination of agriculture and forest production technologies where crops are grown with a few forest trees in lands under the same management system. In areas where animal husbandry is important, grasses and legumes may replace crops.

Extension Forestry

Extension Forestry depends on community involvement and participation. It includes Strip Plantations, Village Woodlots, Shelter-belts etc.

Strip Plantations : As the name indicates, forest trees are planted in strips of land such as roadside, railside, canal-bank, river-bank, foreshore etc. Villagers, particularly from the weaker sections and close to the strip plantation are entrusted with the job of protecting them. They are also allowed to collect grass, fodder, fallen wood and other minor produce from these areas.

Village Woodlots : These comprise mixed forestry, raising of grass, leaf fodder, fruit trees, fuelwood trees etc. established on suitable wastelands, panchayat lands and village commons. Panchayats have the responsibility for the management and protection of village woodlots and strip plantations.

Shelter Belts : Also known as wind-breaks, are established in areas having high wind velocity, to protect crops, fruit plants, homesteads etc. from damage.

Reforestation in Degraded Forests

Degraded forests are regenerated through replanting and/or coppicing and suitably protecting the area. Local villagers are permitted to collect a portion of the produce such as fuelwood, fodder etc. free of cost.

Recreation Forestry

These are established in urban, industrial or rural areas for the purpose of providing shade, shelter, and creating facilities for recreation of the people. In addition to giving an aesthetic and beautiful environment to the people, it helps in preventing and minimising pollution.

B. FARMERS' PARTICIPATION IN FARM FORESTRY

Traditionally, interactions between foresters and rural populations have been limited to protection, policing and revenue collection. Thus, the art of encouraging people's participation in forestry activities is new to foresters. Forestry extension systems provide the means for encouraging or inducing local participation.

In an interim evaluation report of Social Forestry Project in West Bengal, the Monitoring and Evaluation Cell (1983) identified some key contributing factors for success of farm forestry in the State. These are -

- i) Availability of wastelands
- ii) Supply of seedlings free of cost and additional material support in the shape of free supply of inputs like fertilisers, insecticides etc.
- iii) Setting up of a network of well distributed nurseries within convenient distance from the villages.

- iv) Extension activities by the field staff by repeated interaction with the target groups, mostly face-to-face talk, discussion in small groups, meetings, seminars and field level workshop, etc.
- v) Suitable legal safeguard for trees planted on farm-land.
- vi) Prospect of favourable marketability of produce.
- vii) Government support in the programme.

The following priority in the type of assistance needed by the participants in farm forestry programme in the laterite zone comprising Bankura, Purulia, Midnapore and Birbhum districts, was revealed by the Monitoring and Evaluation Cell (1983).

<u>Type of assistance</u>	<u>Mean percentage of multiple responses</u>
Supply of seedlings	98.2
Additional input including cash	90.0
Field level workshop-cum-training	55.2
Regular visit by forest personnel	44.5
Supply of printed materials	40.7
Marketing assistance	30.2

While assessing the gains from social forestry in West Bengal Shah (1987) stated that Arabari Forest Range in Midnapore district signified a unique opportunity to use wasteland afforestation as a means to improve livelihoods of the poor people. Vested land distribution programme of West Bengal government would not help poor people greatly except through farm forestry since more vested land, especially in laterite districts is unfit for productive agricultural use. Further, the 99 year land 'patta' has helped to instil in 'patta' holders a confidence and a feeling of ownership that has encouraged them to invest effort in improving the productivity of their land. Whether the shorter term 7-10 year tree 'pattas' that some other States are contemplating will be able to produce the same sense of security and ownership is an open question, but the answer most likely is negative.

In the final evaluation report of Social Forestry Project in West Bengal, the Monitoring and Evaluation Cell (1992) concluded that -

It is necessary that proper message is delivered to the people about the importance of timely planting, spacing, tending operations, thinning etc. For the poor section of the society, good amount of incentive should be given, otherwise the whole purpose will be lost.

In laterite zone soil is very poor and soil erosion is also very high. In such type of land some kind of soil conservation

measure must be taken to increase the growth of the plant. The Monitoring and Evaluation Cell suggested that -

- i) Choice of species should be done after discussion with the community. During choice of species, more attention should be given to the local needs. Percentage of timber and fruit species should increase.
- ii) Dialogue and meetings with the local community and Forest Protection Committees should continue regularly. Intensive motivation programme for awareness development should continue.
- iii) Stress should be given on more production of minor forest produces.

On motivational aspects, the Monitoring and Evaluation Cell (1992) observed that, the marginal farmers' holdings mostly were unproductive lands and they took to planting trees on a large scale as the inputs were obtained either free of cost or at a subsidised rate. They were motivated to adopt an alternative land use.

Most of the farmers planted trees for their fuelwood need and cash income. It was an encouraging trend that the farmers were trying to meet their fuelwood demand from their own land, which indirectly reduced the pressure on government forest.

In West Bengal, unlike many other States the major beneficiaries were resource-poor farmers who participated in a large number in farm forestry on their small holdings. Seldom prime agricultural lands were diverted for tree planting, as was the case with many resource-rich farmers in some of the agriculturally advanced States in the country.

Tree husbandry advice is generally given at the time of delivery of the seedlings at the nursery site. But after planting it is not possible for the staff to visit each and every plot due to shortage of time and manpower. Because farm forestry plots are scattered all over district and there are thousands of plots, it was not possible to cover those with so small number of staff.

Most of the beneficiaries did their planting works themselves along with their family members.

A study on management of social forestry in Assam indicated that the programme succeeded in attracting only the educated people. The study recommended that steps should be taken to involve panchayats, youth clubs and women's organisations, etc. in this programme (Saikia and Goswami, 1985).

In a proposal to strengthen forestry extension in India, Banerjee (1987) suggested that in farm forestry, farmers have to be motivated to plant trees on their own land at their own cost. This may mean using land lying waste (including planting on bunds around farms), switching over from the present land use to tree

farming, allocating a part of one's labour to an activity which is not immediately rewarding. The aim of all these activities is for better economic returns to the farmer and for production of fuelwood, fodder and small timber for direct use at his home. The technology required to achieve these benefits has to be specifically extended to the farmers. This technology should include how to raise the maximum volume of wood in a minimum time. To realise the benefits of tree planting takes time; therefore, extension has to be continuous. According to him, the operational steps in farm forestry extension are -

- i) Creating a general awareness of tree economics, availability of incentives for farmers, importance of trees at homestead, its effect on agriculture, etc.
- ii) Conducting survey every year of demand for different species of trees by would-be beneficiaries at least 3-6 months in advance of planting time.
- iii) Checking whether suitable land is available for the number of plants requested.
- iv) Supply of seedlings and other inputs.

- v) Promotion of decentralised people's nursery involving landless people, school children and such other village level institutions.
- vi) Transfer of technology and skills through regular field visits.

Sharma, Chand and Bhatti (1989) estimated the fuelwood, timber and fodder requirements of three farm household size groups in the hill areas of Himachal Pradesh. Data for 1987 were collected from 226 farmers selected from three zones (low hills, mid hills and high hills). The results indicated a high dependence on forests. The nature and degree of dependence varied on purpose, agro-climatic conditions and income status. An inverse relationship was found between the dependence on forests for fuelwood and fodder and farm size. They suggested that in view of the heavy reliance of local people on forests, efforts should be made to encourage the protection, regeneration and development of forests.

Mondal (1991) in his study on "Development Management by Gram Panchayat Organisation" in Nadia and Hoogly districts of West Bengal found that the Gram Panchayat Pradhans considered 'tree plantation' and 'protection of trees' important as it contributed towards improving the quality of rural life. The factor loading of these two variables were 0.8486 and 0.8782 respectively. It

was suggested that the Gram Panchayat has to play an important role in restoring and improving the ecological balance in the rural areas through plantation of trees and their proper maintenance.

In a study on the impact of Tanzania's policy of village afforestation, Skutsch (1983) found that -

Shortage of firewood was not merely an incentive to start a woodlot, but also to succeeding with it;

Skills in planting and caring for young trees were widespread;

The style of forestry extension work tended to encourage the starting of woodlots but not their planning and expansion;

The transport of seedlings to the villagers at the appropriate time was a greater constraint than their actual production at the nurseries; and

The communal aspects of organising social forestry projects led to more difficulties than the physical aspects of silviculture.

Wiersum (1984) reported that social forestry, encompassing small-scale forestry activities conceived and implemented largely through farmers' initiatives for their own socio-economic-ecological benefits, is, progressively being regarded by land use policy makers and rural development planners in developing tropical

countries as an effective means for achieving multiple objectives. These objectives include : generating income and stable employment opportunities for socio-economically disadvantaged rural populations, stabilising and strengthening rural communities and institutions, producing on a sustained basis vital commodities such as fuelwood, construction wood, fodder, green manure and food for local consumption and minimising local ecological degradation and maintaining the productive capacity of land. The four basic inputs to be considered in organising a forestry development project are land, labour, capital and technical knowledge. Other important elements are site and species selection, site and seedling preparation, tree planting, weeding and plant protection and intercropping.

Wiff (1984) reported that women were involved by Honduras Forestry Development Corporation in construction of terraces and reforestation. Although the project was not aimed at women, but they proved more receptive to new ideas. Their success led to wider community participation in the project. However, many legal and social obstacles remained to the participation of women in work and training outside what is perceived as their primary role as mother.

Fortmann (1984) reported that agro-forestry and other 'tree projects' in developing countries often simply fail to take women into account. Yet women provide at least half the rural labour and head significant number of rural households, as well as being

the major users of fuelwood and wood products. It is essential that women participate in agro-forestry projects and benefit from them. It is the intelligence, energy, initiative and labour of women that will determine whether agroforestry and other tree projects work or not.

Keith (1986) reviewed the role of economic and non-commercial incentives in persuading farmers to grow trees despite risks and difficulties based on field interviews in India. Formal and informal education via school, media and organisations encourage people to grow trees. But people need economic support for long term benefits. Economic support may stimulate large farmers but smaller farmers may require additional market support and credit schemes for financial security before tree harvesting. When there is inadequate market demand, programmes rely on non-market incentives like social and environmental needs promoted by education. When there is adequate market demand, programmes rely on individual profit as the primary motivating force with encouragement from education and other support measures.

According to Mercer and Hyde (1991) studies of adoption behaviour suggest that the wealthier, more educated, and more aggressive members of any community are more likely to accept new ideas and adopt new technologies. Those with the least amount of land, labour and financial risk capital (the poor) are unlikely to take the lead in adopting agro-forestry innovations.

Initially, therefore, distributive gains are most likely to flow to the wealthier farmers who are willing to bear the initial risks. Over time, however, their successes with the technology serve as incentives to the poorer farmers, so that adoption rates of wealthier and of poorer farmers eventually equilibrate. This process may be speeded up by reducing subjective risks through education, extension and local demonstrations of the technologies and by improving access to credit and variable inputs.

Based on a case study of USAID/Haiti Agro-forestry Outreach Project, Murray (1987) stated that successful agro-forestry projects, even under the most difficult institutional, technical, and motivational circumstances and under the most trying political, economic, and environmental conditions, can succeed if based on sound ethnographic theory and practice and if implemented by interdisciplinary teams that understand local realities such as land tenure and incentive structures. These realities, including control of assets, outputs, and shared benefits, must be addressed in appropriate ways.

C. PROBLEMS OF FARM FORESTRY

Introduction of a new technology creates a sort of disequilibrium in the adoption system. The problems generated with the introduction of farm forestry and measures suggested for solving them are reviewed in brief.

The Monitoring and Evaluation Cell (1983), identified some adverse attitude of the people in strip plantation in West Bengal which were attributed to (a) likely loss of grazing lands, (b) lack of adequate publicity, (c) inadequate extension coverage, (d) consequent lack of awareness amongst local community about the benefit that would accrue to them from these plantations and (e) apprehension regarding loss of agricultural crop due to shade.

It was further observed that in the village woodlot, the performance had not been up to the mark due to (a) lack of community land, (b) lack of suitable local leadership, (c) lack of technical and financial capacity, (d) lack of adequate extension coverage, (e) perceived individual benefit from village wood lot somewhat obscure, (f) absence of social cohesion, community being highly fragmented professionally and economically.

Tilander (1985) in a study of the North Bengal Agro-silviculture Project identified some problems which included land available too late for planting agricultural crops, wild animals consuming interplanting crops, too much work, villagers feel job opportunities are limited, while forest officers find pilfering a problem. Recommendations cover organisation, biological aspects, social aspects and research.

Swarup and Chand (1986) reviewed the performance and constraints in Social Forestry in Himachal Pradesh. The total area under forests indicated a declining trend, whereas the area

of demarcated protected forests and strip forests have increased. Poverty and dependency of forests showed that there was an inverse relationship between the desire to preserve forests and economic backwardness. People had not shown enthusiasm for social forestry because of the non-availability of seedlings at the right time and also the lack of choice and of other support activities.

In the Final Evaluation Report of Farm Forestry in West Bengal, the Monitoring and Evaluation Cell (1992) concluded that marketing of farm forestry produce is a vital aspect which requires immediate attention. When these plantations will become mature, huge quantity of such produce will come into the market. If proper price is not received by the farmers, the programme may receive a setback. Ways and means should be devised to provide extension support to people for setting up small scale forest based industries with this farm forestry produce. Unless some internal market is developed, possibly this programme in future may not be that interesting as it is today.

Keita (1982) reported that forestry activities in West Africa provided the farmer with food, fodder, fertiliser, energy and raw material. The constraints to implement programme were land tenure system, demographic pressures on land and the viability of collective institutions. It was suggested that long term ownership of trees planted should be guaranteed for the farmers. Farm subsidy should give priority to nurseries, setting up market and processing activities.

Kowero and Temu (1985) identified some major limiting factors of village forestry in Tanzania. These are - inadequate planning, poor follow up, lack of sufficient seedlings and lack of transportation. It was recommended that overall responsibility for programmes be given to the Forest Division and that programmes become an integral part of village development plans.

Ruangpanit (1985) described the forestry project in Thailand. He reported that the participation of the people in community forestry is very important. If they do not participate in the planning and implementation, the community forestry project will not satisfy individual and local needs; if they do not participate in receiving benefits, the projects will have no meaning for them. To fulfill the objectives, emphasis should be given on agro-forestry. Special attention should be given so that rural people get additional income through forest and forest based processing activities. Knowledge of forestry should be given to the people to involve them in the programmes.

Onweagba (1987) reported that the Shelterbelt Project to control desertification in Northern Nigeria has been seriously hindered by lack of communication with local landowners. Proposed measures for better communication support are : increased client participation in the programme, establishment of extension units in the forestry service, reorganisation of local sections of the Information Ministry into Field Communication Centres to provide communication, training and packages for agency personnel.

CHAPTER III

METHODOLOGY

CHAPTER III

METHODOLOGY

This chapter deals with the methods and procedures used in the study and consists of four main parts.

- A. Sampling technique,
- B. Empirical measures of variables,
- C. Techniques of field data collection, and
- D. Statistical methods used.

A. SAMPLING TECHNIQUE

Farm forestry programme was launched in Midnapore district, West Bengal in 1981, mainly in laterite zone and low rainfall areas, where agricultural production was very low, and large areas of land remained fallow year after year. Farmers belonging to the weaker sections largely participated in the programme.

Kharagpur and Jhargram Social Forestry Ranges in Midnapore district were purposively selected for the study as these areas have major concentration of farm forestry. The area was more or less homogeneous with respect to soil, climate, socio-cultural conditions and forestry extension activities.

Selection of Villages

For the present study, the villages where farm forestry programme had been in operation at least for a period of five years at the time of collection of data were purposively selected. Thus 7 villages in Hariatara-II Gram Panchayat and 5 villages in Arjuni-I Gram Panchayat in Kharagpur Social Forestry Range, and 3 villages in Sardiha-IX Gram Panchayat in Jhargram Social Forestry Range were selected. The total number of villages selected were fifteen. The study area is diagrammatically shown in Fig. 1.

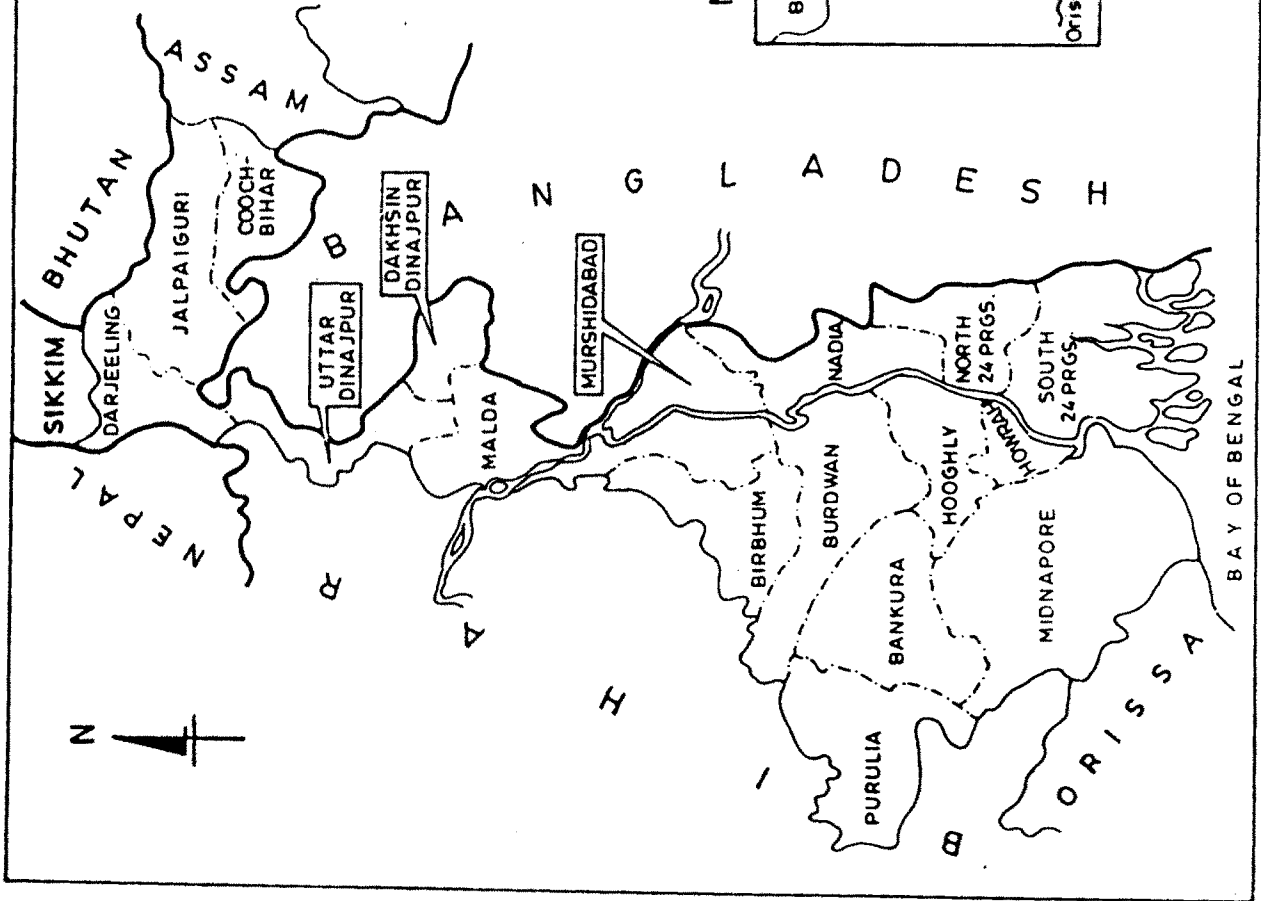
Selection of Respondents

A list of farmers who have participated in farm forestry programme in the 15 selected villages at least for a period of five years, was prepared with the help of the personnel of Social Forestry Wing, Directorate of Forests, West Bengal implementing the programme in the area. The list contained total 366 participants which formed the population. They participated in 'block planting' of trees under farm forestry programme. Out of them, 250 respondents were proportionately selected at random from the 15 villages, which formed the sample for study. The village-wise distribution of respondents is given in Table 1.

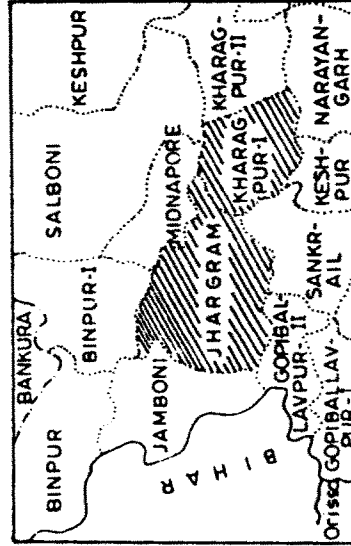
FIGURE 1

STUDY AREA IN KHARAGPUR AND JHARGRAM SOCIAL FORESTRY RANGES IN MIDNAPORE DISTRICT, WEST BENGAL

[International Boundary = ———
 State Boundary = ———
 District Boundary = - - - - -]



MIDNAPORE DISTRICT



Study Area

Table 1. Distribution of Farmers in Farm Forestry Programme Selected for Study

Forest range	Gram panchayat	Selected villages	No. of households in farm forestry for 5 years or more	No. of farmers selected for study
KHARAGPUR RANGE				
	Hariatara-II	Paljhari	67	46
		Sakpara	40	27
		Kumardubi	13	9
		Teleghana	7	5
		Tangasole	19	13
		Geriasuli	8	5
		Moulisole	31	21
		Sub-total		185
	Arjuni-I	Charkabani	30	20
		Khemasuli	26	18
		Patna	5	3
		Kantasala	4	3
		Doarkhole	4	3
		Sub-total		69
JHARGRAM RANGE				
	Sardiha-IX	Baharakota	50	34
		Chingurkosa	32	22
		Sakbandhi	30	21
		Sub-total		112
	Total		366	250

B. EMPIRICAL MEASURES OF VARIABLES

A number of variables relevant to the objectives of the study were selected. The method of computing each of the variables is furnished below. The finally selected items are presented in the Interview Schedule.

I. Socio-economic Profile

Socio-economic profile of the respondents was measured with the help of Socio-economic Status Scale -Rural developed by Pareek & Trivedi (1964). The scale had 9 items.

Caste : A caste system is one whereby a society is divided into a number of self-contained and completely segregated units (castes), the mutual relations between which are ritually determined in a graded scale (Hutton, 1933). Caste still retains its pivotal position in the social structure of Indian villages. Muslim respondents were given scores equivalent to agricultural caste. The method of scoring was as follows.

Scheduled tribe and Scheduled caste - 1, Lower caste - 2,
Artisan caste - 3, Agricultural caste - 4,
Prestige caste - 5.

Occupation ; The occupation of a person is an important indicator to determine the economic status of that person in a society. The scores for different categories of occupations were as follows.

Labour - 1, Caste occupation - 2, Business - 3,
Independent profession - 4, Cultivation - 5,
Service - 6.

Education : Education is generally believed to have the effect of widening the mental horizon of a person and thereby predispose him to be receptive to new ideas. Beal and Sibley (1967) pointed out that the individual's ability to read and write and the amount of formal education he possesses will affect the manner in which the individual gathers data and relates himself to the environment. Education refers to the respondent's academic attainment through formal schooling. The method of scoring was as follows.

Illiterate - 0, Can read only - 1, Can read and write - 2,
Primary - 3, Middle school - 4, High school - 5, Graduate
and above - 6.

Family : Family type refers to whether there was single or joint family. A family was considered as single when it consisted of husband, wife and unmarried children. A joint family consisted of other blood relations also.

Family size refers to the number of members present in the individual family. Generally upto 5 members is regarded as a

small size family and more than 5 members a large size. The scoring was as follows.

Single family - 1, Joint family - 2,
Upto 5 members - 1, Above 5 members - 2.

Social participation : Social participation refers to the voluntary sharing in person to person and in group to group relationship beyond the immediate household (Hay, 1951). It shows the degree to which the respondents were involved in formal organisations as member and/or office bearer. The scoring was as follows.

No membership - 0, As member of one organisation - 1,
As member of more than one organisation - 2,
Office bearer in one organisation - 3, Wider public
leader - 6.

Land : The amount of land owned by a person is an important parameter to assess the economic standing of that person in the society. The procedure for scoring was as follows.

Less than 1 acre - 1, 1-5 acres - 2, 5-10 acres - 3,
10-15 acres - 4, 15-20 acres - 5.

House : The possession of a house and the nature of the house are important indicators of socio-economic status. These were measured as follows.

Hut - 1, Kutcha house - 2, Mixed house - 3,
Pucca house - 4.

Farm power : The possession of farm power positively contributes towards earning from the farm. This variable was measured as below.

No draught animal - 0, 1-2 draught animals - 2,
3-4 draught animals or one or more prestige
animals - 4, 5-6 draught animals or tractor or
power tiller - 6.

Material possession : Some material items are indicators of modernisation. The score of the material items was as follows.

Bullock cart - 1, Cycle - 1, Radio - 1, Chair - 1,
Improved agricultural implements - 2.

Socio-economic status : The socio-economic status of the respondents was obtained by summation of scores of all the nine items and were categorised as follows.

<u>Category</u>	<u>Score</u>
Upper class	43 and above
Upper-middle class	33 - 42
Middle class	24 - 32
Lower-middle class	13 - 23
Lower class	Below 13

Age

Age refers to the number of years the respondent lived since birth at the time of interview and was rounded to the nearest whole number. The respondents were categorised according to age as follows.

Young - upto 35 years, Middle aged - 36 to 55 years,
Old - 56 years and above.

II. Prior Status, Communication and Motivation

Prior Status

For obtaining information about utilisation of land prior to the adoption of farm forestry programme, the respondents were asked to mention crops they had grown on the land preceding the year of planting trees and yields obtained by them.

The frequency and percentage of respondents cultivating different crops and average yield in quintals per hectare were calculated.

Communication

According to Berlo (1960) the main aim of communication is persuasion, i.e. an attempt to sway other people to the speaker's point of view. Simon (1957) pointed out that action of an individual was^a function of his exposure to the sources of information.

He further defined exposure as the willingness of a farmer to react with a particular information medium.

A list of sources from which the respondents were getting information about farm forestry was prepared in consultation with the forestry extension personnel, farmers participating in farm forestry programme and available literature. The information sources relevant for the study area were retained after pretesting and grouped into three categories such as Mass media, Personal cosmopolite and Personal localite. To measure the degree of utilisation of the information sources by the farmers, a 5-point scale - Most often, Often, Sometimes, Rarely and Never with scores (weights) 4, 3, 2, 1 and 0 respectively were provided against each item. The farmers' responses were recorded by putting a tick mark in the appropriate column against each item. The total rank score for each item was obtained by multiplying the frequencies with the respective weights and adding them up. The procedure for computation of the total rank score obtained for Forest Extension Worker is given below as an example.

Forest Extension Worker	Score (weight)	Frequency	Total
Most often	4	152	608
Often	3	61	183
Sometimes	2	27	54
Rarely	1	2	2
Never	0	8	0
Total Rank Score			847

The rank order of the items (communication sources) under each category were obtained on the basis of total rank score.

The respondents were further asked to mention from whom they received the first information about farm forestry. The year and source of information were recorded.

Motivation

Motivation means movement or motion, an inner state that energizes, activates or moves and directs human behaviour towards goals. It is a need satisfying and goal seeking behaviour. Motivation is a generalised term which includes drives, desires, needs and similar forces. The main purpose of extension work is to motivate the farm people to adopt new ideas and practices.

A list of motivating needs relevant for the farmers under farm forestry programme was prepared in consultation with experts in forestry, farmers participating in farm forestry programme and available literature. The items in the list were scrutinised and edited as per criteria set up by Edwards (1969). Eight items were finally retained.

The respondents were asked to rank the motivating needs relevant to them according to the degree of importance. As all the items were not ranked by all the respondents, the method of 'combining of incomplete order of merit ratings' as suggested by Garrett (1981) was followed. The method of computation is illustrated with an example.

Formula for percent position

$$\text{Percent position} = \frac{100 (R - .5)}{N}$$

where, R is the rank of the individual item in the series and, N is the number of individual items ranked.

Name of the farmer - Sarbeswar Chalak

Village - Moulisole

<u>Items of motivation</u>	<u>Rank*</u>
i) High lumpsum return	2
ii) Utilisation of free time	5
iii) Utilisation of unproductive land	4
iv) Little investment	-
v) Availability of free seedling and other inputs	3
vi) Availability of subsidy	-
vii) Need for fuel	1
viii) Need for timber	-

Percentage Position of Ranks*

2	5	4	3	1
$\frac{100(2 - .5)}{5}$	$\frac{100(5 - .5)}{5}$	$\frac{100(4 - .5)}{5}$	$\frac{100(3 - .5)}{5}$	$\frac{100(1 - .5)}{5}$
$\frac{100 \times 1.5}{5}$	$\frac{100 \times 4.5}{5}$	$\frac{100 \times 3.5}{5}$	$\frac{100 \times 2.5}{5}$	$\frac{100 \times .5}{5}$
30	90	70	50	10
<u>(Score after transmutation of orders of merit as per Garrett, 1981)</u>				
60	24	40	50	75

The transmutation of orders of merit into scores was done as per table 49 of Garrett (1981). A reproduction of table 49 is given in Appendix I.

The particular respondent was a marginal farmer and the total number of respondents in this category was 101. To obtain the final order of merit for the category of marginal farmers, the scores for all the respondents in this category were summated and the mean values were found out. In finding out the mean values, the sum of scores for each item was divided by its frequency of responses. The motivations were finally ranked on the basis of mean scores which represented the hierarchy of motivations for the particular category of respondents.

A representation of the table to compute the final order of merit of motivations for the marginal farmers is furnished here.

Sl. No. of respondents in marginal category (N = 101)	Items of motivation							
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
	Score after transmutation of orders of merit							
n ₁	31		69				50	
n ₂	66	22	34	50	57	43	79	
.								
.								
.								
n ₅₇	50						69	31
.								
.								
.								
n ₁₀₀	50			31			69	
n ₁₀₁	75		60	40	24		50	
Sum of scores	5527	1106	3917	2214	2656	1271	5979	548
Frequency of responses	95	34	76	58	62	33	96	10
Mean	58	33	52	38	43	39	62	55
Order of merit	II	VIII	IV	VII	V	VI	I	III

III. Farmers' Participation in Farm

Forestry Programme

One of the major goals of extension is to get new and profitable technologies adopted by the rural community. According to Rogers and Shoemaker (1971), adoption is a decision to make full use of a new idea as the best course of action. An innovation is an idea, practice or object perceived as new by an individual.

Farmers' participation was measured by the level of adoption in farm forestry programme.

Level of Adoption

The level of adoption was measured by the Adoption Quotient formula developed by Chattopadhyay (1963). According to him, the adoption quotient is a ratio scale designed to quantify the adoption behaviour of an individual. He considered potentiality, extent, time and consistency to measure the adoption quotient. The formula for adoption quotient is explained below with an actual computation.

$$\text{Adoption Quotient} = \frac{\sum_{j=1}^N (Y_j W_j)}{\sum_{j=1}^N W_j} \times 100$$

$$\text{where, } Y_j = \frac{\sum_1^{t_p - t_1} (e_j / p_j)}{t_p - t_1}$$

- N = Number of practices for which the individual has the potentiality to adopt. The respondents in the present study were recommended only one practice i.e. practice of farm forestry.
- $\sum_{j=1}^N$ = Summation over each of the N practices, of which any one is the j th practice.
- w_j = Weight to be given to a j th practice based on its difficulty of adoption. As only farm forestry practice was recommended by the forestry extension worker and was not difficult for the farmers to adopt, it was given weightage of 1.
- t_p = Time of investigation. In the present case many farmers completed adoption of farm forestry in the available land before the period of investigation which was 1991. For those who completed adoption before the year of investigation, their year of adoption was taken as a measure for this item.
- t_1 = Time of first introduction (year) of the j th practice in a community. Farm forestry programme started in the particular village, was taken as the year of first introduction of the technology in that village.
- $\sum_{1}^{t_p-t_1}$ = Summation over each year from t_1 to t_p i.e. difference between year of introduction of farm forestry programme and year of complete adoption or year of investigation.
- e_j = Extent of adoption of any particular (j th) practice in a particular year (amount of land). Extent of adoption has been defined as the degree to which the farmer has actually adopted a practice.

p_j = Potentiality of any particular (jth) practice from which e_j is calculated in that particular year (amount of land). Potentiality is conceived as the maximum degree to which the farmer can extend his adoption, if he so wills, depending on maximum utilisation of the resources he commands or can command.

Computation of Adoption Quotient

Name of farmer - Nagen Mahato

Village - Tangasole

(e and p calculated in hectare)

	1985	1986	$\Sigma e/p$	Y_j	$Y_j \times W_j$
Extent of adoption of farm forestry (e) (i.e. the area in which farm forestry has been done)	0.25	0.25			
Potentiality of farm forestry adoption (p) (i.e. the maximum area in which farm forestry could be done)	0.50	0.25			
e/p	0.50	1.00	1.50	1.50/2	0.75 x 1 = 0.75

$$\text{Adoption Quotient} = \frac{0.75}{1} \times 100 = 75.00 \text{ percent}$$

Adoption Period

Adoption period is the length of time required for an individual to pass through the adoption process from awareness to adoption (Rogers, 1962). This was computed as the number of years required by each individual farmer to adopt farm forestry since he first came to know of it.

Decision Making

Wilkening (1953) described the adoption of an innovation as a process composed of learning, deciding and acting over a period of time. The adoption of a specific practice is not the result of a single decision to act but a series of actions and thought decisions.

In deciding about adoption of farm forestry programme, the respondents not only have deliberated themselves but also have discussed with others, in the family and/or outside. In the present study it was intended to find out with whom the farmers discussed regarding farm forestry programme so that these could be taken care of in forestry extension work. The responses were obtained by asking an open ended question to the respondents in this respect.

IV. Management Factors

Involvement of Family Members

For this purpose, the major items of field work in farm forestry were identified with the help of experts in Social Forestry Wing,

Directorate of Forests, Govt. of West Bengal. Altogether there were 9 such items. The respondents were asked to mention whether the farmer himself, his wife, children and others were involved in each of the items of work. The frequency and percentage of responses for each item was then found out.

Importance of Package of Practices

Farm forestry being a new technology, its success depends on proper application of the package of practices by the farmers. The package of practices are communicated by the extension workers to the beneficiaries through various extension methods and aids, so that they can perceive the importance of each of the practices recommended.

In this study, it was intended to find out farmers' perception of importance of the package of practices recommended in farm forestry. For this purpose, a list of items (statements) relating to package of practices in farm forestry was prepared, scrutinised and edited. The items were then sent for judges' rating with a 3-point scale, most important, important and not so important against each item (Appendix II). The judges comprised 24 Forest Range Officers and 3 Divisional Forest Officers, who were implementing farm forestry programme in the State. The judges were asked to mention any other item which they considered important and rate them accordingly. Correct responses were obtained from 12

judges (11 Forest Range Officers and 1 Divisional Forest Officer). They suggested some new items also.

For item analysis, the statements marked most important, important and not so important were given scores (weights) 3, 2 and 1 respectively. For each statement the frequency of responses were multiplied with respective weightage to obtain the total score for each item. To obtain mean score for each item, the total score was divided by the frequency of responses for that particular item. Items with mean score above 2 were selected. In this way 14 items were selected. The items finally selected are given in Appendix III.

The selected items were incorporated in the interview schedule and then administered to the respondent farmers. Each item was provided with a 3-point scale, most important, important and not so important and the farmers were asked to judge each statement according to its importance.

The frequency and percentage of responses for most important, important and not so important in respect of each item in the package of practices were then computed.

Choice of Tree Species

In this context, the important question which comes to our mind is 'whose choice' ? Is it the choice of the extension worker who

identifies some tree species suitable for the area and thinks that farmer should plant them to get maximum return ? Or of the farmers who have some experience of tree species grown locally and are inclined to plant them as they feel that those would satisfy their urgently felt needs.

A balance (or, compromise) between the thinking of the two partners, extension workers and farmers is necessary for successful implementation of the farm forestry programme. This aspect was investigated by asking several questions relating to the following issues -

Tree species planted by the farmers,

Farmers' choice of plant species other than those planted, and

Preference of plant species, considering the species planted and species desired.

V. Benefits of Farm Forestry

This includes availability and utilisation of forest products, farmers' preference of forest products and farmers' perception about the benefits of farm forestry programme.

Availability and Utilisation of Forest Products

To get an idea about the availability of forest products, the farmers were asked to mention the nature of products obtained by them. It was observed that fuel and timber were the main

forest products obtained in the study area and these two were considered for the present investigation. The frequency and percentage of farmers obtaining fuel and timber were computed separately for the marginal, small, medium and pooled sample of farmers.

Those who obtained fuel and timber, were further asked to give an estimate of the quantum of products expressed in percentage, utilised for household consumption and sold in the market. The mean percentage of products used for household consumption and sold in the market were obtained for each category of farmers.

Farmers' Preference of Forest Products

For this purpose, the respondents were asked to mention three farm forest products which they required most and rank them. Products ranked 1, 2 and 3 were given scores (weights) 3, 2 and 1 respectively. To obtain total rank score for each product, frequency of responses in different ranks were multiplied by the respective weightage and added up. The products were finally ranked on the basis of total rank score.

Farmers' Perception about the Benefits of Farm Forestry

A list of benefits which may be obtained by the implementation of farm forestry programme was prepared with the help of experts in

farm forestry, farmers participating in the programme and available literature. The list of items (statements) were then scrutinised and edited as per criteria set up by Edwards (1969). Nine items were finally retained and were incorporated in the interview schedule. A 4-point scale strongly agree, agree, disagree and strongly disagree with weights 4, 3, 2 and 1 respectively were provided against each item. The farmers were then asked to rate the items according to their perception of agreement or disagreement about each of them. To obtain total rank score for each item, the frequency of responses in different ranks were multiplied by their respective weightage and added up. The items were then finally ranked on the basis of total rank score.

VI. Role of Panchayat

Forest related works bring about poverty alleviation in the rural areas and that the conservation and regeneration of forests are beneficial for the rural eco-system, Panchayats were involved in implementing Social Forestry Project in West Bengal since its inception in 1981. It was, therefore, intended to investigate the role of panchayat in farm forestry.

Role Played by Panchayat

To find out the role of Panchayat, the respondents were asked to mention the role being played at present by the Panchayat in connection with the farm forestry programme. The frequency and percentage of responses were computed.

Role Expectation from Panchayat

The respondents were asked what further role they thought that Panchayat should play in improving farm forestry programme. The frequency and percentage of responses were calculated.

VII. Problems of Farm Forestry and Suggestions for Improvement

Technology adoption may give rise to some problems for which adjustments must be made. Unless the problems are adequately taken care of, continued adoption of the technology may be in jeopardy. Hence these aspects were studied.

Problems in Farm Forestry

The respondents were asked to mention three most important problems which they were facing in implementing farm forestry programme. They were then asked to rank them.

The frequency of items ranked 1, 2 and 3 were multiplied by their respective weightage of 3, 2 and 1 respectively and added up to get the total rank score. The rank order of the items were obtained on the basis of total rank score.

Suggestions for Improvement

The respondents were further asked to suggest three important measures which, in their opinion, would make farm forestry more

profitable. The frequency and percentage of responses were computed and the items were ranked accordingly.

C. TECHNIQUES OF FIELD DATA COLLECTION

Before construction of the data collection device, a pilot study was undertaken in the 3 villages of Kharagpur and Jhargram Social Forestry Ranges, where farm forestry programme was being implemented.

The draft schedule for collection of data, incorporating the tools and techniques of measurement of different variables was pretested twice, each time with 12 beneficiaries of farm forestry programme. In pretesting, care was taken not to include farmers who were selected as sample for final interview.

On the basis of experiences in pretesting, appropriate changes in the construction of questions and their sequence were made. The schedule was then finalised and duplicated. The final format of the interview schedule is given in Appendix IV.

The data were collected during December, 1990 to March, 1991 with the help of the schedule constructed for the study. In each village, before starting the interview, a few days were devoted for the establishment of rapport with the village leaders and the respondents.

The schedule was then administered to the respondents and the replies were recorded. The interview was done by the researcher himself.

D. STATISTICAL METHODS USED

The statistical methods used in this study were Mean, Percentage, Spearman's Rank Correlation Coefficient and 't' test. Different methods of ranking used in the study have been explained in appropriate places in Empirical Measures of Variables of this Chapter. The statistical analyses were done following Guilford (1954), Edwards (1969), Garrett (1981) and Panse and Sukhatme (1989).

CHAPTER IV
RESEARCH SETTING

CHAPTER IV

RESEARCH SETTING

The present study was undertaken in 15 villages of Kharagpur and Jhargram Social Forestry Ranges in Midnapore district, West Bengal. A brief description of the State and the study area relating to farm forestry is presented, following the Final Evaluation Report, West Bengal Social Forestry Project prepared by the Monitoring and Evaluation Cell (1992) and Social Forestry in West Bengal compiled by Roy (1988) of the Directorate of Forests, Government of West Bengal.

Forest in West Bengal

The State of West Bengal with an area of 88,752 sq km, has a population of about 68 million in 1990-91, of which 75 percent reside in rural areas and are spread over nearly 42,000 villages. The schedule castes and scheduled tribes account for nearly 30 percent of the total population. Agriculture plays a predominant role in the State economy, accounting for 35 percent of the total State income, and 60 percent of its total employment. Farms, in general, are small with 80 percent of all holdings being less than 2 hectares.

The total forest area of the State is 1.18 million ha. or 13.5 percent of the total geographical area. It has been

estimated that about 0.9 million ha. of land, constitutes of waste and eroded agricultural lands and is suitable for afforestation. The distribution of forests in the State is uneven with a large forest tract in the hills, foothills and plains in the northern region; another large tract in the marshy, inter-tidal zone in the south and small segments in the south-western tract. There is hardly any forest in the intensively cultivated central Gangetic plains. Productivity of more than half the forest land is low either because of aridity and low soil fertility or because of gradual degradation through felling, over-grazing and burning.

Social Forestry in West Bengal

Social Forestry Project in West Bengal was launched in 1981 with the following objectives :

Production objectives

- i. To increase the supply primarily of fuelwood, small-wood and fodder to the rural people;
- ii. To produce raw materials for village level cottage industries;
- iii. To generate a marketable surplus of forest products to yield cash-incomes and improve the consumption level of the village poor; and
- iv. To increase yields of edible flowers, tubers and other minor forest products as a natural byproduct.

Rural development

- i. To create additional gainful employment for the rural poor with an accent on women and people of backward communities and developing self-employment activities related to forestry;
- ii. To create new assets on a community basis which can be managed, utilised and protected for sustained yield; and
- iii. To increase the participation of landless, small and marginal farmers in the management of this common property by effecting proper protection from biotic interferences.

Ecological development

- i. To protect and improve indirectly the soil and moisture regime of the degraded areas;
- ii. To arrest the gradual process of ecocides; and
- iii. To lessen biotic pressure on the natural forest by creating a sort of a buffer zone in the 'halo' region.

Social forestry has various components, out of which the farm forestry component was more popular with the rural people. This will be evident from the area coverage during the period 1981-90 in which social forestry project was implemented in West Bengal (Evaluation and Monitoring Cell, 1992).

	Area coverage in West Bengal during 1981-90	
Strip plantation	23,784	hectare
Village woodlot	2,405	"
Farm forestry	1,50,554	"
Reforestation of degraded forests	65,011	"

Farm Forestry in West Bengal

Farm forestry is a land use system in which trees are regarded as crops. Farm forestry project was implemented all over West Bengal. However, in comparison to the hill and alluvial zones, its concentration was more in the laterite zone. This was due to large availability of uncultivable land under private ownership. The physical achievement in farm forestry during the decade 1981-90 was as follows :

Hill zone	-	4,999	hectare
Alluvial zone	-	60,670	"
Laterite zone	-	84,885	"

In the laterite zone, in 1990, 72 percent of the families whose main source of income was agricultural farming and 9 percent of families whose main source of income was dairying lifted seedlings from nurseries. The average size of holding was 2.14 hectares and the average family size was eight.

With the rapid progress in land reforms by the State Government, a large number of landless labourers have been given 'patta' on land-holding, bulk of which could not be utilised by them for agricultural purposes due to refractory nature of the soil. This group of land-holders formed the majority of farm forestry beneficiaries who have taken to this model as an alternative to agriculture.

The percentage composition of different tree species in laterite zone in 1990 was as follows :

Eucalyptus	-	59	percent
Akashmoni	-	31	"
Sissoo	-	6	"
Gamar	-	2	"
Babla	-	1	"
Miscellaneous	-	1	"

In laterite zone, fuel crisis was very acute. So people were primarily interested in planting fuelwood species. Soil was also very poor and in such soil good economic species could not grow well. Eucalyptus and Akashmoni were very hardy species and could grow on any type of soil. Moreover, these were not grazed by the cattle and were fairly fast growing in this zone. Since firewood was readily salable in the market, people were getting some cash income at a very short period say, within 5 to 6 years of planting from those lands which were otherwise lying barren.

The location of planted seedlings during the decade 1981-90 in laterite zone was as follows :

Previously fallow land	-	78.6	percent
Previously cropped land	-	6.1	"
Bund, boundaries etc.	-	8.8	"
Homestead etc.	-	6.5	"

In laterite zone, farm forestry was done mostly in previously fallow land which were available in plenty and in lands where crops were grown but did not prove economic, and together they accounted for 85 percent of the planted area.

The main reasons for planting trees by the farmers in laterite zone were as below :

Fuelwood need	-	55	percent
For cash income	-	39	"
Fodder need	-	1	"
Other purposes	-	5	"

Getting fuelwood and cash income were the two important reasons for the farmers joining the farm forestry programme. It was an encouraging trend that the farmers were trying to meet their fuelwood demand from their own land.

The average annual labour inputs per hectare in laterite zone in 1990 was as follows :

Family labour	-	19 Mandays
Hired labour	-	7 "
Total labour	-	26 "

In farm forestry programme, family labour was mostly used. Small amount of hired labour was also used as and when necessary.

Kharagpur Social Forestry Range and
Jhargram Social Forestry Range

Kharagpur Social Forestry Range and Jhargram Social Forestry Range are under Kharagpur Forest Division in Midnapore district. Each of the forest ranges is headed by a Range Officer, who has Beat Officers (Deputy Rangers/Foresters) and Forest Extension Workers under them. At the village level there may be motivators who are chosen from the rural areas for maintaining liaison with the local people for extension activities and are paid an honorarium.

The Forest Extension Workers are trained in the Forestry Training Centre at Jhargram, Midnapore for eight weeks. Provisions also exist for refresher and continuing education courses for field level forestry extension staff. The motivators are trained at the Divisional level.

Social Forestry Work of the Directorate of Forests, Government of West Bengal is carried out in close collaboration with 3-tier panchayat system in the State. The Divisional Forest Officer, the Range Officer and the Beat Officer are the members of the Bon o Bhumisanskar Sthayee Samity (Forest and Land Reforms Standing Committee) of the Zilla Parishad and Panchayat Samity respectively.

Soil and Climate : The soil of Kharagpur and Jhargram Forest Ranges is red laterite with ferruginous concretions at depths of 15-30 cm. The soil is generally poor in plant nutrients.

The meteorological data of rainfall and temperature of Midnapore district in respect of critical period for forest development i.e. from April to September are presented.

Data on rainfall in Midnapore District

(in mm.)

Year	Months					
	April	May	June	July	August	September
1991	34.3	129.0	259.2	486.2	201.1	145.9
1992	24.6	183.0	359.8	376.2	231.8	125.8

Data on temperature in Midnapore District

(in degree celcius)

Year	Months					
	April	May	June	July	August	September
<u>Maximum</u>						
1991	39.8	36.3	35.2	33.0	33.0	32.2
1992	39.5	35.5	34.6	32.1	31.7	32.0
<u>Minimum</u>						
1991	25.2	23.8	25.0	25.8	24.6	25.0
1992	24.6	24.5	25.1	25.8	25.9	25.7

Phasing of Forestry Extension Activities

Tree plantation is a season-bound work and as such the extension activities to be carried out in a year are phased out in different stages. These are -

- i. Preparatory phase (November to February) - Identification of sites and people, need assessment through micro-planning, technical and extension plan preparation, identification of Kisan and School nursery beneficiaries, arranging training regarding nursery techniques to them, arranging preparation of extension messages for farmers

on site preparation before farm forest planting, establishing links with financial institution for arranging bank loans etc.

- ii. Pre-planting phase (February to May) - Extension messages on seed collection, site preparation, sowing/planting, continuing training and visit of Kisan and School nurseries, tending techniques, protection through vegetative means, etc.
- iii. Planting phase (May to August) - Nursery techniques including shifting, sorting and insecticide application, maintenance, safe transport of seedling, supervision of planting technique etc.
- iv. Follow-up phase (August to November) - Mulching, tending, fertiliser application, insecticide application, green manuring, grass cutting, pollarding, protection, survival, monitoring, random field check etc.

CHAPTER V

FINDINGS AND DISCUSSION

CHAPTER V

FINDINGS AND DISCUSSION

The results of the investigation are presented and discussed in this chapter after appropriate statistical analyses. These are presented according to specific objectives of the study.

A. SOCIO-ECONOMIC PROFILE OF PARTICIPANTS UNDER FARM FORESTRY PROGRAMME

The purpose for selection of this objective was to find out the socio-economic classes in which the participants of farm forestry programme belonged. Socio-economic profile of the participants was developed by measuring different components of their socio-economic status. For this purpose, the Socio-economic Status Scale - Rural developed by Pareek and Trivedi (1964) was used. The scale consisted of 9 items. The sum of scores indicated one's socio-economic status. The data are presented in Table 2.

Caste : Farm forestry programme was developed for the farmers, and it was found from Table 2 that 61 percent of the respondents belonging to agricultural caste participated in the programme. In agricultural caste, majority of the people in the study area belonged to Mahato community.

Table 2. Socio-Economic Profile and Age of Participants under Farm Forestry Programme

(N = 250)

Items	Category	Frequency	Percentage
CASTE	Scheduled tribe	39	15.6
	Scheduled caste	52	20.8
	Lower caste	5	2.0
	Agricultural caste	152	60.8
	Prestige caste	2	0.8
OCCUPATION	Labour	75	30.0
	Caste occupation	4	1.6
	Business	9	3.6
	Independent profession (Farm forestry)	13	5.2
	Cultivation	126	50.4
	Service	23	9.2
EDUCATION	Illiterate	55	22.0
	Can read only	16	6.4
	Can read and write	22	8.8
	Primary	51	20.4
	Middle	55	22.0
	High school	47	18.8
	Graduate and above	4	1.6
FAMILY	Type : Single family	105	42.0
	Joint family	145	58.0
	Size : Upto 5 members	100	40.0
	Above 5 members	150	60.0

Table 2 (Contd...)

Items	Category	Frequency	Percentage
SOCIAL PARTICIPATION	No membership	164	65.6
	As member of one organisation	70	28.0
	As member of more than one organisation	11	4.4
	Office bearer	4	1.6
	Wider public leader	1	0.4
LAND	Less than 1 acre	38	15.2
	1-5 acres	157	62.8
	5-10 acres	43	17.2
	10-15 acres	10	4.0
	15-20 acres	2	0.8
HOUSE	Hut	2	0.8
	Kutchra house	231	92.4
	Mixed house	13	5.2
	Pucca house	4	1.6
FARM POWER	No draught animal	62	24.8
	1-2 draught animals	150	60.0
	3-4 draught animals or 1 or more prestige animals	32	12.8
	5-6 draught animals or tractor or power tiller	6	2.4
MATERIAL POSSESSION	Bullock cart	109	43.6
	Cycle	212	84.8
	Radio	129	51.6
	Chair	68	27.2
	Improved agricultural implements	23	9.2

Table 2 (Contd....)

Items	Category	Frequency	Percentage
	Upper class (Score in the scale 43 and above)	-	-
	Upper-middle class (Score : 33 - 42)	38	15.2
SOCIO-ECONOMIC STATUS	Middle class (Score : 24 - 32)	105	42.0
	Lower-middle class (Score : 13 - 23)	83	33.2
	Lower class (Score : Below 13)	24	9.6
	Young (Upto 35 years)	132	52.8
AGE	Middle aged (36 - 55 years)	70	28.0
	Old (56 years and above)	48	19.2

The participation of about 16 percent Schedule tribe and 21 percent Schedule caste is of significance, as quite a good number of people belonging to backward classes have come forward to accept the programme. The Schedule tribe participants belonged to Lodha Community.

Occupation : It appears that farm forestry programme has caught the imagination of non-farmers also, as half of the respondents belonged to this category. Five percent of the respondents took farm forestry as an independent profession. Fifty eight respondents (23 percent) took farm forestry as a secondary occupation.

Education : The participants under the farm forestry programme had, in general, a low level of education. Twenty two percent of the respondents were illiterate and 58 percent of the respondents were upto middle level pass. Twenty percent of the respondents had education upto high-school level and above.

Family : Large family was rather predominant among the participants under farm forestry programme as more number of respondents had joint family and more than 5 members in the family.

Joint family and bigger family size were found more amongst the economically well-off section of the respondents whereas, nuclear and small size family was found more amongst the tribal and economically weaker section of the respondents.

Social Participation : The respondents under the farm forestry programme had, in general, a low level of social participation. Two-thirds of the beneficiaries had no social participation at all i.e. neither they were member, nor office bearer of any village organisation. Twenty eight percent of the respondents were member of one organisation.

Land : A majority of the respondents under farm forestry programme had small land holding as will be evident from Table 2 that 15 percent had land holding below one acre and 63 percent one to five acres.

House : Kutcha house was rather predominant amongst the participants of farm forestry programme as 92 percent of the respondents had this type of house.

Farm Power : About 25 percent of the respondents had no draught animal and had to depend entirely on others. Sixty percent of the respondents had only one to two draught animals. That is, 85 percent of the respondents had poor farm power status.

Material Possession : Cycle being the most important means of communication in the villages, 85 percent of the respondents possessed this item. More than half of the respondents had a radio and more than one-fourth of the respondents had chairs in their house.

Possession of improved agricultural implements was very low as only 9 percent of the respondents had some of the items. About 44 percent of the respondents possessed bullock-cart.

Socio-Economic Status : The overall socio-economic status score indicated that 43 percent of the respondents belonged to lower and lower-middle classes and 42 percent belonged to middle class. Only 15 percent of the respondents belonged to upper-middle class. There was no respondent in the upper class.

The socio-economic profile indicated that majority of the participants under the farm forestry programme came from the weaker sections of the rural community with low level of education, low social participation, small land holding, kutcha house, little farm power and few improved agricultural implements.

Age : Table 2 indicated that 53 percent of the respondents were young i.e. upto 35 years of age, while 28 percent were middle-aged i.e. 36 - 55 years, and 19 percent were old i.e. above 55 years. It was evident that villagers of younger age predominantly participated in the farm forestry programme.

B. PRIOR STATUS, COMMUNICATION
AND MOTIVATION

In this section, utilisation of land prior to the introduction of farm forestry programme, sources of first information, degree of utilisation of various sources of information and motivations for farm forestry programme have been presented.

Prior Status

Farm forestry programme was mainly introduced in the rainfed areas. Most of the farmers had some uncultivable uplands of poor soil type. The weaker sections obtained land on 'Patta' which were also of low fertility status. These lands were subjected to erosion.

Most of these lands remained fallow. Attempts to grow some crops in these lands were made but the yields were very low.

Table 3. Prior Utilisation of Farm Forestry Lands

(N = 250)			
Utilisation	Frequency	Percentage	Average yield (q/ha)
Kept Fallow	112	44.8	-
Aus Paddy	132	52.8	15.3
Til (sesamum)	3	1.2	1.5
Groundnut	2	0.8	9.0
Aman Paddy	1	0.4	1.5

It may be found from Table 3 that 45 percent of the respondents did not make use of the uncultivable uplands before introduction of farm forestry. Fifty three percent of the respondents tried rainfed Aus in these lands and the average yield was about 15 q/ha which was about half of a normal yield in the paddy lands of the area. Crops like Til, Groundnut and Aman paddy were tried by a few farmers where the yields were also very low.

The situation prior to the introduction of the farm forestry programme indicated that some lands the people were possessing were going waste and were not contributing to their employment and income. This was also creating an unsustainable ecological condition in the area.

Sources of First Information about Farm Forestry Programme

The prior status discussed earlier provides the background against which the farm forestry programme was introduced in the area. In bringing awareness of the people regarding the programme, various extension methods such as group discussion, meeting the farmers individually, film show etc. were adopted. In this context it was intended to find out wherefrom the people first got information about farm forestry. The data on sources of first information about farm forestry is presented in Table 4.

Table 4. Sources of First Information about Farm Forestry Programme

(N = 250)

Source	Frequency	Percentage
1. Social Forestry Dept. personnel	226	90.4
2. Farmers of other villages	13	5.2
3. Panchayat	3	1.2
4. Neighbours	3	1.2
5. Motivator	2	0.8
6. Radio	1	0.4
7. Newspaper	1	0.4
8. Krishi Mela	1	0.4

Table 4 indicated that 90 percent of the respondents got first information about farm forestry programme from Social Forestry personnel. Five percent of the respondents got first information about the programme from farmers of other villages where farm forestry programme had been introduced earlier. Other sources of information had very little role to play in bringing awareness of the people about the programme.

The farm forestry programme being a new concept and most of the respondents being from weaker section of the community, they depended mostly on face-to-face, word-of-mouth communication from source of information which they perceived as credible (trustworthy and competent) i.e. Social Forestry personnel.

Utilisation of Sources of Information in
Farm Forestry Programme

In the adoption process, after getting first information about a new technology, people begin to collect further information about it from various sources. The degree to which different sources of information were utilised by the participants under farm forestry programme were investigated. The sources of information were grouped into three categories - mass media, personal cosmopolite and personal localite. The rank order of the sources of information under each category were obtained on the basis of total rank score and are presented in Table 5.

Table 5 indicated that in mass media, educational films and radio were utilised most by the respondents in obtaining information about farm forestry programme and were ranked 1st and 2nd respectively. The next important sources of information in mass media were meeting, demonstration, poster and farm publications which were ranked 3rd, 4th, 5th and 6th respectively. Other mass media sources like newspaper, television, field trip and exhibition had very low utilisation.

In personal cosmopolite category, Forest Extension Worker was the most utilised source of information for farm forestry programme and was ranked 1st. Next came the Beat Officer and Range Officer who were ranked 2nd and 3rd respectively. Farmers of other village and Panchayat personnel were also utilised rather well and

Table 5. Utilisation of Sources of Information in Farm Forestry Programme

	Total Rank Score	Rank Order
<u>Mass Media</u>		
1. Educational films	348	1
2. Radio	298	2
3. Meeting	173	3
4. Demonstration	163	4
5. Poster	142	5
6. Farm publications	140	6
7. Newspaper	82	7
8. Television	31	8
9. Field trip	21	9
10. Exhibition	16	10
<u>Personal Cosmopolite</u>		
1. Forest Extension Worker	847	1
2. Beat Officer	659	2
3. Range Officer	510	3
4. Farmers of other village	365	4
5. Panchayat personnel	331	5
6. Divisional Forest Officer	258	6
<u>Personal Localite</u>		
1. Friends and neighbours	772	1
2. Other family members	724	2
3. Relatives	659	3
4. Village leader	227	4
5. Wife	130	5

were ranked 4th and 5th respectively. The Divisional Forest Officer being a high ranking officer had various official duties and was less available to the respondents.

In personal localite sources, friends and neighbours, other family members and relatives were good sources of information and were ranked 1st, 2nd and 3rd respectively. Village leaders and wife were less important sources of information.

Considering all the three categories of sources of information it may be said that Forest Extension Worker was the most important source of information to the rural people for providing information about farm forestry programme, closely supported by Beat Officer and Range Officer. They not only provided needed information about the new technology but also helped in removing their doubts and mistakes by providing face-to-face, word-of-mouth communication. Mass media like educational films and radio were important in providing the needed information. Meeting, demonstration, poster and farm publications which were considerably used were important in providing information to the people about farm forestry. Personal localite sources were also frequently used by the respondents.

Motivation

The farm forestry programme was introduced in the study area in a situation where the uncultivable uplands the people were possessing

were going waste and were not contributing to their employment and income. By becoming aware of the programme and obtaining further information on it the participants could visualise some advantages, which would satisfy some of their urgently felt needs. The hierarchy of eight motivating needs in respect of marginal, small, medium, and pooled sample of respondents is presented in Table 6.

Table 6 indicated that 'need for fuel' was the most important motivation for marginal and small farmers and was ranked first. 'High lumpsum return' was next in importance to them. In respect of medium farmers, who had more lands, 'high lumpsum return' and 'need for fuel' occupied 1st and 2nd positions respectively. 'Need for timber' was third in importance to the marginal farmers, whereas it occupied 4th position in respect of small and medium farmers. Utilisation of unproductive land was 4th in importance to the marginal farmers whereas, it occupied 3rd position for small and medium farmers who had more land.

'Availability of free seedling and other inputs', 'availability of subsidy' and 'little investment' as motivations were less important and occupied next three positions in varying degrees. All the three categories of farmers perceived 'utilisation of free time' as least important.

Spearman's Rank correlation co-efficient in the ranking of motivations between marginal and small farmers, marginal and

medium farmers, and small and medium farmers were 0.91, 0.93 and 0.96 respectively which were all significant at 5 percent level. It indicated that the ranking of motivations by all the three categories of farmers were not significantly different and were of the same order.

Table 6. Hierarchy of Motivations for Farm Forestry Programme for Different Categories of Farmers

Items	Marginal Farmers (N=101)		Small Farmers (N=88)		Medium Farmers (N=61)		Pooled sample (N=250)	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
1. Need for fuel	62	I	61	I	59	II	61	I
2. High lumpsum return	58	II	60	II	60	I	59	II
3. Need for timber	55	III	45	IV	46	IV	49	IV
4. Utilisation of unproductive land	52	IV	50	III	51	III	51	III
5. Availability of free seedlings and other inputs	43	V	38	VI	41	V	41	V
6. Availability of subsidy	39	VI	37	VII	37	VII	38	VII
7. Little investment	38	VII	43	V	39	VI	40	VI
8. Utilisation of free time	33	VIII	31	VIII	28	VIII	31	VIII

Ranking done with pooled sample of farmers revealed a clear picture and indicated that the motivations 'need for fuel', 'high lumpsum return', 'utilisation of unproductive land' and 'need for timber' were more important for the adoption of farm forestry programme. The motivations 'availability of free seedlings and other inputs', 'little investment', 'availability of subsidy' and 'utilisation of free time' were less important.

C. FARMERS' PARTICIPATION IN FARM FORESTRY PROGRAMME

Farmers' participation in farm forestry programme was found out by measuring their level of adoption. This section deals with level of adoption of different categories of farmers, adoption period in farm forestry and decision making in adoption.

Level of Adoption of Different Farmer Categories in Farm Forestry Programme

Level of adoption was measured by the Adoption Quotient formula developed by Chattopadhyay (1963). The level of adoption was grouped into four categories 'very low', 'low', 'medium' and 'high', indicating below 25 percent, 25-50 percent, 51-75 percent and above 75 percent level of adoption respectively. The frequency of respondents for marginal, small, medium and pooled sample of farmers under different levels of adoption along with their percentage in parentheses, were computed separately and are presented in Table 7.

Table 7 indicated that 78 percent marginal farmers, 74 percent small farmers and 66 percent medium farmers had high level of adoption of farm forestry. The table further indicated that 16 percent marginal farmers, 22 percent small farmers and 33 percent medium farmers had medium level of adoption.

Table 7. Level of Adoption of Different Farmer Categories in Farm Forestry Programme

Farmer category	Percentage of Adoption			
	Below 25 (very low)	25-50 (Low)	51-75 (Medium)	Above 75 (High)
Marginal farmers (N=101)	1 (0.9)	5 (5.0)	16 (15.9)	79 (78.2)
Small farmers (N=88)	2 (2.2)	2 (2.2)	19 (21.6)	65 (74.0)
Medium farmers (N=61)	- (0.0)	1 (1.6)	20 (32.8)	40 (65.6)
Pooled sample (N=250)	3 (1.2)	8 (3.2)	55 (22.0)	184 (73.6)

From the pooled sample it may be said that 96 percent of the respondents in the study area had medium to high level of adoption in farm forestry. This high level of adoption with majority of the farmers indicated that farm forestry programme could satisfy farmers' some of the most urgently felt needs such as 'need for fuel', 'high lumpsum return', 'utilisation of unproductive land' and 'need for timber' (Table 6).

Adoption Period in Farm Forestry

According to Rogers (1962) adoption period is the length of time required to pass through from first hearing of an innovation to its final adoption. The adoption period of the respondents were

calculated in an yearly sequence from awareness to adoption and is presented in Table 8.

Table 8. Adoption Period in Farm Forestry

(N=250)

Year	Frequency	Percentage
Same year	186	74.4
Next year	40	16.0
After two years	18	7.2
After three years	5	2.0
After four years	1	0.4

Table 8 revealed that 74 percent of the respondents adopted farm forestry the same year in which they became aware of it, and another 16 percent next year. That is, within a period of two years 90 percent of the farmers adopted this new technology of farm forestry.

The conditions which appear to have favoured such a short adoption period are mentioned in brief -

1. Farm forestry programme was mainly introduced in rainfed uncultivable uplands of poor soil type. The farmers perceived that the lands they were possessing were going waste and were not contributing to their employment and income (discussion in Section B - Prior Status).

While favourable conditions like availability of irrigation water, good soil type etc. are conducive to the adoption of improved technology in crop production, the motivations to overcome the unfavourable ecological conditions of the same set of farmers helped in rapid adoption of farm forestry technology in the study area.

- ii. High level of utilisation of personal cosmopolite sources of information such as, Forest Extension Worker (Table 5).
- iii. The attributes of farm forestry innovation which could satisfy farmers' some of the most urgently felt needs such as, 'need for fuel', 'high lumpsum return', 'utilisation of unproductive land' and 'need for timber' (Table 6).

Decision Making about Adoption of Farm Forestry

Here it was intended to find out with whom the farmers discussed while taking decision about the adoption of farm forestry. The persons concerned with whom the farmers discussed in taking decision were arranged more or less from low to high social distance from the respondent (ego), and are presented in Table 9.

Table 9. Decision Making about Adoption of Farm Forestry

(N=250)

Persons concerned	Frequency	Percentage
Ego himself	35	14.0
With wife	6	2.4
With other members of the family	155	62.0
With relatives	2	0.8
With neighbours	79	31.6
With farmers of other village	3	1.2
With panchayat members	2	0.8

Table 9 revealed that 14 percent of the respondents took the decision to adopt farm forestry technology themselves. Sixty two percent respondents discussed with other members of the family and only about 2 percent discussed with their wives. About 32 percent of the respondents discussed with their neighbours.

The socio-economic profile of the respondents (Table 2) indicated that a large number of respondents belonged to weaker sections (SC, ST and lower caste), had low level of education, low social participation and belonged to lower and lower-middle classes. This type of situation is generally not conducive to the development of individualism in the people.

In this condition persons generally do not have the ability to take decisions themselves and rather depend on others. The tribal farmers (Lodhas) were prone to take community decisions. This was reflected in the present study where a large percentage of respondents discussed with other members of the family and with neighbours while taking decision about adoption of farm forestry technology.

D. MANAGEMENT FACTORS IN FARM FORESTRY PROGRAMME

This section deals with involvement of family members in farm forestry, importance of package of practices, tree species planted, choice of tree species other than those planted and preference of tree species.

Involvement of Family Members in Farm Forestry

Farm forestry is a family enterprise. The extent to which the family members had participated in the programme was investigated. The frequency and percentage of farmers, farm women, children and others who have actually participated in different operations relating to farm forestry were computed and are presented in Table 10.

Table 10 revealed that all the components of the family i.e. farmers, farm women and children participated in farm forestry programme in varying degrees. Outside help was also required to some extent. It was found that the mean participation level for all the operations in farm forestry was highest in respect of farmers followed by farm women, children and others.

Except casualty replacement, more than 80 percent of the farmers were involved in all the operations relating to farm forestry. The involvement of the farm women in operations like

Table 10. Involvement of Family Members in Farm Forestry Programme

(N=250)

Items	Involvement							
	Farmer		Women		Children		Others	
	Fre- quency	Percen- tage	Fre- quency	Percen- tage	Fre- quency	Percen- tage	Fre- quency	Percen- tage
1. Site preparation	222	88.8	103	41.2	63	25.2	75	30.0
2. Digging pits	210	84.0	100	40.0	61	24.4	112	44.8
3. Planting seedlings	230	92.0	195	78.0	139	55.6	69	27.6
4. Application of manure, fertiliser and insecticides	230	92.0	128	51.2	82	32.8	60	24.0
5. Protection of seedlings	236	94.4	200	80.0	140	56.0	25	10.0
6. Casualty replacement	197	78.8	143	57.2	80	32.0	30	12.0
7. Mulching	228	91.2	100	40.0	65	26.0	32	12.8
8. Intercultural opera- tion and top dressing	230	92.0	104	41.6	65	26.0	33	13.2
9. Collection of twigs and leaves from farm forest for fuel	221	88.4	205	82.0	137	54.8	17	6.8
Mean participation level	223	89.1	142	56.8	92	37.0	50	20.1

'planting seedlings', 'protection of seedlings' and 'collection of twigs and leaves for fuel' were around 80 percent. In respect of all other items of operation their involvement was about 40 to 50 percent. Children were engaged around 55 percent in operations like 'planting seedlings', 'protection of seedlings' and 'collection of twigs and leaves for fuel', where women also had high level of involvement. In respect of other items, the participation of children was around 20 to 30 percent. In operations like site preparation and digging pits which involve quite a good amount of labour, considerable outside help was sought. Some assistance was sought for operations like 'planting seedlings' and 'application of manure, fertiliser and insecticides', probably to maintain the time schedule. Involvement of outsiders in other operations was negligible.

It appeared that success of the farm forestry programme was dependent to a great extent on total involvement of the family.

Perceived Importance of Items
in Package of Practices

The items in package of practices of farm forestry were presented to the respondents and they were asked to indicate whether they considered each of the items as 'most important', 'important' or 'not so important'. The responses were computed and are presented in Table 11.

Table 11. Perceived Importance of Items in Package of Practices of Farm Forestry

(N = 250)

Items	Perceived importance (frequency and percentage)		
	Most important	Important	Not so important
1. Dose of fertiliser	248 (99.2)	2 (0.8)	0 (0.0)
2. Time of fertiliser application	247 (98.8)	3 (1.2)	0 (0.0)
3. Mode of fertiliser application	247 (98.8)	3 (1.2)	0 (0.0)
4. Spacing	246 (98.4)	4 (1.6)	0 (0.0)
5. Protection from biotic damage	246 (98.4)	2 (0.8)	2 (0.8)
6. Planting technique	244 (97.6)	5 (2.0)	1 (0.4)
7. Time of planting	245 (98.0)	3 (1.2)	2 (0.8)
8. Optimal gestation period for fetching reasonable price	243 (97.2)	6 (2.4)	1 (0.4)
9. Time of interculture and mulching	241 (96.4)	5 (2.0)	4 (1.6)
10. Time of insecticide application	240 (96.0)	4 (1.6)	6 (2.4)
11. Dose of insecticide	240 (96.0)	4 (1.6)	6 (2.4)
12. Time of casualty replacement	235 (94.0)	13 (5.2)	2 (0.8)
13. Choice of species	223 (89.2)	14 (5.6)	13 (5.2)
14. Edaphic factor (soil testing)	208 (83.2)	25 (10.0)	17 (6.8)

Table 11 indicated that out of 14 items twelve items were considered 'most important' by at least 94 percent of the respondents. Other two items like 'choice of species' and 'edaphic factor' (soil testing) were considered most important by 89 percent and 83 percent of the respondents respectively.

That an overwhelming number of respondents considered all the elements in the package of practices of farm forestry as most important indicated that the respondents understood well the importance of each of the items, which may be attributed to their high level of contact with the Forest Extension Worker and utilisation of mass media like Educational Films and Radio (Table 5).

Choice of Tree Species

Tree species planted by the respondents under farm forestry programme are presented in Table 12. Tree species mentioned here are in English or local names. Their scientific names with the particular species used in the study area are presented in Appendix V.

Table 12 revealed that Eucalyptus was planted by 99 percent and Acacia by 24 percent of the respondents. Tree species like Gamar, Cashew, Subabul, Sishoo, Teak and Arjun were planted by 2 to 5 percent of the respondents. Other tree species were planted by an insignificant number of respondents.

Table 12. Tree Species Planted by Farmers under Farm Forestry Programme

(N = 250)

Species	Frequency	Percentage
1. Eucalyptus	248	99.2
2. Acacia	61	24.4
3. Gamar	12	4.8
4. Cashew	8	3.2
5. Subabul	6	2.4
6. Sishoo	6	2.4
7. Teak	5	2.0
8. Arjun	5	2.0
9. Sirish	4	1.6
10. Bamboo	3	1.2
11. Coconut	2	0.8
12. Guava	2	0.8
13. Radhachura	2	0.8
14. Sal	1	0.4
15. Jackfruit	1	0.4
16. Papaya	1	0.4
17. Mango	1	0.4

It appeared that in the study area Eucalyptus was the predominant tree species planted, followed by Acacia. This is probably because the forestry extension workers emphasised most on Eucalyptus followed by Acacia and also supplied these seedlings.

It may be that farmers desired to plant other tree species which were not included in the forestry programme of the area. It was, therefore, investigated whether the farmers liked to grow tree species other than those actually supplied. The responses are presented in Table 13.

Table 13. Farmers' Choice of Tree Species Other than those Planted
(N = 250)

Species	Frequency	Percentage
1. Mango	97	38.8
2. Gamar	86	34.4
3. Jackfruit	82	32.8
4. Cashew	53	21.2
5. Acacia	44	17.6
6. Guava	41	16.4
7. Coconut	35	14.0
8. Sal	35	14.0
9. Neem	34	13.6
10. Arjun	32	12.8
11. Teak	30	12.0
12. Papaya	24	9.6
13. Subabul	19	7.6
14. Citrus	15	6.0
15. Sishoo	14	5.6
16. Mahua	12	4.8
17. Bamboo	8	3.2
18. Eucalyptus	1	0.4

Table 13 indicated that about 30 to 40 percent of the farmers desired to plant Mango, Gamar and Jackfruit trees. Ten to twenty percent of the farmers desired to plant Cashew, Acacia, Guava, Coconut, Sal, Neem, Arjun, Teak and Papaya. Less than 10 percent of the farmers wanted trees like Subabul, Citrus, Sishoo, Mahua, Bamboo etc.

Though majority of the farmers planted Eucalyptus and Acacia mainly for fuel and timber, they desired to have some fruit plants of their choice and traditional timber plants like Gamar, Sal, Neem, Arjun, Teak etc.

Considering the tree species the respondents have actually planted and other species they would have planted if these were available (Tables 12 and 13), the respondents were asked to mention three tree species which they would like most and rank them. The tree species ranked 1, 2 and 3 were given scores 3, 2 and 1 respectively. The tree species were placed in four categories, very high, high, medium and low preferences, according to total score obtained by each species. The data were compiled separately for marginal, small and medium farmers and are presented in Table 14.

Table 14 revealed that all the three categories of farmers marginal, small and medium had very high preference for Eucalyptus. Apart from its quick growing nature under adverse agro-climatic conditions, the attributes which most fascinated the farmers were its less susceptibility to browsing by cattle at the early stage

Table 14. Farmers' Preference of Tree Species

Farmer Category	Farmers' Preference of Tree Species			
	Very high (score more than 100)	High (100-50)	Medium (50-25)	Low (25-0)
Marginal farmers (N = 101)	Eucalyptus (243)	Mango (69), Gamar (56)	Cashew (43), Acacia (41), Jackfruit (31)	Teak(21), Sal(17), Neem(14), Guava(14), Coconut(13), Papaya(10), Sirish(8), Subabul(7), Arjun(6), Mahua(5), Sishoo(5), Citrus(3), Bamboo(3)
Small farmers (N = 88)	Eucalyptus (158)	Gamar (60), Mango (56)	Cashew (42), Acacia (36)	Teak(24), Neem(22), Sal(22), Jackfruit(22) Guava(16), Arjun(14), Papaya(11), Mahua(9), Coconut(9), Sirish(6), Sishoo(4), Citrus(3), Subabul(2), Bamboo(2)
Medium farmers (N = 61)	Eucalyptus (129)		Gamar (40), Mango (30)	Acacia(23), Cashew(20), Sal(17), Teak(15), Jackfruit(15), Sishoo(11), Sirish(11), Guava(11), Arjun(10), Coconut(10), Neem(8), Bamboo (8), Citrus(5), Papaya(4), Mahua(3), Subabul(3)

N.B. Scores obtained by each of the tree species are given in the parentheses.

and a source for steady supply of fuel through fall of leaves and dead twigs etc. during the growth period. In addition, Eucalyptus required less inputs and had good coppicing property.

The tree species which had high and medium preferences were Mango, Gamar, Cashew, Acacia and Jackfruit which reflected the felt needs of all the three categories of farmers in the study area. Mango and Jackfruit not only provided good quality timber but also fruits for home consumption and sale. The preference for Cashew was for its high-value nuts. Gamar is traditional timber plant with high acceptability for its good quality timber and resistance to insect attack. Acacia which has been newly introduced supplies both timber and fuel.

Besides, there were many other plant species for which the farmers had low preferences.

It appeared that in the study area the farmers had clear-cut choice of a few tree species which they felt would satisfy their maximum needs.

E. BENEFITS OF FARM FORESTRY

This section deals with the availability and utilisation of forest products, preference of forest products and perception of the benefits of farm forestry.

Availability and Utilisation of Forest Products

The main forest products obtained from tree plantation in the study area were fuel and timber, and were considered for the present investigation. The respondents were asked to mention the type of products they were getting from their plantation. The frequency and percentage of respondents who obtained these products were compiled separately for marginal, small, medium and pooled sample of farmers and are presented in Table 15.

From the pooled sample of farmers in Table 15 it may be observed that more than 90 percent of the farmers obtained fuel from their tree plantation whereas, about one-third of them received timber. Low response in the availability of timber may be due to the fact that at the time of collection of data, majority of the trees were not mature enough to be harvested as timber.

Those who obtained fuel and timber were further asked to give an estimate of the quantum of products expressed in percentage, utilised for household consumption and sold in the market. It may be observed from Table 15 that 99 percent of the fuel obtained was

used for household consumption and a negligible amount was taken to the market for sale by all categories of farmers.

Table 15. Availability and Utilisation of Forest Products

Category of farmers	Availability		Utilisation	
	Frequency	Percentage	Household consumption(P.C.)	Sold in the market (P.C.)
<u>Forest Product : Fuel</u>				
Marginal farmers (N=101)	96	95.04	99.63	0.36
Small farmers (N=88)	81	92.04	98.70	1.29
Medium farmers (N=61)	54	88.52	99.44	0.55
Pooled sample (N=250)	231	92.40	99.26	0.73
<u>Forest Product : Timber</u>				
Marginal farmers (N=101)	41	40.59	21.09	78.90
Small farmers (N=88)	20	22.72	28.25	71.75
Medium farmers (N=61)	15	24.59	4.33	95.66
Pooled sample (N=250)	76	30.40	19.67	80.32

Further, it was found that 96 percent of timber produced by the medium farmers and about 70 to 80 percent of timber produced by the small and marginal farmers were sold to the market. It may be observed from Table 6 that 'high lumpsum return' was the most important motivation of the medium farmers for which they offered almost the entire quantity of timber in the market for sale. Timber being a costly item, the small and marginal farmers could ill afford to purchase it from the market and their household requirement of timber was met up mainly from their own produce. After their initial household requirement of timber is met up, it is expected that the marginal and small farmers will be able to offer more timber for sale and derive maximum benefit from farm forestry.

Farmers' Preference of Forest Products

The respondents were asked to mention three forest products which they required most and rank them. Forest products ranked 1, 2 and 3 were given scores 3, 2 and 1 respectively. The forest products were finally ranked on the basis of total rank score and are presented in Table 16.

Table 16 revealed that the most important need of the farmers for forest products was fuel which was ranked first, followed by timber which was ranked second. Both fuel and timber had very high total rank score.

Table 16. Farmers' Preference of Forest Products

Items	Frequency	Frequency of respondents in different ranks			Total Rank Score	Rank Order
		I	II	III		
1. Fuel	250	161	86	3	658	I
2. Timber	250	87	152	11	576	II
3. Fruit	129	5	7	117	146	III
4. Fodder	125	1	5	119	132	IV

The respondents also wanted to have tree species which would yield fruits and fodder and these were ranked third and fourth respectively. Fruit and fodder trees could be planted near the homestead and could be protected from biotic damage. As would be evident from Tables 13 and 14, farmers have indicated their choice for some fruit trees also.

Farmers' Perception about the Benefits of Farm Forestry

The respondents had at least 5 years of experience in working with the farm forestry programme at the time of collection of data. Though all of them had not been able to harvest the trees, they were asked to mention about their perception of the benefits of the programme.

The perceived benefits were presented in nine items and the farmers were asked to respond on a 4-point scale. The responses 'strongly agree', 'agree', 'disagree' and 'strongly disagree' were given scores 4, 3, 2 and 1 respectively. The items were finally ranked on the basis of total rank score and are presented in Table 17.

The important benefits of farm forestry which the respondents perceived were 'it helps in proper utilisation of land', 'it saves time of fuelwood collection', 'it meets demand for fuelwood', 'it helps in checking soil erosion', 'it meets demand of timber' and were ranked 1st, 2nd, 3rd, 4th and 5th respectively. The benefits were rather visual in nature which the respondents could observe and satisfied their some of the most urgently felt needs.

The perception of monetary benefits after felling of trees had a rather low ranking as some of the respondents were yet to harvest the trees and see the benefits for themselves.

The benefits like 'it helps in increasing the number of forest birds and animals', 'it acts as a wind break' and 'it helps in retention of soil moisture' were less observable in nature, particularly when the planting sites were away from the homestead, and were ranked 7th, 8th and 9th respectively.

Table 17. Farmers' Perception about the Benefits of Farm Forestry Programme

Statements	Frequency in Different Ranks				Total Rank Score	Rank Order
	Strongly agree	Agree	Disagree	Strongly disagree		
	(4)	(3)	(2)	(1)		
1. It helps in proper utilisation of land	225	23	2	0	973	1
2. It saves time of fuelwood collection	231	13	2	2	969	2
3. It meets demand for fuelwood	200	44	6	0	944	3
4. It helps in checking soil erosion	201	31	15	3	930	4
5. It meets demand of timber	192	45	13	0	929	5
6. It assures monetary benefit after felling of trees	130	75	31	14	821	6
7. It helps in increasing the number of forest birds and animals	146	18	62	24	786	7
8. It acts as a wind-break	146	30	37	37	785	8
9. It helps in retention of soil moisture	88	18	122	22	672	9

In this context, Rogers and Shoemaker (1971) have mentioned that observability is an important attribute of innovation and the visible impact of an innovation facilitates its communication and diffusion in the social system.

F. ROLE OF PANCHAYAT IN FARM
FORESTRY PROGRAMME

Panchayati Raj is now well established in West Bengal, with regular Panchayat General Elections being held in 1978, 1983, 1988 and 1993 in the State. Panchayati raj has emerged as the dominant and dynamic institution for rural development in this State. All rural development programmes, including social forestry are implemented at the grass roots level with the assistance and co-operation of the panchayats.

Beneficiaries of farm forestry programme are selected by the Forest Department in consultation with the panchayat. The beneficiaries which formed the sample for study were asked an open-ended question to mention about the role played by panchayat in connection with farm forestry programme. They were further asked about the role panchayat should play in improving the programme. The frequency and percentage of responses were computed and are presented in Tables 18 and 19 respectively.

It was revealed from Table 18 that 59 percent of the respondents perceived that panchayat 'played no role in farm forestry programme'. Forestry programme like village woodlot is implemented at the local level directly by the panchayat. It may be that farmers expected that a similar role shall be played by panchayat in farm forestry programme. As the responsibility for implementing the farm forestry programme lied with individual farmers, a large

Table 18. Role Played by Panchayat in Farm Forestry Programme

(N = 250)

Statement (Role played)	Frequency	Percentage
1. Played no role in farm forestry programme	147	58.8
2. Encouraged farmers through meeting, group discussion to adopt the programme	60	24.0
3. Distributed seedlings, fertiliser, insecticides and other necessary inputs among farmers supplied by Forest Department	55	22.0
4. Helped the farmers in getting subsidies	7	2.8
5. Arranged proper marketing facilities	5	2.0
6. Helped in establishing nursery within the village	3	1.2
7. Selected the beneficiaries of the programme	3	1.2
8. Helped in protection of trees	2	0.8
9. Distributed 'patta' land	1	0.4
10. Acted as a medium between the farmers and Forest Department	1	0.4

majority of them perceived no role of panchayat in it. However, 24 percent of the respondents perceived that panchayat 'encouraged farmers through meeting, group discussion to adopt the programme' and 22 percent perceived panchayat 'distributed seedlings, fertiliser, insecticides and other necessary inputs among farmers supplied by Forest Department'.

Only a few farmers perceived other roles played by the panchayat in farm forestry.

Table 19. Farmers' Role Expectation from Panchayat about Farm Forestry Programme

(N=250)		
Statement (Role expected)	Frequency	Percentage
1. Arrange fertiliser and insecticides	204	81.6
2. Arrange seedlings	59	23.6
3. Direct involvement in protection	29	11.6
4. Arrange loan for the farmers	20	8.0
5. Distribute more waste land through 'patta'	17	6.8
6. Help in establishing nursery in the village	15	6.0
7. Take steps about proper marketing	10	4.0
8. Arrange proper irrigation facilities	8	3.2
9. Arrange training programme for farmers in collaboration with Forest Department	7	2.8

As regards role expected, 82 percent of the respondents mentioned that panchayat should 'arrange fertiliser and insecticides' and 24 percent said that panchayat should 'arrange seedlings'. The responsibility of supplying these inputs lies with the Forest Department. What the respondents perceived here is that the panchayat should more actively associate with the

programme to see that fertiliser, pesticides and seedlings are available to the farmers in time and in adequate quantity.

About 12 percent of the respondents mentioned that panchayat should have 'direct involvement in protection' of trees. It was difficult for individual farmers to protect forest lands developed away from their homestead. In such cases the farmers expected that the panchayat should exercise its authority so that forest lands developed by individual farmers could be protected from miscreants and stray animals.

Panchayat should 'arrange loan for the farmers', 'distribute more waste land through 'patta' and 'help in establishing nursery in the village', were perceived by 8 percent, 7 percent and 6 percent of the respondents respectively.

That panchayat should 'take steps about proper marketing', 'arrange proper irrigation facilities', 'arrange training programme' for farmers in collaboration with Forest Department' were perceived by less than 5 percent of the respondents.

Taking a holistic approach of role played by and role expected from panchayat, it may be said that the farmers perceived a more active involvement of the panchayat in farm forestry programme.

G. PROBLEMS IN FARM FORESTRY AS PERCEIVED
BY THE FARMERS AND MEASURES SUGGESTED
BY THEM FOR IMPROVEMENT

This section deals with the problems of farm forestry as perceived by the farmers and measures suggested by them for improvement. For this purpose, the respondents were asked an open-ended question to mention three important problems which they were facing in farm forestry and rank them. The problems ranked 1, 2 and 3 were given scores (weights) 3, 2 and 1 respectively. The total rank score for each problem was obtained by multiplying the frequency the problem was ranked first, second, or third, with the respective weightage and adding them up. The problems were then arranged in descending order of importance on the basis of their total rank score and finally ranked. These are presented in Table 20.

The respondents were further asked an open-ended question, to suggest important measures, which in their opinion would help in improving farm forestry. These were ranked on the basis of percentage of respondents reporting and are presented in Table 21.

Table 20 revealed that the most important problems perceived by the respondents in farm forestry in the study area was 'attack of termite' followed by 'biotic damage' and 'pilferage'. These were perceived as problems relating to protection of plants and were ranked 1st, 2nd and 3rd respectively. The study area being in dry laterite tract were prone to termite attack. Unless

Table 20. Farmers' Perception of Problems in Implementing Farm Forestry Programme

(N = 250)

Items (Problems)	Frequency of respondents in different ranks			Total Rank Score	Rank Order
	I	II	III		
1. Attack of termite	130	48	14	500	I
2. Biotic damage	62	85	40	396	II
3. Pilferage	21	32	25	152	III
4. Lack of fertiliser in subsequent years	17	25	36	137	IV
5. Lack of seedlings	8	13	29	79	V
6. Lack of technical knowledge	5	14	26	69	VI
7. Lack of insecticides in later years	3	6	22	43	VII
8. Lack of funds	1	10	15	38	VIII
9. Problem of marketing	4	4	2	22	IX

appropriate termite control measures were taken, seedlings got damaged within a few days of planting and subsequent operations in farm forestry became redundant. That is why attack of termite was perceived as the most important problem. In the Final Evaluation Report of the Social Forestry Project in West Bengal, the Monitoring and Evaluation Cell (1992) also noted the incidence of termite attack as a problem in the laterite zone.

Biotic damage which generally mean damage by cattle and human beings, and pilferage were mainly social problems and unless panchayat came forward to tackle the problem locally it would be difficult for farmers to protect the plants and ultimately get the harvest.

'Lack of fertiliser in subsequent years', 'lack of seedlings', 'lack of insecticides in later years' and 'lack of funds' emphasised problems relating to input supply and credit and were ranked fourth, fifth, seventh and eighth respectively.

'Lack of technical knowledge' was ranked sixth and emphasised need for appropriate training and communication.

High lumpsum return was an important motivation for the farmers to join the farm forestry programme (Table 6). Farmers perceived problem of marketing which made high return from farm forestry unattainable. In respect of marketing, farmers perceived the problem of interference by middlemen and lack of minimum price of produce declared by an appropriate authority.

It will appear from Table 21 that availability of production inputs, like 'supply of fertiliser for application in later years', 'timely supply of insecticides', 'supply of seedlings in time according to farmers' choice', were uppermost in the minds of the respondents and were suggested for improving farm forestry programme. These were ranked first, second and third respectively.

Table 21. Farmers' Suggestions for Improving Farm Forestry Programme

(N = 250)

Statements (suggestions for improvement)	Frequency	Percentage	Rank
1. Supply of fertiliser for application in later years	159	63.6	I
2. Timely supply of insecticides	112	44.8	II
3. Supply of seedlings in time according to farmers' choice	95	38.0	III
4. Provision of training about technological know-how, particularly about after-care	65	26.0	IV
5. Provision of credit	44	17.6	V
6. Adequate technical supervision by the Forest Department	34	13.6	VI
7. Establishment of nursery within the village	33	13.2	VII
8. Arranging marketing of produce	23	9.2	VIII
9. Adequate protection of plants	7	2.8	IX
10. Group approach in farm forestry	3	1.2	X
11. Provision of subsidy to economically weak farmers	3	1.2	XI

'Provision of training about technological know how particularly about after-care' was ranked fourth and was considered essential for improvement of the farm forestry programme. Next came 'provision of credit' which was ranked fifth.

'Adequate technical supervision by the Forest Department' to provide the necessary guidance for correct application of the technology and 'establishment of nursery within the village' to ensure availability of seedlings of required species locally, in time and in adequate quantity were considered important for improvement of farm forestry programme and were ranked sixth and seventh respectively.

'Arranging marketing of produce' to ensure fair price of the produce, 'adequate protection of plants' and 'group approach in farm forestry' which would also ensure some amount of protection and better bargaining ability and 'provision of subsidy to economically weak farmers' were considered important and were ranked eighth, ninth, tenth and eleventh respectively.

CHAPTER VI

SUMMARY, CONCLUSION AND RECOMMENDATIONS

CHAPTER VI

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Traditionally, forests were developed on government-owned lands by exclusively using strategies and programmes developed by government forestry officials without consulting the local people. This isolation of the local people from the government managed forest system made them hostile to it and these people became a major factor in the gradual deterioration and destructions of forests.

People's participation on a decentralised self-help basis by introducing trees into traditional farming systems became an urgent necessity. In this context, a study has been taken up to investigate some aspects of farmers' perception and participation in farm forestry programme, so that the knowledge could be used in enhancing their participation in the programme.

The objectives of the study were to investigate the following dimensions of the participants under farm forestry programme.

1. Socio-economic profile of the participants;
2. Prior status, communication and motivation;
3. Farmers' participation in farm forestry programme;
4. Management factors in farm forestry;
5. Benefits of farm forestry;
6. Role of panchayat in farm forestry; and
7. Problems in farm forestry as perceived by the farmers and measures suggested by them for improvement.

Based on review of literature, discussion with the experts on social forestry, and pilot study, some important variables which are likely to be associated with the farmers' participation in farm forestry programme were selected. The variables were measured by following standard methods and procedures.

The field investigation was carried out in Kharagpur and Jhargram Social Forestry Ranges in Midnapore district, West Bengal. A total of 15 villages, 12 in Kharagpur Social Forestry Range and 3 in Jhargram Social Forestry Range where farm forestry programme had been in operation at least for a period of five years were purposively selected. A list of farmers who have participated in farm forestry programme in the 15 selected villages at least for a period of five years, was prepared. The list contained total 366 farmers who participated in 'block planting' of trees under farm forestry programme. Out of them, 250 respondents were proportionately selected at random, which formed the sample for study.

The data were collected by the researcher himself during December, 1990 to March 1991, by interviewing the respondents through a schedule constructed for the study.

The statistical methods used in this study were Mean, Percentage, Ranking, Spearman's Rank Correlation Coefficient and 't' test.

The important findings are presented according to specific objectives of the study.

I. SOCIO-ECONOMIC PROFILE OF PARTICIPANTS UNDER FARM FORESTRY PROGRAMME

The overall socio-economic status indicated that 43 percent of the respondents belonged to lower and lower-middle classes and 42 percent belonged to middle class. Only 15 percent of the respondents belonged to upper-middle class. There was no respondent in the upper class.

The socio-economic profile indicated that majority of the participants under the farm forestry programme came from the weaker sections of the rural community with low level of education, low social participation, small land holding, kutcha house, little farm power and few improved agricultural implements.

Fifty three percent of the respondents were young i.e. upto 35 years of age, 28 percent were middle-aged i.e. 36-55 years and the remaining 19 percent were old i.e. above 55 years.

II. PRIOR STATUS, COMMUNICATION AND MOTIVATION

Prior Status : Farm forestry programme was mainly introduced in the rainfed areas. Most of the farmers had some uncultivable uplands of poor soil type. The weaker sections obtained land on 'Patta' which were also of low fertility status. These were mostly undulating uplands of poor quality and subjected to erosion. Most of these lands remained fallow. Attempts to grow some crops in these lands were made but the yields were very low.

The study revealed that some lands the people were possessing were not properly utilised and were not contributing to their employment and income. This was also creating an unsustainable ecological condition in the area.

Sources of First Information about Farm Forestry Programme : It is important for the extension worker to know wherefrom the farmer got first information about the technology. It was found that 90 percent of the respondents depended on personnel of the Social Forestry Wing of the Directorate of Forests for first information about farm forestry programme. Farm forestry being a new concept and most of the respondents being from weaker section of the community, they depended mostly on face-to-face, word-of-mouth communication from sources of information which they perceived as credible.

Utilisation of Sources of Information in Farm Forestry Programme : Forest Extension worker was the most important source of information to the rural people for providing information about farm forestry programme, closely followed by Beat Officer and Range Officer. Mass media like educational films and radio were important in providing the needed information. Meeting, demonstration, poster and farm publications which were considerably used were important in providing information to the people about farm forestry programme. Personal localite sources were also frequently used by the respondents.

Motivation : Ranking done with the pooled sample of farmers indicated that the motivations need for fuel, high lumpsum return, utilisation of unproductive land and need for timber were more important for the adoption of farm forestry programme.

The motivations, availability of free seedlings and other inputs, little investment, availability of subsidy and utilisation of free time were less important.

III. FARMERS' PARTICIPATION IN FARM FORESTRY PROGRAMME

Level of Adoption of Different Farmer Categories in Farm

Forestry Programme : Level of adoption was measured by the Adoption Quotient formula. Seventy eight percent marginal farmers, 74 percent small farmers and 66 percent medium farmers had high level of adoption of farm forestry. This high level of adoption with majority of the farmers indicated that farm forestry programme could satisfy farmers' some of the most urgently felt needs such as need for fuel, high lumpsum return, utilisation of unproductive land and need for timber.

Adoption Period in Farm Forestry : Ninety percent of the farmers adopted farm forestry within a period of two years from its first hearing. The motivation to overcome the unfavourable ecological conditions; high level of utilisation of personal cosmopolite sources of information; and the attributes of farm

forestry innovation to satisfy farmers' some of the most urgently felt needs such as, need for fuel, high lumpsum return, utilisation of unproductive land and need for timber, favoured such a short adoption period.

Decision Making about Adoption of Farm Forestry : In taking decisions about adoption of farm forestry, the farmers' not only deliberated themselves but also discussed with members of the family and others. Fourteen percent of the respondents took the decision to adopt farm forestry technology themselves. Sixty two percent respondents discussed with other members of the family, and only 2 percent discussed with their wives. About 32 percent of the respondents discussed with their neighbours. A large number of respondents belonged to the weaker sections, had low level of education, low social participation and belonged to the lower and lower-middle classes which were conducive to taking of community decisions.

IV. MANAGEMENT FACTORS IN FARM FORESTRY PROGRAMME

Involvement of Family Members in Farm Forestry Programmes : All the components of the family i.e. farmers, farm women and children participated in farm forestry programme in varying degrees. Outside help was also sought. It was found that the mean participation level for all the operations in farm forestry was highest in respect of farmers, followed by farm women, children and others.

Perceived Importance of Items in Package of Practices : Out of 14 items in the package of practices for farm forestry, 12 items were considered most important by at least 94 percent of the respondents. The other two items were considered most important by more than eighty percent of the respondents. It indicated that the respondents understood well the importance of each of the items of package of practices in farm forestry.

Choice of Tree Species : In the Kharagpur and Jhargram Social Forestry Ranges, Eucalyptus was the predominant tree species planted, followed by Acacia. Though majority of the farmers planted Eucalyptus and Acacia, mainly for fuel and timber, they desired to have some fruit plants of their choice and traditional timber plants like Gamar, Sal, Neem, Arjun, Teak etc.

On being asked about the tree species the respondents of the area would have 'liked most, considering the tree species they had actually planted and other species they would have planted if these were available, the marginal, small and medium farmers had very high preference for Eucalyptus. The tree species like Mango, Gamar, Cashew, Acacia and Jackfruit had high and medium preferences.

V. BENEFITS OF FARM FORESTRY

Availability and Utilisation of Forest Products : More than 90 percent of the farmers obtained fuel from their tree plantation, whereas about one-third of them received timber. Low response in

the availability of timber may be due to the fact that at the time of collection of data, the majority of the trees were not mature enough to be harvested as timber.

In respect of utilisation of fuel, it was found that 99 percent was used for household consumption and a negligible amount was taken to the market for sale by all categories of farmers. It was found that 96 percent of timber produced by the medium farmers and about 70 to 80 percent of timber produced by the small and marginal farmers were sold to the market.

Farmers' Preference of Forest Products : The most important need of the farmers for forest products was fuel, followed by timber. They also wanted to have tree species which would yield fruits and fodder.

Farmers' Perception about the Benefits of Farm Forestry Programme : The important benefits of farm forestry programme which the respondents perceived, were, it helps in proper utilisation of land, saves time of fuelwood collection, meets demand for fuelwood, helps in checking soil erosion and meets demand of timber.

VI. ROLE OF PANCHAYAT IN FARM FORESTRY PROGRAMME

Role Played by Panchayat : Fifty nine percent of the respondents perceived that panchayat played no role in farm forestry programme. However, 24 percent of the respondents perceived that panchayat

encouraged farmers through meeting, group discussion to adopt the programme and 22 percent perceived panchayat distributed seedlings, fertiliser, insecticides and other necessary inputs among farmers supplied by the Forest Department.

Role Expected from Panchayat : Farmers' role expectation from Panchayat, in order of importance were, arrange fertiliser, insecticides and seedlings, protection of plants, arrange loan, distribute wastelands through 'patta', help in establishing nursery in the village and take steps about proper marketing of produce.

Taking a holistic approach it may be said that the farmers perceived a more active involvement of the panchayat in farm forestry programme.

VII. PROBLEMS IN FARM FORESTRY AS PERCEIVED BY THE FARMERS AND MEASURES SUGGESTED BY THEM FOR IMPROVEMENT

Problems in Farm Forestry : The problems in farm forestry as perceived by the farmers, in order of importance were, attack of termite, biotic damage, pilferage, lack of fertiliser in subsequent years, lack of seedlings, lack of technical knowledge, lack of insecticides in later years, lack of funds and problem of marketing.

Suggestions for Improvement : The suggestions for improvement of farm forestry in order of priority were supply of fertiliser for application in later years, timely supply of insecticides, supply

of seedlings in time according to farmers' choice, provision of training about technological know-how particularly about after-care, provision of credit, adequate technical supervision by the Forest Department, establishment of nursery within the village, arranging marketing of produce, adequate protection of trees, group approach in farm forestry and provision of subsidy to economically weak farmers.

Conclusion and Recommendations

It may be concluded that a sustainable development of forest may be attained when people in the neighbourhood participate in programmes for generating forest resources to meet their urgently felt needs. To enhance farmers' participation in farm forestry programme, the following recommendations are made. Though the recommendations are made specifically for farm forestry programme, these may be applicable in other relevant situations in social forestry.

1. In farm forestry extension it may be emphasised that tree is a crop with longer gestation period. Like field crops, trees also require adequate care and management for getting an economic return.
2. In selecting tree species for planting, a proper balance may be made between the constraints and facilities of the ecosystem

in one hand and farmers' needs and their preferences of forest products on the other.

As far as possible, suitable species-mix, particularly with leguminous trees based on adaptive research, may be advocated. The trees thus selected should be compatible with the farming system of the individual farmers.

3. In selecting tree species, the possibility of bringing unfelt needs of the rural people to the level of felt needs may be explored.

For example, where the ecosystem permits, trees like Arjun may be planted for Tasar cultivation which shall generate large on-farm and off-farm employment, in addition to providing fodder, fuel, timber etc. Similarly, in areas where there is large concentration of cattle population, emphasis may be given on planting suitable fodder trees, rather than trees which shall yield only fuel and timber.

4. Farm forestry was practised in uncultivable waste lands and majority of the participants belonged to the weaker sections of the farming community.

In selecting beneficiaries for the farm forestry programme, emphasis may be given to those who have more of uncultivable lands and less of economic resources.

5. Social Forestry personnel, particularly the Forest Extension Worker, have a major role to play in informing, educating and motivating the farmers to adopt farm forestry practices. These functionaries may be trained in forestry extension to improve their competency and credibility.
6. The forestry extension personnel can not cope up with the large number of beneficiaries scattered over areas of low accessibility during the short planting period of 3 to 4 monsoon months.

During this period Radio may be used more frequently to keep proper tempo of extension work. The beneficiaries of farm forestry may be encouraged to form Radio Rural Forum, to facilitate inter-personal discussion after each broadcast

7. To reinforce extension work, mass media like educational films, poster, farm publications etc. may be used in combination with other extension methods and aids.

Conducting field trip or field day in farmers' lands where farm forestry has been successfully demonstrated and farmers' meeting with the help of coloured slides based on actual field work of the area may be stressed in forestry extension work.

8. As farmers have more reliance on other farmers, knowledgeable participants in farm forestry of the neighbouring villages may be utilised in extension programmes to motivate the farmers.

9. People belonging to the weaker sections, particularly the tribals, are prone to take community decisions. In doing extension work with them, group approach may be used in addition to individual contact.
10. Need for fuel, high lumpsum return, utilisation of unproductive land and need for timber were important motivations of the beneficiaries of farm forestry programme. These may be emphasised in training, communication, publications etc. relating to farm forestry.
11. It was found that all components of the family i.e. farmers, farm women and children were involved in farm forestry programme. To develop appropriate skills, training programmes may be arranged for the farmers as well as for the women and children.

In training, emphasis may be given not only on 'how-to-knowledge', but also on 'principles-knowledge'. That is, emphasis should be given not only on how to do a job but also on why to do it.

12. In motivating the farmers, stress may be given on 'observable' benefits of farm forestry. High lumpsum return, production of timber, availability of fuel and utilisation of unproductive land were some of the observable benefits of farm forestry which were ranked high.

13. Farm forestry has the capacity to generate more employment in the family and outside by involving them in different field operations. Panchayats may play a more dynamic role in farm forestry to utilise the employment potential for the benefit of the rural people and particularly of the weaker sections of the community.
14. Measures for protection of trees may be emphasised not only at the individual level but also at the community level. Panchayat has an important role to play in this respect.
15. All necessary inputs like seedlings, fertiliser, pesticides etc. may be made available to the farmers in time and in adequate quantity. Credit may also be arranged for those who need it.
16. With the success of farm forestry programme, the production of timber shall increase. Sustained adoption of farm forestry, particularly by the weaker sections of the community, calls for appropriate and timely action in marketing of the produce.

The beneficiaries of farm forestry programme may be encouraged to form marketing co-operatives. A price support system with declaration of minimum price for timber may also be thought of.

CHAPTER VII

FUTURE SCOPE OF RESEARCH

CHAPTER VII

FUTURE SCOPE OF RESEARCH

1. The present study on farm forestry was conducted in the low-rainfall laterite zone of West Bengal. Similar studies may be carried out in other agro-climatic zones of the State.
2. In-depth studies may be conducted in various locations to find out farmers' knowledge, attitude, motivations and perception of benefits of trees and forests.
3. Panchayats and non-govt. organisations have a major role to play in the development of social forestry. Their role and ability to mobilise different sections of the rural community in the programme may be investigated.
4. Appropriate extension methodology may be found out to strengthen the participation of individuals and communities in farm forestry to improve their quality of life.

CHAPTER VIII

BIBLIOGRAPHY

CHAPTER VIII

BIBLIOGRAPHY

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APPENDICES

APPENDIX I

Reproduction of Table 49 : The Transmutation of Orders of Merit into Units of Amount or 'Scores' (Garrett, 1981, Page 329)

Example If $N = 25$, and $R = 3$, Percentage Position is $\frac{100(3 - .5)}{25}$
or 10 (formula 78) and from the table, the equivalent rank is 75,
on a scale of 100 points.

Percent	Score	Percent	Score	Percent	Score
.09	99	22.32	65	83.31	31
.20	98	23.88	64	84.56	30
.32	97	25.48	63	85.75	29
.45	96	27.15	62	86.89	28
.61	95	28.86	61	87.96	27
.78	94	30.61	60	88.97	26
.97	93	32.42	59	89.94	25
1.18	92	34.25	58	90.83	24
1.42	91	36.15	57	91.67	23
1.68	90	38.06	56	92.45	22
1.96	89	40.01	55	93.19	21
2.28	88	41.97	54	93.86	20
2.63	87	43.97	53	94.49	19
3.01	86	45.97	52	95.08	18
3.43	85	47.98	51	95.62	17
3.89	84	50.00	50	96.11	16
4.38	83	52.02	49	96.57	15
4.92	82	54.03	48	96.99	14
5.51	81	56.03	47	97.37	13
6.14	80	58.03	46	97.72	12
6.81	79	59.99	45	98.04	11
7.55	78	61.94	44	98.32	10
8.33	77	63.85	43	98.58	9
9.17	76	65.75	42	98.82	8
10.06	75	67.48	41	99.03	7
11.03	74	69.39	40	99.22	6
12.04	73	71.14	39	99.39	5
13.11	72	72.85	38	99.55	4
14.25	71	74.52	37	99.68	3
15.44	70	76.12	36	99.80	2
16.69	69	77.68	35	99.91	1
18.01	68	79.17	34	100.00	0
19.39	67	80.61	33		
20.93	66	81.99	32		

APPENDIX II

LETTER OF INSTRUCTION FOR JUDGES' RATING OF ITEMS RELATING TO
PACKAGE OF PRACTICES IN FARM FORESTRY

From : Dr. S. K. Maity, M.Sc.(Ag.), Ph.D.,
Professor & Head
Deptt. of Agricultural Extension
Bidhan Chandra Krishi Viswavidyalaya
Mohanpur, Nadia, West Bengal 741252

To : _____

Dear Sir,

In connection with the Ph.D. Research study on Farm Forestry by Shri Krishnendu Bhattacharya under my supervision, we want to prepare an index of items relating to package of practices for farm forestry which the farmers are required to perceive for successful implementation of the farm forestry programme.

The items are given on the left hand side of the enclosed sheet under different sub-heads. You are requested to please judge each item which in your opinion, 'most important', 'important' and 'not so important' for the farmers. You will please put a tick mark (✓) in the appropriate column against each item. Please see that no item is left out.

If you want to add any other item you may please do so and judge the item as above.

It will be highly appreciated if you kindly send your reply at your earliest convenience in the self addressed stamped envelope enclosed herewith.

Yours sincerely,

Date : June, 1990

Place : Mohanpur, Nadia

(S. K. MAITY)

Sl. no.	I t e m s	Most Important	Important	Not so important
1.	Time of planting			
2.	Spacing			
3.	Size of pit			
4.	Planting technique			
5.	Time of fertiliser application			
6.	Dose of fertiliser			
7.	Mode of fertiliser application			
8.	Time of interculture and mulching			
9.	Time of casualty replacement			
10.	Time of insecticide application			
11.	Dose of insecticide			
12.	Mode of insecticide application			
13.	Optimal gestation period for fetching reasonable price			
14.	Present market price of the produce			
15.	(Any other)			
16.				
17.				

APPENDIX III

COMPUTATION OF JUDGES' RATING FOR SELECTION OF ITEMS RELATING TO PACKAGE OF PRACTICES IN FARM FORESTRY

Items	Mean score
1. Time of planting	3.00*
2. Spacing	2.34*
3. Size of pit	1.91
4. Planting technique	2.50*
5. Time of fertiliser application	2.50*
6. Dose of fertiliser	2.41*
7. Mode of fertiliser application	2.34*
8. Time of interculture and mulching	2.50*
9. Time of casualty replacement	2.34*
10. Time of insecticide application	2.41*
11. Dose of insecticide	2.58*
12. Mode of insecticide application	1.91
13. Optimal gestation period for fetching reasonable price	2.34*
14. Present market price of the produce	1.75
15. Choice of species	3.00*
16. Edaphic factor (soil testing)	3.00*
17. Protection from biotic damage	3.00*

* Items selected.

APPENDIX IV

BIDHAN CHANDRA KRISHI VISWAVIDYALAYA
DEPARTMENT OF AGRICULTURAL EXTENSION

Interview Schedule

Sl. No...

MNF/SF/ME

1. Identification

- a) Name of the respondent _____
- b) Village _____
- c) Panchayat _____
- d) Block _____
- e) Forest Range _____
- f) Division _____ Kharagpur _____

2. Background Information

- a) Age : _____ Years
- b) Sex : Male/Female

3. Socio-Economic Status

- a) Land : No land (0)/Upto 1 acre (1)/Upto 5 acres (2)/
Upto 10 acres (3)/Upto 15 acres (4)/Upto 20
acres (5)/Above 20 acres (6)
- b) Education : Illiterate (0)/Can read only (1)/Can read and
write (2)/Primary (3)/Middle (4)/High School (5)/
Graduate and above (6)
- c) House : No house (0)/Hut (1)/Kutchha house (2)/Mixed
house (3)/Pucca house (4)/Mansion (6)
- d) Caste : Scheduled caste*(1)/Lower caste (2)/Artisan
caste (3)/Agricultural caste (4)/Prestige
caste (5)/Dominant caste (6)
* and tribe

- e) Farm Power : No draught animal (0)/1-2 draught animal (2)/
3-4 draught animals or one or more prestige
animals (4)/5-6 draught animals or tractor (6)
- f) Material Possession : Bullock cart (1)/Cycle (1)/Radio (1)/Chair (1)/
Improved agril. implements (2)
- g) Family
- i) Type : Single (1)/Joint (2)
- ii) Size : Upto 5 (1)/Above 5 (2)
- h) Occupation : Labour (1)/Caste occupation (2)/Business (3)/
Independent profession (4)/Cultivation (5)/
Service (6)
- i) Social partici-
pation : Member of one organisation (1)/Member of more
than one organisation (2)/Office bearer (3)/
Wider public leader (6)

4. Household's Source of Livelihood

Primary Occupation : Farming/Farm forestry/Farm labour

Secondary Occupation: _____

5. Do you think that the area which you have put under
tree and other plantation crops had any alternative
use?

Yes/No

If yes, specify crop -
yield-

6. You may be getting information regarding farm forestry through various sources. Which of the following sources you have utilised for getting information and how often ?

Sl. no.	Sources of information	Most often (4)	Often (3)	Some-times (2)	Rarely (1)	Never (0)
---------	------------------------	-------------------	--------------	-------------------	---------------	--------------

A. Mass Media

- a) Radio
- b) Television
- c) Educational film
- d) Newspaper
- e) Farm Publications
- f) Poster
- g) Demonstration
- h) Field trip
- i) Exhibition/
Krishi Mela
- j) Meeting

B. Personal Cosmopolite

- a) Forest Extension
Worker
- b) Beat Officer
- c) Range Officer
- d) D. F. C.
- e) Panchayat personnel
- f) Farmers of other
village
- g) Any other (Specify)

Sl. no.	Sources of information	Most often (4)	Often (3)	Some-times (2)	Rarely (1)	Never (0)
---------	------------------------	-------------------	--------------	-------------------	---------------	--------------

C. Personal Localite

a) Family

i) Wife

ii) Other family members

b) Relatives

c) Friends and neighbours

d) Village leader

e) Any other (Specify)

7. Adoption of Farm Forestry

i) Please let me know when and from whom you first came to know about farm forestry ?

Year _____

Source _____

ii) Please let me know the area (acres) put under farm forestry by you since first adoption

Year	Area suitable for farm forestry (p)	Area put under farm forestry (e)	e/p
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990			

8. Decision Making

How did you decide upon adoption of the farm forestry programme ?

Ego himself

With wife

With other members of the family

Others (Specify) _____

9. Motivation

Now please let me know why you have decided upon the adoption of farm forestry. Please rank the items.

Rank

- i) High lumpsum return
- ii) Utilisation of free time
- iii) Utilisation of unproductive land
- iv) Little investment
- v) Availability of free seedling and other inputs
- vi) Availability of subsidy
- vii) Need for fuel
- viii) Need for timber

10. Trees Planted by Respondent

- | | |
|---------------|------------|
| a) Eucalyptus | e) Subabul |
| b) Acacia | f) |
| c) Gamar | g) |
| d) Arjun | h) |

11. Farmer's Choice of Other Tree Species

In addition to the species which you have planted, what other tree species you would have planted if these were available to you ?

- | | |
|----------|----------|
| a) _____ | d) _____ |
| b) _____ | e) _____ |
| c) _____ | f) _____ |

12. Farmer's Preference of Tree Species

Of all the tree species you have mentioned (items 10 & 11), please let me know three tree species which you would like most and rank them.

	<u>Species</u>	<u>Rank</u>
a)	_____	_____
b)	_____	_____
c)	_____	_____

13. Importance of Items of Package of
Practices in Farm Forestry

To what extent do you consider the following items
important for farm forestry ?

Sl. no.	I t e m s	Most important (3)	Important (2)	Not so important (1)
a)	Time of planting			
b)	Spacing			
c)	Planting technique			
d)	Time of fertiliser application			
e)	Dose of fertiliser			
f)	Mode of fertiliser application			
g)	Time of interculture and mulching			
h)	Time of casualty replacement			
i)	Choice of species			
j)	Edaphic factor (Soil testing)			
k)	Time of insecticide application			
l)	Dose of insecticide			
m)	Protection from biotic damage			
n)	Optimal gestation period for fetching reasonable price			

14. Pattern of Utilisation of Forest Products

Please let me know the products you get from your farm forest and their pattern of utilisation

Product obtained	Utilisation	
	Marketed (P.C.)	Household use (P.C.)
Timber		
Fuel		

15. Farmer's Preference of Forest Products

Please mention three farm forest products which you require most and rank them.

<u>Products</u>	<u>Rank</u>
a) _____	_____
b) _____	_____
c) _____	_____

16. Perception about Benefits of Farm Forestry

You have undergone through farm forestry programme for a number of years. Now please let me know your perception about the various benefits of farm forestry.*

Statements	Strongly agree (4)	Agree (3)	Disagree (2)	Strongly disagree (1)
a) It meets the fuelwood demand of the farmers				
b) Helps in the proper utilisation of land				
c) Meets the demand of timber of the farmers				
d) Helps in increasing the number of forest animals and birds				
e) Helps in checking soil erosion				
f) Helps in retention of soil moisture				
g) Acts as a wind-break				
h) Saves the time of farmer in fuelwood collection				
i) Assures monetary benefit after harvesting				

17. Involvement in Farm Forestry Programme

Please let me know the family members and others who have mostly done the following items of work relating to farm forestry.

Items of work	Involvement
a) Site preparation	F W C O
b) Digging pits	F W C O
c) Planting seedlings	F W C O
d) Application of manure, fertiliser and insecticides	F W C O
e) Protection of seedlings	F W C O
f) Casualty replacement	F W C O
g) Mulching	F W C O
h) Intercultural operation and top dressing	F W C O
i) Collection of twigs and leaves from farm forest for fuel	F W C O

(F - Farmer, W - Wife, C - Children, O - Others)

18. Role of Panchayat

i) Please let me know the role your panchayat is playing at present in connection with farm forestry programme

- i) _____
- ii) _____
- iii) _____
- iv) _____
- v) _____

ii) What further role do you think that panchayat should play in improving farm forestry programme

- i) _____
- ii) _____
- iii) _____
- iv) _____
- v) _____

19. Problems of Farm Forestry

Please let me know three most important problems which you are facing in implementing farm forestry programme. Please rank them.

Sl. no.	Items (Problems)	Rank
a)		
b)		
c)		

20. Suggestions for Improving Farm Forestry

Please suggest three important measures which shall make your farm forestry more profitable.

Sl. no.	Items (Suggestions)
a)	
b)	
c)	

Comments :

Thanks.

APPENDIX V

SCIENTIFIC NAMES OF TREES MENTIONED IN THE STUDY

<u>English/Local Name</u>	<u>Scientific Name</u>
Akashmoni (Acacia)	<u>Acacia auriculiformis</u>
Arjun	<u>Terminalia arjuna</u>
Bamboo	<u>Bambusa tulda</u>
Cashewnut	<u>Anacardium occidental</u>
Citrus	<u>Citrus spp.</u>
Coconut	<u>Cocos nucifera</u>
Eucalyptus	<u>Eucalyptus tereticornis</u>
Gamar	<u>Gmelina arborea</u>
Guava	<u>Psidium guajava</u>
Jackfruit	<u>Artocarpus integrifolia</u>
Radhachura	<u>Peltophorum ferrogenum</u>
Mahua	<u>Madhuca latifolia</u>
Mango	<u>Mangifera indica</u>
Neem	<u>Azadirachta indica</u>
Papaya	<u>Carica papaya</u>
Sal	<u>Shorea robusta</u>
Sirish	<u>Albizia procera</u>
Sishoo	<u>Dalbergia sissoo</u>
Subabul	<u>Leucaena leucocephala</u>
Teak	<u>Tectona grandis</u>