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**STAFF APPRAISAL REPORT**

**INDIA**

**NATIONAL SOCIAL FORESTRY PROJECT**

May 20, 1985

South Asia Projects Office Department  
General Agriculture Division

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WEIGHTS AND MEASURES

Metric System

ABBREVIATIONS AND ACRONYMS

ACF	-	Assistant Conservator of Foresters
Addl. CCF	-	Additional Chief Conservator of Forests
Add'l IGF	-	Additional Inspector General of Forests
CCF	-	Chief Conservator of Forests
CF	-	Conservator of Forests
CIDA	-	Canadian International Development Agency
DCF	-	Deputy Conservator of Forests
DEA	-	Department of Economic Affairs
DFO	-	Divisional Forest Officer
DIGF	-	Deputy Inspector General of Forests
FD	-	Forest Department
FG	-	Forest Guard
FR	-	Forest Ranger
Fr	-	Forester
FRET	-	Forestry Research, Education and Training Project
FRI	-	Forest Research Institute
GOI	-	Government of India
GOG	-	Government of Gujarat
GOHP	-	Government of Himachal Pradesh
GOR	-	Government of Rajasthan
GOUP	-	Government of Uttar Pradesh
HP	-	Himachal Pradesh
ICAR	-	Indian Council of Agriculture Research
ICB	-	International Competitive Bidding
ICFRE	-	Indian Council of Forestry Research and Education
ICRAF	-	International Center for Research on Agroforestry
IDA	-	International Development Association
IGF	-	Inspector General of Forests
LCB	-	Local Competitive Bidding
M&E	-	Monitoring and Evaluation
NCA	-	National Commission on Agriculture
NCAER	-	National Council of Applied Economic Research
NSFP	-	National Social Forestry Project
ODA	-	Overseas Development Agency
SFW	-	Social Forestry Wing
SAU	-	State Agricultural University
SIDA	-	Swedish International Development Agency
T&V	-	Training and Visit System of Agricultural Extension
UP	-	Uttar Pradesh
USAID	-	United States Agency for International Development
VFW	-	Village Forestry Worker

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INDIA

NATIONAL SOCIAL FORESTRY PROJECT

Credit and Project Summary

Borrower: India.

Beneficiaries: The States of Gujarat, Himachal Pradesh, Rajasthan and Uttar Pradesh and the Government of India's Ministry of Environment and Forests.

Amount: SDR 166.1 Million (US\$165.0 M equivalent)

Terms: Standard.

On-lending Terms: From GOI to the Governments of Gujarat, Himachal Pradesh, Rajasthan and Uttar Pradesh as part of Central assistance for State development projects on terms and conditions applicable at the time. GOI would bear the foreign exchange risk.

Project Description: The project would provide continuing assistance initiated under earlier credits to two states (Uttar Pradesh and Gujarat) to expand and improve their social forestry activities, and would initiate investment in two other states (Himachal Pradesh and Rajasthan). It would increase supplies of fuelwood, small timber, poles, bamboo, fodder and other minor forest products. It would also strengthen institutional capabilities including the strengthening of the Central Social Forestry Support Office, for better planning and management of forestry resources, through provision for additional staff, training of existing personnel, research and additional vehicles and equipment. Wood balance and other studies would be carried out, and programs would be conducted to promote fuel saving devices. There are no major project risks. However, shortage of funds could become a problem if the States over-extend themselves on forestry programs. To minimize this risk the States would inform the Association of any major developments concerning their social forestry programs to enable the Association to evaluate the impact, if any, which these developments might have on project-financed activities. An additional risk is that farmers may favor planting of and saturate the market for higher value products. However, wood balance studies to be undertaken and continuous monitoring including the proposed mid-term review would effectively minimize this risk.

<u>Estimated Cost: 1/</u>	<u>(US\$ Million)</u>		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
Incremental Staff	35.3	-	35.3
Civil Works	17.2	0.9	18.1
Vehicles and Equipment	8.1	1.6	9.7
Incremental Operating Costs	21.3	0.7	22.0
Training	3.8	0.4	4.1
Technical Assistance, Studies and Research	0.5	-	0.5
Plantation Activities	<u>162.2</u>	<u>1.6</u>	<u>163.8</u>
Total Baseline Costs	248.3	5.2	253.5
Physical Contingencies	11.2	0.3	11.5
Price Contingencies	61.9	0.9	62.8
Total Project Costs	<u>321.3</u>	<u>6.4</u>	<u>327.8</u>

1/ Including taxes and duties of US\$3.93 M equivalent.

Financing Plan:

	<u>US\$ Million</u>		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
GOI/GOG/GOUP/GOHP/GOR	82.3	0.5	82.8
USAID	79.0	1.0	80.0
IDA	<u>160.0</u>	<u>5.0</u>	<u>165.0</u>
TOTAL	<u>321.3</u>	<u>6.5</u>	<u>327.8</u>

Estimated Disbursements:

<u>IDA FY</u>	<u>(US\$ Million)</u>					
	<u>FY86</u>	<u>FY87</u>	<u>FY88</u>	<u>FY89</u>	<u>FY90</u>	<u>FY91</u>
Annual	17.1	25.9	32.4	37.0	36.1	16.5
Cumulative	17.1	43.0	75.4	112.4	148.5	165.0

Rate of Return: 27%.

Appraisal Report: No. 5591b-IN, dated May 21, 1985.

## INDIA

### NATIONAL SOCIAL FORESTRY PROJECT

#### I. INTRODUCTION

1.01 The proposed National Social Forestry Project (NSFP) would be the seventh Bank or IDA-assisted project in India designed to promote social forestry in support of increased production of fuel, small timber, pulpwood, fodder and other minor products. As the first two states assisted by the Bank were completing their five year projects, the Government of India (GOI) proposed that a composite project be considered to assist them and other states as well as to strengthen the central Government's office which supports state social forestry activities. This request stems from the growing importance being given by the Government of India to social forestry. The Seventh Five Year Plan (1985-90) calls for a several-fold increase in investment and social forestry has become one component of the Government's Ten Point supported programs.

1.02 In 1984 four states (Uttar Pradesh, Gujarat, Rajasthan and Himachal Pradesh) prepared proposals for financing with the help of GOI's office of the Inspector General of Forests (IGF) and the Bank's office in New Delhi. As other donors have been active in financing social forestry projects throughout India, and in view of the size of the projects being brought forward, and in an effort to coordinate assistance, the Bank and USAID agreed to appraise NSFP jointly. This report is the result of appraisal missions in October/November 1984 and January/February 1985 consisting of Mr. D. W. Jeffries, Mr. L. Ljungman, Ms. L. Muller, Ms. Ai-Chin Wee, Ms. T. Estoque (Bank), Mr. D. Heesen (USAID), Dr. J. G. Campbell, Dr. P. J. Wood (ICRAF), Mr. S. B. Palit, Mr. Raj Bhatia, and Dr. W. R. Bentley (Ford Foundation), consultants.

#### II. BACKGROUND

##### A. Forestry in India

2.01 Of India's total land area, 23% or about 75 M ha, is designated in land revenue records as "forests", mostly Government-owned. Increasing pressure of population (about 722 M <sup>1</sup>/<sub>1</sub> and growing at 2% per annum) and of cattle has resulted in ever increasing depletion and degradation of much of the natural forests so that only about 40 M ha of this land is actually tree covered. Deforestation has taken the shape of either outright clearing for agriculture or the slow and continuous decimation, often illegally, for meeting the fodder, fuel and timber needs of the community and industry.

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<sup>1</sup>/<sub>1</sub> Based on 1981 Census figure of 684 M, with 2% annual growth

2.02 Non-commercial energy sources, including fuelwood, agricultural wastes and animal dung, account for more than half of the total consumption of energy in India. Such fuel accounts for about 80% of rural and 50% of urban households' energy consumption. Nearly 55% of non-commercial energy is derived from fuelwood, obtained from reserve forests and from trees grown on private and communal lands. Much of the fuelwood burnt is gathered by women and an estimated 20% of available labor in farming families is spent on this task. Many families, however, due to the absence of forest areas near their homes, are forced to burn only dung cake and crop residues.

2.03 While existing planting programs should be able to meet most of the industrial requirements for hardwood and, to a lesser extent, for coniferous pulpwood, they are inadequate for meeting the demand for fuelwood. Fuelwood demand in the year 2000, estimated in a study by the National Council of Applied Economic Research, will be  $200 \text{ M m}^3$  annually or roughly twice the estimated present level. If fuelwood were substituted for half of the energy represented by cowdung presently burned, the total fuelwood demand would be about  $230 \text{ M m}^3$ . Adding the annual industrial wood demand of  $65 \text{ M m}^3$  (compared with estimated 1980 demand of  $27 \text{ M m}^3$ ) brings the total annual wood demand for the year 2000 to nearly  $300 \text{ M m}^3$ , equivalent to some 20 to 30 M ha of mature plantation. Recognizing that fuelwood will continue to be an important source of energy, the Government of India (GOI) is focusing increased attention on the development and management of fuelwood resources.

#### Government of India Policies for Social Forestry

2.04 As an awareness grew amongst administrators as to the implications of the social, economic and ecological consequences created by continuing degradation of forests, two conclusions became apparent: first, that traditional development and management of government owned forest resources would not succeed in providing the rural and urban population with their basic needs for forestry products and second, that development of forest resources outside the traditional reserve forests through active participation of local communities would be required to help break the vicious circle created by encroachment and the shortages of fuelwood, fodder and small timber. Although during the 1950's and 60's increasing emphasis was given to plantings on farm, village and communal lands, from the First to the Fourth Five Year Plans (1951-74), schemes which could be classified as social forestry received only 9.1% of total forest development investment. Toward the end of the Fourth Plan, the National Commission on Agriculture (NCA) made a compelling plea for a change in the traditional approach, recommending that forest resources should be developed outside the reserved and protected forests through a well organized social forestry program, with active participation of the local community. GOI accepted these recommendations and introduced a massive program of social forestry throughout India. In the country's Fifth (1974-79) and Sixth (1980-85) Plans, social forestry was allocated 49% and

78%, respectively, of total sectoral allocations and 46% and 70%, respectively, of total forestry planting targets.

2.05 Although social forestry development is a state responsibility, GOI assists through a number of centrally sponsored schemes, which finance half the plantation costs. During the Sixth Plan, about 1.9 M ha came under these schemes out of a total of about 4 M ha put under social forestry (Annex 1, Table 1b) accounting for expenditures of over Rs 2,164 M (Annex 1, Table 1a). The above figures include farm forestry under which some 3,720 M seedlings were distributed to individual growers. The largest of these schemes, measured by planting area, is the Small and Marginal Farmers Program, started in 1983-84 with 0.8 M ha planted; the other programs, of 0.35 M ha planted each, are the Rural Fuelwood Program, Drought Prone Areas Program and National Rural Employment Program. In addition, statewide projects with external financial assistance are being implemented in the states of Gujarat, Uttar Pradesh, West Bengal, Haryana, Jammu and Kashmir, Karnataka and Kerala (World Bank-assisted, Haryana and Jammu and Kashmir with DANIDA and Karnataka with ODA), Madhya Pradesh and Maharashtra (USAID-assisted), Tamil Nadu and Orissa (SIDA-assisted) and Andhra Pradesh (CIDA-assisted). These projects account for 0.68 million ha planted and over Rs 2,500 M in expenditures during the Sixth Plan period. Unlike expenditures under centrally-sponsored schemes which go to direct plantation costs, donor-assisted projects also help to finance incremental staff, civil works and vehicles. Finally, the states operate their own social forestry programs which during the Sixth Plan period account for 1.3 M ha planted and over Rs 3,000 M in expenditures.

2.06 Of the present India-wide tree planting of some billion seedlings annually (roughly equivalent to 0.67 M ha), about half is planted through farm forestry (by farmers on their own land). The rest is planted by the state forest departments in commercial plantations (30%) and social forestry plantations (20%).

2.07 Under the Seventh Plan, currently being formulated, resources allocated for social forestry are expected to increase several fold from those of the Sixth Plan.

#### B. The Bank's Role in Indian Social Forestry

2.08 The Bank's first intervention in the forestry sector, the Madhya Pradesh Forestry Technical Assistance Project (Credit 609-IN, December 1975), was directed primarily towards the development of plantations for the pulp and paper industry. Since then, the main thrust of Bank Group operations in this sector has been in social forestry development, with six projects covering seven states. The status of these projects is summarized below. Each of these projects had the objective of increasing the supply of fuelwood and providing poles, small timber, fodder and other minor forest

products to those living rural areas, with special concern for increasing employment and fuelwood supplies for marginal farmers and the landless, of increasing production of wood products from government and village waste lands and strengthening the social forestry organization within State Forest Departments. In addition to these projects, the Kandi Watershed and Area Development Project (Ln. 1897-IN, \$30 M, July 1980), the Himalayan Watershed Management Project (Ln. 2295-IN, \$46.2 M, June 1983) and the Rainfed Areas Watershed Development Project (Cr. 1424-IN, \$31.0 M, February 1984) also include substantial components for reforestation and pasture development.

2.09 The relative emphasis on different types of plantation components has changed in Bank-financed social forestry (Annex 2), as it has in social forestry generally in India. The initial projects were not expected to invest heavily in farm forestry as little information was available as to whether or not farmers would plant trees on their holdings. Farm forestry has, however, grown rapidly, far exceeding appraisal targets. The projects also provide for improved extension, linked to the Training and Visit System of agricultural extension, where it exists, in order to help farmers to upgrade their agroforestry practices, improving inservice training, strengthening agro-forestry research within the state, introduction of more fuel efficient cooking stoves and crematoria, and strengthening monitoring and evaluation.

Uttar Pradesh Social Forestry (Cr. 925-IN, US\$23.0 M, June 21, 1979)

2.10 This was the Bank's first social forestry project in India. It called for the establishment of 8,000 ha of village woodlots, 27,000 ha of strip plantations along roads, canals and railways, rehabilitation of 13,600 ha of degraded government owned forest and the provision of seedlings for 4,000 ha of farm forestry. The project was completed on schedule and the credit closed December 31, 1984. A Project Completion Report is being prepared and will be available later in 1985.

2.11 In terms of physical targets, the project has generally exceeded the overall targets set at appraisal, with about 76,000 ha of plantations achieved on government and community wastelands (i.e., not counting farm forestry) compared with about 48,600 ha proposed for the five-year period of the project. Survival rates on various plantation schemes are satisfactory. The farm forestry component has proved the most surprising, however, with the response of farmers to planting trees on their own lands far exceeding expectations. Compared with the original goal of 8 M seedlings, over 500 M (equivalent to 349,000 ha) 1/ have been distributed. To handle both farm forestry and departmental plantation seedling requirements, a total of 1,037 new nurseries was established.

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1/ Equivalent ha figured by dividing number of seedlings by 1500.

2.12 Despite these substantial overall achievements, the project fell short in several areas. Implementation of the civil works program, designed to support field activities, was neglected in favor of staff being diverted to expanding seedling production. There was also a shortfall in procurement of vehicles needed to improve staff mobility. The self-help village woodlots component lagged, with 136 ha established against a target of 3,080 ha, since poor villagers proved unwilling to contribute their labor as expected in exchange for rather limited potential benefits which would flow to a group sharing the produce from a small woodlot (about 2 ha.) after many years' protection and maintenance. As project implementation progressed, several other deficiencies have become apparent. The project did not cover effectively the eastern part of the state, where the smaller farms and landless poor are concentrated as the social forestry organization lacked relevant know-how and resources to deal with the sociological and technical problems associated with densely cultivated areas and very small farms. The State has been slow to decide on the management system to be applied and on the mode of distribution of the produce from departmental plantations, although many are reaching maturity. The Uttar Pradesh extension services for social forestry are weak, with neither development of an effective departmental extension network nor systematic linkage with the agricultural extension organization. The latter, however, is shortly to be reorganized and strengthened with IDA assistance. In addition, monitoring and evaluation capability and research activities have made a slow start and need strengthening. The Government of Uttar Pradesh (GOUP) recognizes these problems and they would be addressed in the proposed project (para 3.24). Finally, the dissemination of fuel-efficient stoves seems to have been done more effectively by voluntary groups and services organizations than under the auspices of Forest Department, as had been envisioned at project appraisal.

Gujarat Community Forestry Project (Cr. 961-IN, US\$37.0 M, April 24, 1980)

2.13 The project calls for the establishment of 37,440 ha of village woodlots, 30,000 ha of reforestation of government-owned degraded forests, 1,000 ha of privately owned and heavily eroded lands, establishment of 37,000 ha of strip plantations along roads, canals and railways, and the provision of 30 M seedlings to farmers to plant on 20,000 ha of privately-owned land. The physical planting targets for the project have been completed ahead of schedule, only the self-help village woodlot component falling somewhat below original targets with about 6,000 ha of the 9,200 ha targetted having been planted to date. Survival rates have been satisfactory. The credit is likely to be fully disbursed by the end of June 1985, six months before the original closing date. While the primary objective of the project was to increase fuelwood supplies in rural areas, due to prevailing high prices of wood, most of the wood produced on private holdings is expected to go for commercial, non-fuelwood purposes. Nevertheless, given the acute shortage of wood in the state, the project is contributing to relieving the pressure on existing forests and, therefore, indirectly is helping fuelwood supply,

particularly for the rural poor. About 20% of Gujarat farmers and a substantial number of landless laborers are likely to become self-sufficient in fuelwood from lop, top and fallen wood from project plantations. Furthermore, the majority of farmers benefitting from the farm forestry component are small and marginal (under 4 ha) who have planted three-fourths of the seedlings distributed under farm forestry, the rest going to larger farmers. Gujarat has made particularly impressive progress in developing a network of small, decentralized "kissan" nurseries (operated by private farmers) and school nurseries. It has successfully introduced low-cost seedling production and distribution methods such as basketing and direct seeding. It has also been the most successful among states with Bank-financed projects in introducing fuel saving stoves and crematoria, having already exceeded the targets of 10,000 stoves and 1,000 crematoria by 10%. Private and voluntary groups have made important contributions to dissemination of these devices. Recognizing the problems associated with village woodlot development, the state has introduced two innovative schemes to benefit the landless, Social Security Plantations and Malki Plantations. Under the former, landless tribal farmers are settled in groups of ten families on denuded government forest land as full-time employees of the forest department (FD). Under the Malki scheme, the FD plants trees on half of the land (maximum 1 ha per farmer) for those who have settled on encroached and eroded, formerly protected forest land. At harvest, costs of plantation establishment and subsistence allowances are to be recovered by the Department, leaving the net profit to the farmer. Progress on research has been unsatisfactory in terms of producing relevant findings based on good research methodology. Civil works, and vehicle and equipment procurement are substantially behind appraisal schedule, and about 15% of staff positions (especially of Guards and Rangers) remain unfilled, mainly as a result of the Agricultural Department undertaking increased responsibility for extension. But these lags have not caused serious problems in overall project performance.

West Bengal Social Forestry Project (Cr. 1178-IN, US\$29.0 M, February 24, 1982)

2.14 Over a six-year period, the project will establish 6,000 ha of village woodlots, 20,000 ha of plantings along roads, railways and water courses, and 52,000 ha of forests on private land and will rehabilitate 15,000 ha of government owned degraded forests. It will also construct a Forest Training Center and expand the West Bengal Forest School. Physical planting targets are being exceeded by about 45%, particularly in farm forestry; however, due to budget restrictions, most plantings by the FD have been carried out by the existing territorial forest divisions rather than by expanding the Social Forestry Wing as called for under the project. Consequently, most planting has taken place in areas where there is enough forest to justify a territorial division and, as a result, five western districts have accounted for three-fourths of the area planted even though they have only one-third of the total population. Only about one-fourth of the total field level social forestry staff thought needed were in position at mid-project period but another 40% of these posts have been sanctioned. Lower

level staff such as Foresters and Forest Extension Workers were most affected. These shortages, compounded by lack of staff mobility due to non-procurement of vehicles required, are reflected in lower quality extension services and research, lower survival rates and growth rates, and limitation of areas (and numbers of farmers) benefiting from the project. Finally, virtually no progress has been made on promotion of improved stoves, because forest department field staff lack the time and orientation, and because the technology used was not appropriate for West Bengal.

2.15 Considering the constraints imposed by lack of funds, physical progress has been generally good. Farm forestry has exceeded SAR goals, departmental plantations have generally gone according to plan, although village woodlots have encountered problems as in other states. West Bengal has been innovative in promoting "group farm forestry" where the landless and poor farmers can take up to one hectare of government wasteland for afforestation and are given rights to the trees but not to the land. Group farm forestry has grown rapidly, accounting for about 360 ha during 1982/83, 2,000 ha during 1983/84 and 5,000 ha in 1984/85, or half of the farm forestry target. West Bengal has also made strides in using women in field staff as "motivators".

2.16 As a result of the mid-term review recently completed, several adjustments have been agreed in the original project composition. In particular, some village woodlots targets have been shifted to farm forestry. Revisions to the technical models for farm forestry were suggested as well as measures to strengthen research and field staffing, and dissemination and application of research results.

Jammu and Kashmir and Haryana Social Forestry Project  
(Cr. 1286-IN, US\$33.0 M, September 7, 1982; DANIDA, US\$4.0 M)

2.17 The project will, over a five-year period, establish 17,000 ha of village woodlots, 19,500 ha of plantings along roads, railways and water courses, 49,000 ha of plantings on private land, 15,000 ha of plantations on sand dunes, 2,000 ha of plantations on wet lands, and 500 ha of plantings on alkali lands and rehabilitate 17,000 ha of degraded government owned forest. Although both states have fulfilled their targets for 1983/84 and made adequate arrangements to meet 1984/85 planting targets, disbursements are only about 50% of appraisal estimates. This reflects the high level of vacancies in the social forestry departments and the lag in important support activities. Coordination with the T&V system for extension has been established in Haryana. A similar linkage between agricultural and forestry extension has been agreed to by J&K when the T&V system becomes operative in that state under the Second National Agricultural Extension Project approved by the Executive Directors March 22, 1985. Haryana, however, has faced organizational problems since two separate entities were implementing the social forestry program; these problems are being addressed by the current mid-term review mission. The forest department of J&K has been reluctant to

recruit lower level staff until the introduction of the proposed extension project is determined. Modification of some plantation targets and staffing plans is being worked out with the Bank in light of initial experience in these states. For example, unlike many states, J&K has done particularly well with its village woodlots and will increase its woodlot goals while reducing those for degraded forests.

Karnataka Social Forestry Project (Cr. 1432-IN, US\$27.0 M, February 8, 1984; ODA, US\$23.0 M)

2.18 In addition to the distribution of 600 M seedlings, the project is supporting departmental plantations including: 20,000 ha on "gomal" (cultivable wasteland used as common grazing grounds) and agriculturally unproductive government wasteland; 3,000 ha on foreshores of irrigation tanks; 4,000 ha of strip plantations along roads and canals and 2,000 ha of bamboo plantations. Plantation programs exceeded targets during the first year and met 1984/85 targets as well. However, the "gomal" lands component has experienced many of the same problems of other village woodlot approaches, and hence will be reallocated to group farm forestry on government wastelands. Some acceleration of the plantation program is being considered. This would require earlier sanctioning and provision of social forestry staff than agreed at appraisal. However, delays in sanctioning of staff have been of some concern, but recruitment is now underway. The state has made a good start in decentralizing seedling production and distribution, particularly important in this project since farm forestry accounts for 80% of plantation targets. The project does not provide for promotion of improved stoves, but this is being done by various organizations under other development programs.

Kerala Social Forestry Project (Cr. 1514-IN, US\$32 M, December 12, 1984)

2.19 Plantations would be established on the equivalent of about 69,000 ha of private land, 12,000 ha on government block plantations, 2,000 ha on strip areas and 2,100 ha for special tribal schemes. In addition, the project aims establishing a network of small, family-operated nurseries to facilitate better distribution and extension services to farmers.

2.20 Although the credit only became effective in March 1985, it provides for retroactive financing to January 1984. Progress during the first year on all components has been good, including farm forestry which accounts for 80% of plantation goals. Initially, seedling production and plantation activities fell somewhat below schedule due to slow release of funds and staffing constraints, due to slow recruitment procedures.

### C. Lessons Learned

2.21 The Bank's experience with social forestry in India is relatively brief, with the first projects just completing five years of implementation. Nevertheless, many useful lessons have been learned and are constantly being used to improve social forestry programs. This is particularly relevant to organizational arrangements for social forestry.

2.22 Organization. Some of the earlier concepts of the organization needed for social forestry require modification in light of experience. In all projects staffing arrangements have not been as anticipated. Some reductions in staff targets have been possible; for example, with greater dependence on using the existing agricultural extension services for social forestry, fewer staff than supposed earlier are required to provide extension. Similarly, experience has shown that it is not necessary to set up a separate social forestry organization within the forest department in all states, although this may be the preferred route in some larger states, where state forests are limited and there are large numbers of small farmers in intensively cultivated areas. Forest departments have already transferred some staff to social forestry activities as well as started modifying the traditional forestry administration to include social forestry. As a consequence, the more recent projects and the proposed project provide for fewer incremental field staff and give more emphasis to retraining of existing staff and broader training of new staff. Some uncertainty remains, however, as to the best overall organization of state forestry activities, e.g., the degree of separation of social and traditional activities and staff, and whether the most effective administrative division of field activities should be along the same block lines as other related rural development and agricultural extension organizations. In addition, some social forestry schemes in the states are under the jurisdiction of other agencies than the forest department, although they are for the most part carried out by the forest department. The coordination of all such schemes within a state would seem desirable and under the proposed NSFP the States have agreed that by March 31, 1988 they would carry out studies of the organizational issues in state forest departments which would include, among other things, the relationship of various social forestry schemes. While the extent that the center can influence state organization of such activities is somewhat limited, the central Ministry of Environment and Forests Social Forestry Support Office would take appropriate note of the results of these studies in its capacity of bringing together the experiences of all states undertaking social forestry programs.

**2.23 Fuelwood Production.** The primary stated purpose of early projects was to produce fuelwood particularly for the rural poor. Although quantitative goals have been met or exceeded in all states, initial benefits have gone only indirectly to that primary target population. At the same time, tree farming by individual farmers has proved far more popular and cost effective than was originally expected. While only a small part of the earlier projects was aimed at farm forestry, this has become a major focus in later projects; however, due to weaknesses in extension and lack of appropriate agroforestry research, and because of lack of adequate staff numbers, resources and training, it has been harder to reach the really poor and smaller farmers. Moreover, most of the main stemwood planted by individual farmers has gone into commercial channels, with the majority of species being planted for poles, timber, pulpwood and fuel, in that order. There is obviously a desire for early and the most lucrative returns. Thus, while farm forestry is very cost effective and helps raise farmers' standard of living, and a large volume in lop and top of the tree goes for fuelwood, experience has shown that social forestry must devise direct channels for meeting fuelwood needs of the poor, as another part of its program. In this respect, previous approaches to village woodlots would need to be revised because generation of cash income to meet other development needs is more important to the panchayats establishing woodlots than providing fuel for the less fortunate. Plantations on common and government wastelands devoted specifically to fuelwood production would give greater potential benefits to the primary target groups; however, costs must be reduced in current models so as to increase the amount available for distribution after cost recovery.

**2.24 Cost Reduction.** Early social forestry plantation models are now considered to be overly expensive. Use of barbed wire may double the costs of public plantations without providing effective protection. Earlier hand-over of management of community plantations by forest department to beneficiaries also reduces direct costs to the forest department. Decentralized seedling production and distribution can also reduce costs (para 2.29).

**2.25 Distribution of Produce/Benefits.** Forest departments and village panchayats have proved slow to develop detailed plans for distribution of the harvest from plantations. Many of these plantations are reaching maturity and decisions on distribution of produce are overdue and must be made. Difficulties in identifying the beneficiaries and of distribution to them create institutional burdens for forest departments and panchayats which they seem unwilling or unable to bear.

**2.26** The above does not mean that the poor have not benefited at all from past efforts. Until trees planted have reached maturity, substantial benefits are derived from twigs, fodder, thatching, fruit and other by-products of growing trees. A major impact has also come from employment generation by village woodlots and departmental plantations. Since forestry work is mainly seasonal (two to three months a year), most work has gone to

landless persons, often women, who do not have regular farming responsibilities of their own.

2.27 Support Services. Forest departments have now recognized shortcomings in not reaching the rural poor to the extent expected. They have begun improving extension, research, monitoring and evaluation and other support services. This has entailed not only supplying more of the staff, vehicles and other resources needed for strong field work, but also the design of special programs to reach a broader spectrum of the rural population. One such program has been the formation of linkages between forestry and agricultural extension services. Considerable improvement is still needed in practical research, especially on agroforestry.

2.28 Group Farm Forestry. Programs involving the landless and poor on government wasteland or common marginal land are being tried in some states (e.g., West Bengal and Social Security Plantations and Malki Plantations in Gujarat) with considerable success. Such schemes represent an innovative way of reaching the target group and are a cost effective means of using otherwise unproductive land. They offer higher incentives to the participants and are easier to administer than other plantation models as they do not require detailed plans for distribution of the produce. Care must be exercised, however, in such schemes not to give a greater subsidy than needed and thus limit the number of potential participants by concentrating available resources on a few.

2.29 Decentralized Nurseries. To ensure the maximum participation by small farmers, nurseries must be decentralized and widely scattered as these farmers lack resources to transport seedlings over large distances. Small nurseries, especially those run by farm families, schools and non-government groups, have proved efficient and require less investment than large centralized nurseries run by the forest department. Other cost reducing practices which are being developed include direct sowing of suitable species by farmers, providing seedlings in baskets ("basketing") and seed "minikits."

2.30 Seedling Distribution Policies. There is no uniform policy in India on the pricing policy and limits on free seedling distribution, and states generally subsidize seedlings given to farmers. Even those which have a policy of charging for seedlings have distributed large amounts free under various centrally-sponsored schemes which have required them to do so. Such subsidization no longer appears needed to promote farm forestry. To ensure more equitable distribution of farm forestry benefits and to improve cost recovery, free seedlings for farm forestry should be limited to what small farmers need for self-sufficiency in terms of fuel and small timber.

2.31 Fuel-Saving Devices. Forest department staff have been generally less successful at promoting fuel-saving devices than voluntary and other non-governmental organizations, because FD staff lack the training and orientation necessary, have trouble communicating since most field staff are men

but users are women, and tend to prefer plantation work. In the future, social forestry projects should continue to promote fuel-saving devices, but encourage active involvement by groups best suited to this purpose, and supply the engineering and sociological expertise to ensure appropriate design.

2.32 Monitoring and Evaluation. Recognition of the crucial need for effective monitoring and evaluation in projects as innovative and large-scale as social forestry led to the incorporation of M&E units in the Bank's previous projects in U.P., Gujarat, and other states. The primary purpose of these units was to develop systematic methods for collecting and analyzing information useful to project management and to measure and evaluate the economic and social changes induced by the project. Operationalizing these units has proved to be more difficult than anticipated. This has been a result of the low priority given to M&E in the past. However, establishing and filling new positions has always been a time consuming endeavor and in the context of M&E the lack of the relevant social science skills among forest officers has made this problem worse. For these reasons, the GOI requested the Bank and FAO to provide assistance in developing practical guidelines for a system of M&E which could be used throughout the country (para 4.06).

2.33 Central Support. While the office of the Inspector General of Forests (IGF) has attempted to assist states in project preparation, to help design and implement a uniform monitoring and evaluation system and to review projects' progress, its involvement has necessarily been constrained by limitations in staff numbers 1/ and budget. The center could more effectively support states in several areas: promotion of consistency and complementarity among centrally-sponsored schemes, donor-assisted projects and state schemes; assumption of greater responsibility in assisting states to design social forestry schemes, and in monitoring and evaluating them; facilitation of exchange of experience among states; undertaking of overview studies; and generally, provision of technical assistance, training, and special support where appropriate.

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1/ Until recently, only two upper level staff were assigned, and even then not entirely full-time; some of the posts for project formulation have been sanctioned and part filled in the past year.

### III. THE PROJECT

#### A. Project Objectives and Rationale

3.01 The project's primary objectives are to (i) increase production of fuelwood, small timber, poles and fodder; (ii) increase rural employment, farmers' incomes and opportunities for participation of landless persons; (iii) afforest degraded areas and wasteland and reduce soil erosion; and (iv) strengthen forestry institutions. The first phase social forestry projects have substantially contributed towards meeting commercial demand for poles and small timber, and raising incomes of land owners, but have fallen short of ensuring that the weaker sections of the population benefit in terms of access to wood products and increased community participation in social forestry development activities. The proposed project will help achieve these goals through (i) refocusing operations (plantation types, choice of species, dispersion of nurseries and seedling distribution policies) to increase the share of the benefits which would reach small and marginal farmers and the landless; and (ii) improving operating efficiency, reducing costs and helping the states to rationalize the organization of forestry departments. Furthermore, the project would assist in strengthening support activities including research, training, extension, and monitoring and evaluation. It would provide for the agricultural extension services to supplement the flow of technical agro-forestry information going to individual farm households through state forestry extension systems. It would emphasize monitoring and evaluation at both the state and central levels in order to assist the process of developing improved technological packages by analyzing cost effective approaches to social forestry.

#### B. General Features

3.02 The proposed five-year project would provide continuing assistance initiated under earlier credits to two states (Uttar Pradesh and Gujarat) to expand and improve their social forestry activities and would initiate investment in two other states (Himachal Pradesh and Rajasthan). The project would also strengthen the Social Forestry Support Office in the Ministry of Environment and Forests to enable it to perform more effectively a coordinating, support and policy guidance role in the development of social forestry throughout India. While the basic approach to social forestry is common to all participating states, adjustments have been made to take account of many differing factors: agro-ecological and social conditions; demographic features; land use, tenure and tenancy laws; the legal basis for forestry development; existing forestry institutions and past experience with social forestry; wood consumption, requirements and supplies of fuelwood, timber and fodder; current forest conditions; forestry and forest-based industries in

the state economy. Such background information for the four participating states is summarized in Project Files C1-C4. Summaries of each state's Seventh Plan targets in social forestry by program, including that under NSFP, together with any special features for the state subproject are given in the section following. Further details on the central Social Forestry Support Office are given in the Project Files C5. Project File C5 also covers subjects of common interest, e.g., monitoring and evaluation, training curricula, improved stoves and crematoria, social impact and benefit. Overall project costs are given in Tables 5.01 and 5.02.

### C. Detailed Features - State Subprojects

3.03 To meet the general objectives of social forestry development and to suit differing requirements of each state, several types of activity or plantation models are called for, the general categories being: agro-forestry, participative tree tenure schemes targeted at landless persons and marginal farmers (normally on government wasteland), plantations on community wasteland, and departmental plantations on government wasteland. These may be planted in strips, blocks, or in the case of agroforestry, interplanted with agricultural crops. The trees may be planted, maintained and managed by farmers, by groups of villagers or local panchayats, or by the forest department, either on its own behalf or for others. The design for these very different plantations differs considerably with the number of trees per ha planted, generally ranging from 1,000 to 3,000. Table 3.01 shows the overall plantation targets for the project. A brief general description of these activities is followed by more specific data for each state's programs under NSFP (paras 3.24-3.27).

#### Plantation Program

3.04 Agroforestry. (a) Farm forestry would account for by far the largest plantation component in all participating states, totalling nearly half a million equivalent hectares. It yields the highest benefits to farmers, costs the least (about one-fifth the cost of plantation on government land), and gives the farmer control over the choice of species and use of the product. Most plantings are likely to occur on individually owned marginal and submarginal land which provides little other agricultural return, on farm boundaries, bunds, around the homestead and along water channels.

**Table 3.01: PLANTATION PROGRAM**  
(Equivalent Hectares)

<u>Plantation Category</u>	<u>Uttar Pradesh</u>	<u>Rajasthan</u>	<u>Gujarat</u>	<u>Himachal Pradesh</u>	<u>Total</u>	<u>Percent Total</u>
<b>A. Agroforestry (Private Lands)</b>						
Farm Forestry						
(seedling distribution) <u>a/</u>	134,000	80,000	200,000	53,000	467,000	71% <u>m/</u>
Private Wasteland Planting <u>b/</u>	-	-	30,500	13,000	43,500	5% <u>m/</u>
Improved (grafted) Orchards <u>c/</u>	-	4,000	-	-	4,000	1% <u>m/</u>
<b>B. Tree Tenure, Poor + Landless</b> (Government Lands, Beneficiary Managed)						
Strip Plantations <u>d/</u>	1,210	-	-	-	1,210	.5% <u>n/</u>
Household/Group Farm Forestry <u>e/</u>	11,000	7,500	-	833	19,333	2% <u>o/</u>
Arjun Plantations <u>f/</u>	1,000	-	-	-	1,000	.5% <u>p/</u>
<b>C. Community Wasteland Plantations</b> (Community Lands, Panchayat Managed)						
Community Woodlots (Rainfed) <u>g/</u>	14,000	5,000	20,000	41,000	80,000	9% <u>o/</u>
Community Woodlots (Irrigated) <u>h/</u>	-	-	5,000	-	5,000	1% <u>o/</u>
Tree Fodder Plantations <u>i/</u>	-	-	10,000	-	10,000	1% <u>o/</u>
<b>D. Government Wasteland Plantations</b> (Government Land, Government Managed)						
Rehabilitated Degraded Forests <u>j/</u>	-	20,000	30,400	5,000	55,400	6.5% <u>p/</u>
Strip Plantations <u>k/</u>	740	4,300	15,000	-	20,040	2% <u>n/</u>
Fuelwood Plantations <u>l/</u>	-	-	2,500	-	2,500	.5% <u>p/</u>
<b>Total Plantations</b>	<b>161,950</b>	<b>120,800</b>	<b>313,400</b>	<b>112,833</b>	<b>708,983</b>	<b>100%</b>

a/ Hectares based on 1,500 trees/ha.

b/ Species mix in HP 80% broadleaved, 20% conifer; in Gujarat 80% broadleaved, 5-10% Eucalyptus, 10-15% misc. Trees/ha in HP 500; Gujarat 2,000.

c/ Rajasthan comprises improved Ber (*Zizyphus mauritania*) grafted onto existing rootstocks; 100 trees/ha.

d/ UP: mainly mixed fuelwood with up to 15-20% of trees for fruit, edible flowers, seeds and small timber; 3,120 to 3,600 trees/ha.

e/ Mixture of fuelwood, fruits and fodder producing species; no Eucalyptus used. In HP, half broadleaved and half conifers. Tree/ha in UP 2,500; Rajasthan 1,670; HP 1,100.

f/ Pilot operation in UP using *Terminalia arjun* for silk production/or fuelwood, 5,000 trees/ha.

g/ Lowland states (UP, Rajasthan, Gujarat) emphasize fuelwood, fruits and other edible products, small timber and grass fodder. More bamboo in Gujarat while HP emphasizes conifers, providing fuel, poles and fodder. Trees/ha in UP 2,500, Rajasthan 1,600, Gujarat 1,750, HP 1,100. The 41,000 hectares in HP includes 1,000 ha under pilot "self-help"/Panchayat management and 40,000 ha rainfed under Forest Department management.

h/ Gujarat high technology model, objective maximum biomass production; half *Eucalyptus tetricornis*, a third *Leucaena leucocephala* and the rest miscellaneous hardwoods and bamboo; 10,000 trees/ha.

i/ Gujarat: High technology model designed to produce fodder from grasses and trees (100 trees/ha).

j/ Rajasthan: Species *Prosopis juliflora/chilensis*, both planted (1,320 trees/ha) and direct sown (higher density), producing grasses fodder, fodder pods and fuelwood.

Gujarat: 80% mixed broadleaved species for fuel and small timber; 20% *Eucalyptus*, *Leucaena* and bamboos. HP: mostly high altitude *Pinus roxburghii* (Chir or Chil pine), 2,000 trees/ha.

k/ Roadside rows generally ornamental and not harvested; the rest: mixed rest fuel and pole species. Trees/ha in UP 2,500-3,100, Rajasthan 1,300-2,000, Gujarat 2,500.

l/ Gujarat: Misc. broadleaves with some *Eucalyptus*; 2,500 trees/ha.

m/ Agroforestry/farm forestry totals 77%.

n/ Strip plantations total 2.5%.

o/ Village woodlots total 1%.

p/ Block/degraded forests total 7.5%.

The only direct cost to forest departments would be in seedling production, but a substantial part of the social forestry extension and monitoring and evaluation effort would be directed to the farm forestry components. (b) Private wasteland planting on eroded land accounting for 43,500 total hectares in the project, would differ from farm forestry because of increased input by (and cost to) the forest departments. It would assist in plantation establishment, and would provide an incentive payment during initial months to the farmers owning the land involved in order to compensate them for income foregone while they work on the plantation. The forest departments, applying their own existing rules, would have to ascertain that the land was seriously eroded or in imminent danger of erosion, and hence of concern for conservation, which would justify higher government investment than under farm forestry. To give planting and other technical advice to farmers, forest departments would make extensive use of the agricultural extension service (para 3.18). (c) Improved (grafted) orchards consisting of fruit bearing bushes (Zizyphus mauritania) would be developed on farmers' land. Farmers would sell the fruit and could also use lop for fuel.

3.05 Tree Ownership Schemes for Poor and Landless. (a) Household/group farm forestry would compose the largest proportion of plantation in this category (20,000 ha, mainly in U.P., 11,000 ha, and Rajasthan, 7,500 ha). Government wasteland, unfit for agriculture but fit for agroforestry, would be transferred from other government departments to the forest department. In turn, the department would consult with adjacent communities to designate landless persons and marginal farmers to use on a fixed term basis 0.5 to 2 ha of wasteland where they would plant trees and have ownership over those trees. (b) Tree tenure strip plantations would be attempted for the first time by U.P., on 1,210 ha. of road, rail and canal strips. Poor persons would be identified to participate; each would establish and care for a length of strip plantation (equivalent to about 0.5-2 ha) and would have ownership over the trees. (c) Arjun plantations would be undertaken on a trail basis on 1,000 ha in Uttar Pradesh on highly alkaline soils which have practically no other use. To ensure adequate protection of beneficiaries in the above models, each state would review current arrangements and where Government Orders and instructions, including proforma agreements, are not comprehensive, specifying the selection criteria, timing and terms for occupation of land by the beneficiary and the disposition of benefits, the state would take appropriate remedial action by December 31, 1985. Assurances on the above were obtained during negotiations.

3.06 Plantations on Community Wasteland. In collaboration with panchayat village organizations, plantations would be established on community owned wasteland, most of it rainfed (80,000 ha) but some irrigated (5,000). Gujarat would also provide for tree fodder plantation (10,000 ha) in areas adjacent to townships and in areas of low rainfall. Unlike "village woodlot" schemes in previous years, this approach would entail formulation of a written agreement with the community before planting denoting intended beneficiaries of fallen wood, leaves, and fodder, and disposition of the final product. It

would also ensure early transfer of responsibilities to the community for protection, maintenance, and plantation establishment where possible. This would result in lower costs being incurred and later recovered by forest department, leaving higher benefits for the community. The forest department would recover direct costs at harvest, with the balance of produce/sales income going to the community.

3.07 Departmental Plantations on Government Land. (a) Rehabilitation of Degraded Forests would be carried out on 52,900 ha, but only when such land was governed by regulations which would enable suitable distribution of benefits. Although such plantations involve less participation than the schemes described above, they are justified economically by their production of fuelwood, small timber and poles, and fodder which would be directed in large part to the rural poor, and by their employment generation and conservation effects. Forest department staff would supervise planting, maintenance, protection, harvesting and distribution of benefits. Adjacent villagers would derive additional benefits by cutting grass within the plantation for fodder and collecting fallen wood, leaves and thinnings, as agreed with forest department staff. (b) Strip Plantations. These plantings (total of 20,000 ha) on government reserves along roads, railways, canals, and embankments are of varying width but usually wide enough to support several rows of trees. Costs of establishment and protection are relatively high due to difficulty of protection. In the past, public authorities have been reluctant to harvest mature plantations because of their aesthetic value; but strip plantations under the project would be restricted to sites where the strip is wide enough to support sufficient rows to allow for progressive harvesting. (c) Fuelwood plantations (2500 ha.) would be established for high growth, short rotation production of wood, and targeted at areas of high fuelwood demand in Gujarat.

#### Nurseries and Seedling Distribution

3.08 Under the project some 700 M seedlings would be produced in project-financed nurseries. All state subprojects support development of a large number of small, widely dispersed nurseries, moving away from large, central and forest department owned nurseries. These may be on family holdings with land rented and family labor hired, or with seedlings grown on a contract basis, or on forest department land, supervised by department staff and run by hired labor, or on school grounds and run by children and staff. Small nurseries have the advantages of being near to farmers and thus reducing transportation costs for seedling distribution. They also provide considerable employment and serve as a focus for extension promotion and advice. The forest department would provide technical advice and would supply seed, fertilizer, polyethelene bags and other materials to those growing seedlings. Close supervision of these nurseries by the forest department is needed to ensure good quality of seedlings. Ultimately, such small nursery operators are expected to become a main source of planting material for farmers, but

this will depend upon farm forestry becoming well established and upon seedling pricing policies which would enable them to do so. Larger departmental nurseries would be used to provide seedlings for block plantations and other departmental plantings, but would also distribute seedlings to farmers.

3.09 Seed would be sown in seedbeds or directly into sleeves. Seedlings from seedbeds would be transplanted into polythene sleeves. All states would take measures to reduce the cost of seedlings, by using smaller sleeves where the species are suited to such techniques. Other measures would include training for nursery staff in improved handling between nursery and planting site, and careful quality control of stock issued from nurseries. Newly established nurseries would be equipped with pumps for hand or overhead irrigation, unless water is otherwise freely obtainable at the site.

3.10 Each of the participating states has its own policy on seedling distribution. Uttar Pradesh and Himachal Pradesh already assess a nominal charge for most seedlings distributed and in the current year Gujarat is introducing a small charge for seedlings, with a free limit of 1,000 per farm family. The forest departments also require nurseries to maintain registers showing the number of seedlings distributed to each family, so as to monitor survival rates. Rajasthan currently has no limit to free distribution of seedlings, in order to promote seedling uptake for social forestry development, which is a relatively new activity in the state. The participating states have recognized the principle of full cost recovery for all social forestry seedlings distributed, except for small and marginal farmers, and during negotiations assurances were obtained that under the project they would undertake socio-economic studies to ascertain farmer response to charging for seedlings as a basis for determining a program of action for implementing the principle of full cost recovery. The results of these studies would be discussed with the Association at the time of the midterm review, i.e., by March 31, 1988, and thereafter the states would start implementing their programs. Meanwhile, for the project, free distribution of seedlings, except for small and marginal farmers, would be reduced in accordance with a schedule agreed with IDA, and seedlings above the free limit would be charged for at rates, also agreed with IDA, which would progressively be increased to cover the direct cost of production. Above about 100 seedlings per farmer per year, farmers would be growing trees for commercial purposes and the small cost assessed for seedlings would not significantly change their returns.

### Plantation Techniques

3.11 Choice of species. All states would select species suited to the sites to be planted. Most are indigenous or thoroughly naturalized, and virtually all seed is collected within the state. Species have been chosen for their suitability for use in social forestry situations. Many are truly multipurpose or effective nitrogen fixers. Eucalyptus tereticornis would be a major species planted where poles are needed. Most farmers tend to choose

species which give a cash income, particularly trees providing fruit, edible flowers and seeds and small timber. A breakdown of the major species to be planted in each state is given in Annex 3. Decisions on the species mix would be made after considering the objectives of the plantations and the needs of the locality. In strip plantations fuelwood and pole species predominate, with ornamental and shade trees included along roads. In village woodlots in the lowland states the main choices would be species providing fuelwood, fruits and other edible products, and small timber. Grass would be interplanted to provide fodder. In Gujarat, emphasis would be placed on bamboo and in Himachal Pradesh on fuel, poles and fodder, with conifers providing much of the biomass, especially from regularly pruned branches. In rehabilitation of degraded forests in Rajasthan, the main species to be planted would be Prosopis juliflora or P. chilensis, whereas in Gujarat mixed broadleaved species would predominate. In Himachal Pradesh, as forests are at high altitudes, Pinus roxburghi would be the main species established. Improved material or Zizyphus mauritania (ber) grafted onto wild rootstock and planting of Terminalia arjuna for silk production would constitute small pilot operations to test the feasibility for large-scale application.

3.12 Site Preparation. Very little site clearance is required in any of the states as most vegetation has already been removed. However, in most cases pitting is necessary to provide improved rooting conditions for planted trees. The size of pits depends upon the state of the soil, the species to be planted and traditional practices of the forest department. The size varies from 30 x 30 x 30 cm to 60 x 60 x 60 cm. Pits are usually dug in the pre-monsoon period when labour demand is slack. In most plantation models, nursery stock is then planted out, but direct sowing of some species would be practiced in UP and Rajasthan. In this case mounds and trenches are used to provide a seedbed for germinating seeds, and to provide protection against animals. All site preparation would generally be done by hand. Table 3.02 shows the number of trees to be planted per hectare under each model.

**Table 3.02: NUMBER OF TREES PER HECTARE, BY PLANTATION MODEL**

Model	Uttar Pradesh	Rajasthan	Gujarat	Himachal Pradesh
<b>A. Agroforestry</b>				
1. Farm Forestry	1,500	1,500	1,500	1,500
2. Private Wasteland Planting	-	-	2,000	500
3. Improved Orchards (Zizyphus mauritania)	-	100	-	-
<b>B. Tree Tenure for Poor and Landless</b>				
1. Strip Plantations	3,120 to 3,600	-	-	-
2. Group Farm Forestry	2,500	1,670	-	1,100
3. Arjun Plantations	5,000			
<b>C. Planting on Community Wastelands</b>				
1. Community Woodlots - Rainfed	2,500	1,600	1,750	1,100
2. Community Woodlots - Irrigated	-	-	10,000	-
3. Tree Fodder Plantations				
-Trees	-	-	100	-
-Grasses (MT/ha)	-	-	20,000	-
<b>D. Planting on Government Wastelands</b>				
1. Rehabilitation of Degraded Forests	-	1,320	2,000	2,000
2. Strip Plantations	2,500 to 3,100	1,300 to 2,000	2,500	-
3. Urban Fuelwood	-	-	2,500	-

3.13 Plantation Establishment. In order to ensure the highest survival rates most trees would be nursery raised in polythene sleeves which are subsequently removed at planting to ensure minimum disturbance to the root system. Experience has shown that bare-rooted seedlings are not generally suitable for issue from nurseries except where the distance between nursery and the planting site is minimal or where more temperate conditions exist at higher altitudes (Himachal Pradesh). The "basket" method of seedling distribution (large number of fingerling seedlings in a basket, raised to larger seedling by farmers themselves) would be continued or introduced, and farmers would be encouraged to collect seeds from nurseries for raising on their own

or for direct sowing. Direct sowing would be used mainly for Acacia tortilis, Acacia arabica and Prosopis juliflora/chilensis.

3.14 Tree Planting and Maintenance. Planting would normally occur at the onset of the monsoon in late June/early July. In Uttar Pradesh, where many soils are highly alkaline, soil acidifying agents (mainly pyrites), would be applied to both strip and block plantings, typically at 200-300 kg per ha applied at planting time. Fertiliser application is heavy in Gujarat, with 20-50 kg per ha of compound fertilizer or urea being used. In other states, the use of fertilizers is not common, except in nurseries. Maintenance of plantings would include the replacement of casualties for up to two years. Different levels of mortality are estimated for each state depending on experience; up to 30% casualty replacements have been included in all project estimates. Weeding would be carried out to ensure survival and good early growth. In farmer's fields weeding may be expected to be of a higher standard than in FD plantings. A particular feature of the maintenance system would be that local people or private owners would be encouraged to cut and remove grass and herbaceous fodder from plantations, thus performing a valuable weeding function and reducing the dry season risk of fire. The trees would eventually suppress much of the weed growth as the canopy closes. Watering after seedling establishment is prescribed for some models in the lowland states of UP, Rajasthan and Gujarat, the objective being to lengthen effectively the wet season and to ensure improved survival and growth.

3.15 Plantation Projection. Experience in the four states differs widely over the amount and type of protection needed for planted trees. Protection needed also depends on the species grown, e.g., whether palatable to wild or domestic animals, or susceptible to termite damage. Termite protection is required most with Eucalyptus species which are the most commonly attacked. In general, protection is given by application of persistent insecticides in the nursery. If attacks are noted after planting out, localized applications of insecticide are made. In Rajasthan and Gujarat insecticide is routinely applied. For protection against browsing, wire fencing is used in some areas of Rajasthan and H.P. for strip plantations, especially along routes used by migrating herdsmen, but an effective alternative method of fencing is the use of a trench planted or sown with a live hedge of thorny (Acacia, Prosopis) or unpalatable (Euphorbia or Ipomea) species. In degraded hills in Rajasthan and Gujarat, effective protection is afforded by dry stone wall construction. Experience has shown that the need for wire fencing decreases as social awareness of the benefits of such plantations has grown. Wire fencing would be phased out as soon as possible in favor of systems using locally available materials. Watchmen would be provided for most plantation areas, at a rate of one per 2 to 10 ha depending on the shape and nature of the site. Local custom also accounts for variation among states. For many plantations under forest department management, the normal cadre of "Forest Guard" takes over. Since most of the benefits from land tenure, community and wasteland plantations go to the local population, the need for paid watchmen would be reduced in those models.

### Project Review

3.16 Since it is not possible to predict with certainty the response of farmers and panchayats to the alternative approaches suggested above, flexibility would be maintained during project implementation and would allow shifting from one category of planting to another according to results. This would be accomplished by monitoring of results by the Monitoring and Evaluation Cell of the state forestry department concerned and by a mid-term review to be held after completion of the third year's planting. Assurances were obtained during negotiations from each state that it would undertake a joint review of the project with GOI, IDA and USAID no later than March 31, 1988.

### Infrastructure and Institutional Support

3.17 State institutions have been appraised with a view toward their capability to handle the entire social forestry program in the state, not just that being financed under the proposed project. The project would provide for incremental forestry staff, vehicles, equipment, housing, offices and incremental operating costs in support of plantation development and farm forestry. Table 3.03 shows key professional incremental staff to be added under each subproject. Mobility of forestry staff is important, and during negotiations the states confirmed that adequate provision of vehicles and travel allowances had been made, and they gave assurances that policies governing these would be revised as necessary to ensure requisite mobility for field staff.

3.18 Given the importance and scope of farm forestry in the state sub-projects, extension and promotional activities would be critical to project success. Each state would support a relatively small, trained cadre of social forestry field staff who would be responsible for farm forestry promotion. Although the forest department would have primary responsibility for extension and communication, the project would rely on village level extension workers to supplement its own field contacts, which would not only release the forest department from having to expand its field staff, but also would offer excellent field coverage because of the larger number of extension staff and would automatically help integrate agroforestry recommendations with other advice on crops. The Training and Visit (T&V) System of agricultural extension is well established in Gujarat and Rajasthan, and is being established in Uttar Pradesh and Himachal Pradesh. In each state, the forest department and the agricultural extension service would enter into an agreement to provide the required cooperation. The forest department would designate Rangers to serve as Forestry Subject Matter Specialists;

Table 3.03: KEY INCREMENTAL STAFF TO BE ADDED UNDER NSFP

A. State Subprojects

	<u>Uttar Pradesh</u>	<u>Rajasthan</u>	<u>Gujarat</u>	<u>H.P.</u>
Chief Conservator of Forests	-	1	-	-
Add'l Chief Conservator	2	-	1	1
Conservator of Forests	9	1	2	1
Deputy Conservator of Forests	28	10	14	5
Assistant Conservator of Forests	88	6	9	41
Ranger Forest Officer	712	60	37	84
Deputy Ranger	343	22	-	79
Forester	1,329	137	22	-
Social Forestry Worker (all Guard Level)	<u>1,013</u>	<u>657</u>	<u>78</u>	<u>364</u>
<b>TOTAL</b>	<u>3,524</u>	<u>894</u>	<u>163</u>	<u>575</u>

B. Support Office Subproject

	<u>Support Office</u>
Head of Support Office	1
Chief Conservator of Forest (Central)	5
Deputy IGF/M&E	2
Assistant IGF	2
Conservator	6
Deputy Conservator of Forest	11
Assistant Conservator of Forests	5
Sociologist	1
Chief Project Economist	1
Project Economist	1
Deputy Director Statistics	<u>1</u>
<b>TOTAL</b>	<u>36</u>

these SMS would attend monthly planning meetings and fortnightly training sessions for VEW as appropriate. Each state would be required under NSFP to give assurances of such cooperation by Government order. Gujarat and Rajasthan have already done so; Himachal Pradesh and Uttar Pradesh have undertaken to do so once the T&V system has been initiated under proposed projects to improve agricultural extension services in those states, but no later than December 31, 1985.

### Training

3.19 Additional emphasis would be given to basic and in-service training under each state subproject. A large number of existing staff working in social forestry lack training at their professional level, many having been promoted from lower levels or transferred into social forestry from other branches of the forestry department without adequate orientation to their new task. Training also needs to be reoriented so as to be less theoretical and to favor practical, people-oriented skills. Training of trainees has been provided in the state as well as the central components. In addition, forest departments have begun and would continue to revise curricula so as to give greater emphasis to social forestry commensurate with its importance in their overall activities. Present curricula require greater emphasis on operation of nurseries, seed collection and storage and extension methodology and are being revised to reflect these needs, and should include lectures and workshops on preparing village level forest management plans. Short intensive courses for senior management and training for Rangers who would serve as Forestry Subject Matter Specialists to the agricultural extension services would also be provided. In general, the states under NSFP would use existing training institutions. A small amount of financing for improved facilities is, however, included. In addition, the project would provide for study tours or fellowships in India and abroad. Brief descriptions of present and proposed training facilities and programs in each state are described in Project Files C1-C4.

### Research and Studies

3.20 The project would strengthen agro-silviculture research through provision of some additional staff and funds for contractual research with the ultimate objective of providing better information in dealing with immediate problems faced by project management. The need for research under the state subprojects is focussed on seed source identification, seed collection and handling, nursery practice, optimizing productivity and reducing costs. The state social forestry projects and work done by their research staff and research stations would also be supported by: the proposed National Agricultural Research Project II which provides assistance through the Indian Council of Agricultural Research (ICAR) to State Agricultural Universities (SAUs) to develop research programs; Forest Research Institute (FRI) at Dehra Dun; and the proposed Forest Research, Education and Training Project (FRET). The research responsibilities of each relevant to NSFP are as follows: (a) ICAR and the SAUs would be responsible for on-farm and on-station research on agroforestry in the main agro-ecological zones of India; competition effects; physiological and nutritional studies; physiology of coppicing, pollarding and coppicing; some breeding work and farm budget analyses. (b) FRI and state silviculturists would be responsible for comprehensive species introduction trials; selection and progeny testing; breeding of trees for use in farm, village and departmental forestry; detailed yield studies of different species under different management systems including trees in free growth,

partial harvesting by coppicing, pollarding etc.; and non-wood products. More detailed descriptions of the work proposed for each state under NSFP and cost details are given in the Project Files C1-C4.

3.21 The project would provide for wood balance studies to be undertaken by all states to develop a basis for estimating future consumption and planning future supplies for major products like fuelwood, pulpwood, poles and timber. The study findings would help define the needs of different user groups and help determine the composition of planting targets and species selection. To serve as effective management tools, these studies need to be revised continuously, and under the project the staff required to do this would be provided. The FDs of Gujarat and Uttar Pradesh have prepared draft reports. Himachal Pradesh and Rajasthan have prepared detailed wood balance study proposals, following the guidelines and terms of reference provided by the Bank and USAID. The Bank and USAID, assisted by the Ford Foundation, are holding discussions with the states to assist in refining the objectives of these studies and in practical methodology including sampling design and analysis so as to improve the basis for social forestry project planning over the longer term.

#### Wood Saving Devices

3.22 Programs to promote efficient wood burning stoves and crematoria are included in the state projects. Efficiency of stoves used in rural households is very low and can be increased by as much as 50% through scientifically designed, low-cost improved stoves. Reduction of smoke also provides substantial health benefits. Improved crematoria can reduce wood consumption by about 40%. In Himachal Pradesh, advantage would be taken of the progress made by the Indo-German Dhauladhar Project in establishing a program of improved stoves and pressure cookers. The subproject would fund an evaluation study of these devices under field conditions, soliciting users' recommendations. The Himachal Pradesh subproject also provides for hiring women forest guards to work as extension agents, inter alia, for promotion of improved stoves. The project would provide funds in all four states for improved crematoria in areas where significant segments of the population use these common facilities. Further information on improved stoves and crematoria is given in Project File C5, Item 7.

3.23 Special features of the individual state subprojects are described below in paras 3.24-3.27. Cost figures in parentheses in these paragraphs represent base costs. Table 3.01, para 3.03, shows the breakdown of plantation components for each state. Summary costs are reflected in Table 5.01. The numbers of key incremental staff appear in Table 3.03, para 3.17. Assurances were obtained during negotiations that by December 31, 1985, the following state positions would be sanctioned: Rajasthan, a Conservator of Forest for Planning, Monitoring and Evaluation; Uttar Pradesh, an additional Chief Conservators of Forests, and a Conservator of Forests for Planning.

Uttar Pradesh (US\$103 M)

3.24 With a population of over 110 million, or 16% of the Indian total, Uttar Pradesh is the largest state in India. The Project would cover all 49 districts of the Plains region (9 more districts than in the previous project). In particular, the Project would provide:

- (a) Tree establishment of about 134,000 hectares under farm forestry, 1/ with more intensive efforts in the more heavily and intensively cultivated Eastern Region, where agroforestry would comprise the main thrust; these efforts would be supported by strong extension to recommend species and approaches best suited to farm conditions and needs;
- (b) Plantations involving tree ownership for poor and landless people (US\$11.8 M) with 11,000 ha of unirrigated blocks, 1,210 ha of strip plantations alongside roads and 1,000 ha of irrigated Arjun plantations to be established on government owned land; in each of the models in this category, participants would be selected in consultation with village authorities; landless persons and marginal farmers would have responsibility for plantation work on leased land with right of ownership to trees planted; the arjun plantations established in alkaline soils would produce tassar for silk making;
- (c) Plantations on Public Wastelands (US\$12.1 M) involving 14,000 ha of community woodlots on panchayat owned waste lands; agreements with villages/panchayats involved would stipulate early local participation and take-over of plantation management responsibilities;
- (d) Plantations on Government Wastelands, (US\$1.3 M) with 740 ha of strip plantations; roadside and railside sites would be selected which are nearby to communities and could support several rows of trees (so as to enable progressive harvesting);
- (e) A network of small decentralized nurseries, (US\$23.9 M) to boost participation in tree planting by small farmers and those living in more remote areas through better access to seedling distribution and advice; each of the 800 Development Blocks would have at least two family or school-operated small nurseries in addition to its existing large departmental nursery; and

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1/ The only direct costs associated with UP farm forestry would be for seedling production, which is reflected as US\$23 M in part (e) following.

- (f) Institutional support (US\$54.3 M) including a strengthening of field operations to coincide with block level administrative arrangements and creation of two administrative zonal headquarters to administer the statewide organization; field staff at the block level would be deployed to facilitate coordination with the extension service and to maximize contacts with farmers and plantation beneficiaries, and to help operate a strong nursery system; the project would provide about 3,100 key professional staff, in addition vehicles and requisite travel and vehicle operating allowances, and residential housing (about 1,000 units) for new field staff to be located in remote areas. Costs include strengthening of extension, training, monitoring and evaluation and social forestry research. Details are given in Table 5.01.

Rajasthan (US\$25.0 M)

3.25 Although the second largest state in the country, Rajasthan is more sparsely populated than Uttar Pradesh, contains few natural forests and suffers from a harsher climate. Of the relatively low proportion of land which is covered by forests (9%), about two-thirds is substantially degraded. The project would cover only the Eastern Region of the state which, while excluding the vast desert areas of the West, still experiences generally inhospitable agroclimatic conditions. This project would represent the first externally assisted social forestry effort, although the state has already undertaken plantations through centrally-sponsored schemes. Special features of the state project would include:

- (a) Tree establishment on the equivalent of 80,000 ha under farm forestry, 1/ This component would include a 4,000 ha pilot program for establishment of fruit bearing bushes (Zizyphus), with hectares calculated at 100 bushes per hectare;
- (b) Plantations involving tree ownership for poor and landless people on 7,500 ha of Government wastelands (US\$2.6 M); plantings would be rainfed and adjacent to village areas;
- (c) Plantation of Community wastelands (US\$1.9 M) including 5,000 ha of community woodlots on panchayat owned wastelands;

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1/ Agro forestry direct costs would include \$0.05 M for grafted fruit trees, and \$4.5 M for seedling production for farm forestry; the latter figures is reflected in part (e) following.

- (d) Plantation on Government wastelands (US\$7.1 M), including 20,000 ha rehabilitated degraded forests, and 4,300 ha of strip plantations along roads, canals and railways. This would necessitate FD gaining jurisdiction over certain tracts of land presently controlled by other government departments;
- (e) Establishment/maintenance of a network of at least 600 decentralized small nurseries (US\$5.1 M), some of which would be temporary and could be relocated as deemed desirable; and
- (f) Institutional support (US\$8.3 M), to comprise reorganization of field operations along Community Development Block lines, strengthening of extension, improved social forestry training (entailing construction of two new social forestry training wings), and appointment of a Woodlot Planning Officer to supervise production distribution and guide formulation of plantation management plans and revise/develop new social forestry plantation models, and harvesting arrangements more responsive to local needs; the project would provide incremental staff (including about 900 key professional positions); 768 bicycles, 72 motorcycles and cars, jeep, vans, etc; travel allowance and operating costs; and about 100 residences for field staff; and installation of 160 fuel-saving crematoria. Costs include strengthening of extension, training, monitoring and evaluation and social forestry research.

Gujarat (US\$83.8 M)

3.26 Over half the land of Gujarat (of total state area about 200,000 km<sup>2</sup>) is under agricultural production; of the remainder, a quarter is classified as wasteland of which 80% is to be found in Kachchh District. Since the land in the other districts is largely cultivated, agroforestry has received special emphasis in the state and would continue to do so under the proposed project. The project would include:

- (a) Some 200,000 ha of farm forestry plantation <sup>1/</sup> on field boundaries, bunds, and farm wastelands, together with 30,500 ha of GOG-assisted planting on particularly eroded/erodable private lands (US\$5.4 M); the latter plantations would expand on the "malki" approach of the previous project, and would provide assistance to the farmer to maintain for a limited period the trees on his land (as income foregone);

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<sup>1/</sup> The only direct costs associated with Gujarat farm forestry would be for seedling production, which is reflected at US\$4 M in part (d) following.

- (b) Plantations on community owned wastelands, (US\$23.7 M) including 20,000 ha of unirrigated woodlots, 5,000 of irrigated woodlots, and 10,000 ha of tree fodder plantations on panchayat lands;
- (c) Plantations on Government Lands (US\$40.8 M), consisting of 30,400 ha rehabilitated degraded forests, 15,000 ha road, rail and canalside strip plantations and 2,500 ha of fuelwood plantations adjacent to urban areas;
- (d) Establishment of over 2,500 small nurseries (US\$4.0 M), with about two thirds of them being farmer-operated and the rest run by schools; and
- (e) Institutional support (US\$9.9 M) including the designation of special "Extension" staff which would enable existing staff to concentrate on physical plantation and nursery work, while the Extension staff (which would include female Plantation Assistants) would devote full-time to farm forestry promotion and advice, identification of sites for public plantation and formulation of plantation management agreements, and promotion of wood saving devices; organizational strengthening would also entail: appointment of a Conservator-level officer for Planning, Information, Reporting and Project Formulation to help institute the system of plantation management plans and arrangements for production distribution and the development of more responsive social forestry plantation models; strengthening of training capacity, including the appointment of an additional DCF level instructor and construction of another dormitory at the Rajpipla School, in order to provide support for stepped-up inservice training; appointment of incremental staff including about 150 key professional positions; provision of 467 motorcycles and other vehicles, plus travel allowances, to support effective field staff mobility; construction of 460 residences for field staff, 80 workshops/sheds/garages for field support; and installation of 11,000 fuelsaving devices. Costs also include strengthening of social forestry research.

Himachal Pradesh (US\$37.3 M)

3.27 In contrast to the other three states in this project, Himachal Pradesh would target social forestry within hilly to mountainous terrain, 38% of which is already afforested. Although this would represent the first externally assisted activity in social forestry, the state has already established about 60,000 ha of social forestry plantations under centrally sponsored and state schemes in the past five years, and for several decades the government has fostered a system of accomodating villagers' minimum needs for fuelwood, small wood for construction, etc. to be provided from state

protected forests. This also prevents uncontrolled felling of trees and permits FDs to retain those trees of highest economic value. The project would provide:

- (a) Agroforestry plantations, including 53,000 ha equivalent under farm forestry 1/, and another 13,000 ha of Forest department assisted plantation on highly eroded/erodable lands (US\$2.0 M) lands involving groups of individuals with no more than 2 ha plantation per farmer;
- (b) Tree ownership for groups of participants, planting on Government wastelands (less than US\$0.1 M) a pilot test involving some 833 ha;
- (c) Plantation of public owned wastelands (US\$13.0 M), consisting of 41,000 ha of community land;
- (d) Plantation on Government Lands (US\$1.6 M), involving rehabilitation of 5,000 ha of degraded forests;
- (e) Establishment and operation of nurseries (US\$7.0 M); and
- (f) Institutional support (US\$13.7 M), including designation of "Extension" staff to work together with territorial forestry staff, whereby the former would undertake promotion, extension and formulation of agreements with villages, and the latter would do the physical plantation work for social forestry; formulation of plantation management plans and distributional arrangements for public plantation sites which ensure social benefits and attention to local needs; strengthening of social forestry research, monitoring and evaluation, and training with stepped-up inservice training at Chail, Mallan and other facilities; field evaluation of existing stove programs, and the installation of some 7,500 fuelsaving devices facilitated by project-hired women stove extension workers; and the addition of incremental staff, including 575 key professional positions; civil works mainly entailing 250 residences for field staff to be posted in remote areas; and 175 motorcycles for field staff.

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1/ The only direct cost for farm forestry would be seedling production which, as part(e) shows, would total about US\$7 M.

C. Detailed Features - Social Forestry Support Office Subproject (US\$4.0 M)

3.28 The Social Forestry Support Office would be located under the Special Secretary of Forests in the Ministry of Environment and Forests. While the newly created Support Office would provide support to the NSFP, its role and functions would be broadly based encompassing the entire forestry subsector throughout the country. Since the Ministry has only recently been established, its internal organization is still incomplete. Accordingly, during negotiations assurances were obtained that GOI would furnish to the Association the completed organizational structure and proposed staffing by April 30, 1986.

3.29 The Support Office would consist of two cells and possibly five regionally oriented support groups. The Project Formulation Cell, headed by the Chief Project Economist, would assist states in project preparation and would foster a consistent social forestry policy among centrally-sponsored and donor-assisted schemes. A Monitoring Cell, headed by the DIGF/M&E, would review progress of all social forestry schemes, and maintain records of total plantation achievements and expenditures by state. The regional support groups, each headed by a Chief Conservator of Forests (Central), would pay attention, inter alia, to training and technical assistance.

3.30 Besides assisting in project preparation and monitoring, the Social Forestry Support Office would provide other assistance which would include: promoting cross-fertilization of experience among states; tracking progress of all social forestry schemes, and working to eliminate redundancies or inconsistencies among them; conducting overview studies, such as national wood supply and demand studies; providing training and technical assistance support where economies of scale so warrant; facilitating nominations for international training; and providing supplementary assistance to states which lack adequate capacity to handle their social forestry programs.

3.31 Central support for social forestry would be achieved by the following:

- (a) Establishing the Social Forestry Support Office (US\$3.4 M), including appointment of some 36 incremental higher level staff plus support staff to the offices of the head of the Social Forestry Support Office, Chief Project Economist and Deputy IGF/Monitoring; assurances were obtained at negotiations that GOI would sanction the new position of the head of the Social Forestry Support Office by April 30, 1986 and that by October 31, 1986 it would have filled this position and would thereafter maintain that position and those of the Chief Project Economist and the Deputy IGF/Monitoring and Evaluation. The project would also provide rented office space, plus necessary resource support including

vehicles (car, jeep and three station wagons), office equipment and furniture, and operating/maintenance costs;

- (b) Provision of funds for training (US\$0.4 M) and technical assistance (US\$0.5 M) in social forestry. Certain training and technical assistance functions (e.g., training of trainers, assistance in selecting and introducing computerized monitoring systems) would be more efficiently done by the Support Office than by each state on its own. A Training Coordinator in central headquarters would organize such training, identify institutions and individuals to carry out such training and process nominations, and would solicit active state participation in designing the program for training and technical assistance. Under this program, a sizable amount of management training could be conducted by the Indian Institute of Forest Management; and
- (c) Special studies (US\$0.1 M), including *inter alia*, an overview of wood supply and demand, and analyses of other policy matters with regional or national ramifications.

#### IV. ORGANIZATION AND MANAGEMENT

4.01 The implementation of the proposed project would be carried out within the framework of the existing institutions at the federal and state levels (paras 4.03 and 4.04). However, to provide better policy direction, technical advice and support throughout the country, as well as to ensure effective coordination of various investment programs for forestry development, the Social Forestry Support Office would be established in the Ministry of Environment and Forests, under the direction of the Special Secretary of Forests in GOI. The primary responsibility of the Social Forestry Support Office would be to undertake forestry sector reviews and analyses and to develop sound sector policies. In addition, this office would assist state entities in sub-project identification, preparation and implementation, provide training and technical assistance support to states, monitor and evaluate ongoing state projects, and foster common approaches to implementation of the various centrally-sponsored, state, and donor-assisted social forestry programs. The Support Office would act in close cooperation with the states, with other GOI agencies conducting social forestry activities, and with external supporting agencies. For states which have yet to develop expertise in project works, the Support Office would provide back-stopping technical support. It is envisaged that in the long run, as it develops and strengthens its capacity for providing effective policy and technical support for forestry development in the country, the Support Office would emerge as an important development entity.

4.02 Compared with previous social forestry projects, GOI will take an increasingly active role in the support of state social forestry activities. Joint IDA/USAID supervision missions would be about made twice a year to each state and GOI staff would accompany them. During project implementation, the Social Forestry Support Office would assume greater responsibility for assisting, coordinating, guiding and monitoring state subprojects. The increased staff and resources provided under NSFP would allow central government to provide greater support to states, including more field visits, than previously possible. This support would extend to all states and to social forestry programs as a whole, not just activities financed under NSFP. The staffing pattern of the Support Office would provide for regional specialization by some staff and it would be decided later whether to decentralize these staff to regional offices.

4.03 Responsibility for forestry has recently been moved from the Ministry of Agriculture to a new Ministry of Environment and Forests, attached directly to the Prime Minister's Office. The Special Secretary of Forests, who is also the Inspector General of Forests (IGF), is responsible for coordinating the planning and implementation of development projects in forestry and has direct responsibility for forestry activities in the Union Territories. He works together with a Joint Secretary to GOI for general administrative purposes, including administration of the Indian Forest Service (IFS), and on the technical side he is assisted by an Additional IGF and six Deputy IGFs, one each for Research and Education, Central Forestry Commission, Survey and Utilization, Afforestation and Extension, Conservation, and Monitoring and Evaluation. Under the project, another Additional IGF is likely to be added to head the Social Forestry Support Office, including the regional (zonal) offices. The initial organization would be decided by April 30, 1986 (para 3.31). A Chief Project Economist (forestry) and Project Economist (forestry) are responsible for formulating projects under multi-lateral and bilateral assistance. A DIGF/M&E heads up the monitoring and review of donor-assisted projects in social forestry.

4.04 Within the states, forestry administration is the responsibility of a separate Department of Forests with a Secretary to the State Government looking after forestry. The Department is headed by a Chief Conservator of Forests (CCF) or Principal CCF who belongs to the IFS. He is assisted by one CCF and/or Additional CCFs and Conservators of Forests (CFs) for functional support, and for administration of field activities. The Circle or Region is generally the largest administrative unit, and it is in turn divided into Divisions, usually five or six, each under a Divisional Forest Officer (DFO) with the rank of Deputy Conservator of Forests (DCF). The DCFs are assisted by other DCFs (state cadre) or Assistant Conservators of Forest (ACF) in managing the Division and implementing development projects. Divisions normally consist of four to six Ranges, each under a Range Forest Officer. The Range is further divided into four to six Rounds, each in the charge of a Forester; Foresters are assisted by several Forest Guards, each on a Beat.

4.05 The organization of forestry and social forestry varies among states, usually as a result of the amount and distribution of state forest reserves to be found in the states. The organization for states participating in NSFP is detailed in Project Files C1-C4. A brief description is given below of organizational arrangements for social forestry in each state.

- (a) Uttar Pradesh. A separate line organization for social forestry was set up under the first project, and would continue under the proposed project and its support functions (extension, research, M&E training and planning) would be strengthened. As before, a CCF (Chief Conservator of Forests) would take charge of social forestry, under supervision of the Principal CCF. The 49 districts covered under the project would now be grouped into ten (instead of the previous five) Circles, to facilitate administration. Field operations would now be structured along "development block" lines and staff would be added for better extension and operation of decentralized nurseries. (Organizational Chart 1)
- (b) Rajasthan. As in U.P., a CCF would head up social forestry, under the supervision of a Principal CCF. In support of the CCF, there would be sections for Extension and Communications; Planning, Monitoring and Evaluation; and Woodlot Planning. Since there are almost no natural forests in the project area and most forestry and social forestry operations would be technically similar, the state would maintain the existing organization but would add Social Forestry staff under each Divisional Forest Officer (DFO). Field operations would be structured along block lines. (Organizational Chart 2)
- (c) Gujarat. The separate line organization for social forestry set up under the first project would continue, with selective strengthening of functional support at headquarters. Responsibility for social forestry lies with a CCF, under the supervision of a Principal CCF. For functional support, there would be three sections covering monitoring and evaluation; research, training and communication; and planning. At field level there would be five social forestry circles, an increase of one from the previous project. Special extension field staff would be added in each division who would focus on farm forestry and wood-saving devices promotion, formulation of agreements with villages and extension. (Organizational Chart 3)
- (d) Himachal Pradesh. Since a relatively high proportion of the state is already afforested (although degraded in some parts) and since there is already a well-established tradition of individual rights to forest produce, the state would maintain the existing organization but would add social forestry staff

under each DFO, and would strengthen functional support at headquarters. Two CCFs are managing social forestry, the CCF/Planning and Development in charge of general program direction and functional support, and the CCF/Territorial looking after all field staff including those added under the project; they both answer directly to the Forest Secretary (there is no PCCF). Assurances were obtained that a single line of command would be maintained from the circle Conservator down for field staff and that a steering committee headed by the Forest Secretary would meet at least every quarter to discuss and assign work priorities to field staff. (Organizational Chart 4)

4.06 Continuous monitoring and evaluation is an integral part of all ongoing Bank-assisted social forestry projects; however, participating states have been slow to establish monitoring and evaluation units and to begin collection and analysis of appropriate data. In recognition of the shortcomings and at the request of GOI, the Bank, FAO and the Office of the IGF, in consultation with state forest departments and the major donor agencies supporting social forestry projects in India, prepared an operational guide in 1982 which was revised after a workshop in 1983. <sup>1/</sup> This guide describes an operational system which all states would implement under the guidance of the DIGF/Monitoring and Evaluation. These guidelines, therefore, would form the basis for state M&E operations under the project. A detailed review of monitoring and evaluation in the project states has been undertaken. A report containing extensive recommendations, which have been taken into account in calculating project costs, is available in the project file (C5, Item 5)

4.07 The project provides for strengthening of M&E cells in each state. Within a state, M&E is the responsibility of a DCF or CF in the forest department, reporting to the head of the department or the social forestry wing. He is assisted by a small headquarters staff including a statistician and an economist, and would supervise a team of Field Supervisors and Investigators to collect field level data. Assurances were obtained at negotiations that all states would undertake monitoring and evaluation in the form already agreed with GOI, and that summary results would be forwarded to IDA and USAID at least once a year.

4.08 State projects would receive general supervision and guidance from the Central Support Office's M&E Unit. This Unit would also be responsible for technical guidance to state M&E cells and for collecting and coordinating the monitoring and evaluation reports from all subproject states including

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<sup>1/</sup> R.H. Slade and R. Noronha with contributions from J.G. Campbell, P. Guhathakurta, and B. Tepping, "An Operational Guide to the Monitoring and Evaluation of Social Forestry in India," Working Draft, June 1984.

those directly supported by the Bank before NSFP, analyzing and forwarding them to the Bank at prescribed intervals.

4.09 Coordination of forestry activities among all agencies in each state would be through an existing committee at the secretarial level. Assurances were obtained during negotiations that the states would maintain these committees. The states also agreed that by March 31, 1988, they would carry out studies of the organizational issues in their forest departments, including, inter alia, the relationship of various social forestry schemes.

4.10 Project Reporting. Each state would be responsible for preparing semi-annual progress reports in a format approved by IDA and USAID, and submitting its reports to the Special Secretary of Forests and DEA. This would include a table on total social forestry performance regarding physical achievements and financial outlays, presented according to a standard format which has been developed at the center for monitoring these data on a state by state basis. The Social Forestry Support Office would prepare semi-annual progress reports each June and December giving a summary of NSFP project activities undertaken during the prior six months. These would be forwarded to IDA and USAID for review. Each participating state and the Social Forestry Support Office would also undertake to prepare a completion report on its subproject. The Social Forestry Support Office would prepare the project completion report required by IDA. Assurances were obtained on the above at negotiations.

## V. COST ESTIMATES AND FINANCING

### A. Cost Estimates

5.01 Total project cost is estimated at Rs 3,933 M (US\$327.8 M), including Rs 47.1 M (US\$3.93 M) for taxes and duties. Cost estimates are based on May 1985 prices. The foreign exchange component is estimated at Rs 77.0 M (US\$6.6 M), which represents 2% of total project cost. Physical and price contingencies over the project period amount to Rs 891.2 M (US\$74.3 M), or 23% of total project cost. Physical contingencies have been estimated at 10% of civil works, and 5% of other costs except for staff salaries and travel allowance for which no physical contingency has been provided. Price contingencies at about US\$62.8 million were derived from projected local inflation rates of 8.5% during 1985-90 and foreign inflation rates of 5% in 1985, 7.5% in 1986 and 8.0% in 1987-1990.

**Table 5.01: PROJECT COST SUMMARY BY STATE COMPONENTS**

	(RUPEES '000)			(US\$ '000)			% Foreign Exchange	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
<b>A. GUJARAT</b>								
1. ORGANIZATION AND MANAGEMENT	96,884.2	2,772.5	93,656.7	7,573.7	231.0	7,804.7	3	3
2. PHYSICAL TARGETS	882,803.8	8,605.2	891,409.0	73,567.0	717.1	74,284.1	1	29
3. RESEARCH	3,896.4	84.3	3,980.7	324.7	7.0	331.7	2	0
4. EXTENSION	2,727.2	53.8	2,781.0	227.3	4.5	231.7	2	0
5. TRAINING	5,911.5	1,041.5	6,953.0	492.6	86.8	579.4	15	0
6. PLANNING	1,566.9	49.1	1,616.0	130.6	4.1	134.7	3	0
7. MONITORING AND EVALUATION	4,656.9	191.0	4,847.9	388.1	15.9	404.0	4	0
Sub-Total GUJARAT	992,446.9	12,797.3	1,005,244.3	82,703.9	1,066.4	83,770.4	1	33
<b>B. HIMACHAL PRADESH</b>								
1. ORGANIZATION AND MANAGEMENT	120,496.7	4,080.7	124,577.4	10,041.4	340.1	10,381.5	3	4
2. PHYSICAL TARGETS	281,389.9	2,753.8	284,143.7	23,449.2	229.5	23,678.6	1	9
3. RESEARCH	5,486.6	138.5	5,625.1	457.2	11.5	468.8	2	0
4. EXTENSION	4,182.9	190.3	4,373.2	348.6	15.9	364.4	4	0
5. TRAINING	10,793.1	1,194.0	11,987.1	899.4	99.5	998.9	10	0
6. MONITORING AND EVALUATION	15,954.3	362.4	16,316.7	1,329.5	30.2	1,359.7	2	1
Sub-Total HIMACHAL PRADESH	438,303.4	8,719.8	447,023.2	36,525.3	726.6	37,251.9	2	15
<b>C. RAJASTHAN</b>								
1. ORGANIZATION AND MANAGEMENT	67,662.8	3,409.2	71,071.9	5,638.6	284.1	5,922.7	5	2
2. PHYSICAL TARGETS	198,078.1	1,934.1	200,012.2	16,506.5	161.2	16,667.7	1	7
3. RESEARCH	2,190.6	52.2	2,242.7	182.5	4.3	186.9	2	0
4. EXTENSION	9,307.5	341.2	9,648.6	775.6	28.4	804.1	4	0
5. TRAINING	6,481.2	1,233.2	7,714.4	540.1	102.8	642.9	16	0
6. MONITORING AND EVALUATION	9,304.3	176.4	9,480.7	775.4	14.7	790.1	2	0
Sub-Total RAJASTHAN	293,024.4	7,146.1	300,170.5	24,418.7	595.5	25,014.2	2	10
<b>D. UTTAR PRADESH</b>								
1. ORGANIZATION AND MANAGEMENT	465,658.0	19,799.5	485,457.5	38,804.8	1,650.0	40,454.8	4	16
2. PHYSICAL TARGETS	584,119.9	5,727.6	589,847.5	48,676.7	477.3	49,154.0	1	19
3. RESEARCH	6,266.7	185.6	6,452.3	522.2	15.5	537.7	3	0
4. EXTENSION	56,382.2	1,614.4	57,996.6	4,698.5	134.5	4,833.1	3	2
5. TRAINING	86,783.4	4,885.7	91,669.1	7,231.9	407.1	7,639.1	5	3
6. PLANNING	3,282.9	58.3	3,341.2	273.6	4.9	278.4	2	0
7. MONITORING AND EVALUATION	6,198.4	111.4	6,309.8	516.5	9.3	525.8	2	0
Sub-Total UTTAR PRADESH	1,208,691.4	32,382.6	1,241,073.9	100,724.3	2,698.5	103,422.8	3	41
<b>E. CENTRAL SUPPORT OFFICE</b>								
	47,404.2	1,032.8	48,437.0	3,950.3	86.1	4,036.4	2	2
<b>Total BASELINE COSTS</b>	<b>2,979,870.3</b>	<b>62,078.7</b>	<b>3,041,948.9</b>	<b>248,322.5</b>	<b>5,173.2</b>	<b>253,495.7</b>	<b>2</b>	<b>100</b>
Physical Contingencies	134,077.8	3,632.0	137,709.7	11,173.1	302.7	11,475.8	3	5
Price Contingencies	742,164.5	11,323.8	753,488.2	61,847.0	943.6	62,790.7	2	25
<b>Total PROJECT COSTS</b>	<b>3,856,112.5</b>	<b>77,034.4</b>	<b>3,933,146.9</b>	<b>321,342.7</b>	<b>6,419.5</b>	<b>327,762.2</b>	<b>2</b>	<b>129</b>

**Table 5.02: SUMMARY OF PROJECT COST BY CATEGORY OF EXPENDITURE**

	(RUPEES '000)			(US\$ '000)			Z Foreign Exchange	Z Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
<b>I. INVESTMENT COSTS</b>								
A. CIVIL WORKS	206,702.2	10,560.8	217,262.9	17,225.2	880.1	18,105.2	5	7
B. VEHICLES	70,948.4	17,272.3	88,220.7	5,912.4	1,439.4	7,351.7	20	3
C. EQUIPMENT	21,392.8	2,309.3	23,702.1	1,782.7	192.4	1,975.2	10	1
B. FURNITURE	4,318.7	-	4,318.7	359.9	-	359.9	-	0
E. TRAINING								
1. STAFF TRAINING DOMESTIC	36,447.9	-	36,447.9	3,037.3	-	3,037.3	-	1
2. STAFF TRAINING INTERNATIONAL	516.0	4,508.5	5,024.5	43.0	375.7	418.7	90	0
3. CENTRALLY - SPONSORED WORKSHOPS	2,158.0	-	2,158.0	179.8	-	179.8	-	0
4. FARMER TRAINING AND EXTENSION	6,119.5	-	6,119.5	510.0	-	510.0	-	0
Sub-Total TRAINING	45,241.4	4,508.5	49,749.8	3,770.1	375.7	4,145.8	9	2
F. TECHNICAL ASSISTANCE	2,502.0	-	2,502.0	208.5	-	208.5	-	0
G. SPECIAL STUDIES AND EVALUATION	2,914.8	-	2,914.8	242.9	-	242.9	-	0
H. RESEARCH OPERATION AND GRANTS TO SAUS	755.8	-	755.8	63.0	-	63.0	-	0
I. PLANTATION								
1. NURSERY DEVELOPMENT	520,059.0	5,099.4	525,158.4	43,338.2	425.0	43,763.2	1	17
2. FARM FORESTRY	88,538.1	868.2	89,406.3	7,378.2	72.3	7,450.5	1	3
3. TREE TENURE PLANTING	148,364.7	1,454.8	149,819.5	12,363.7	121.2	12,485.0	1	5
4. COMMUNITY FOREST	581,078.9	5,697.8	586,776.6	48,423.2	474.8	48,898.1	1	19
5. WASTELAND PLANTATION	601,759.3	5,900.5	607,659.8	50,146.6	491.7	50,638.3	1	20
Sub-Total PLANTATION	1,939,799.9	19,020.7	1,958,820.6	161,650.0	1,585.1	163,235.1	1	64
J. FUELWOOD SAVING DEVICES	6,643.9	-	6,643.9	553.7	-	553.7	-	0
<b>Total INVESTMENT COSTS</b>	<b>2,301,219.9</b>	<b>53,671.5</b>	<b>2,354,891.4</b>	<b>191,768.3</b>	<b>4,472.6</b>	<b>196,241.0</b>	<b>2</b>	<b>77</b>
<b>II. RECURRENT COSTS</b>								
A. STAFF SALARIES	423,160.7	-	423,160.7	35,263.4	-	35,263.4	-	14
B. STAFF TRAVEL ALLOWANCE	81,856.7	-	81,856.7	6,821.4	-	6,821.4	-	3
C. BUILDING RENT AND MAINTENANCE	63,522.1	3,246.0	66,768.1	5,293.5	270.5	5,564.0	5	2
D. VEHICLE OPERATION AND MAINTENANCE	47,849.9	5,161.1	53,011.0	3,987.5	430.1	4,417.6	10	2
E. OFFICE AND OTHER EXPENDITURE	62,261.1	-	62,261.1	5,188.4	-	5,188.4	-	2
<b>Total RECURRENT COSTS</b>	<b>678,650.4</b>	<b>8,407.1</b>	<b>687,057.5</b>	<b>56,554.2</b>	<b>700.6</b>	<b>57,254.8</b>	<b>1</b>	<b>23</b>
<b>Total BASELINE COSTS</b>	<b>2,979,870.3</b>	<b>62,078.7</b>	<b>3,041,948.9</b>	<b>248,322.5</b>	<b>5,173.2</b>	<b>253,495.7</b>	<b>2</b>	<b>100</b>
Physical Contingencies	134,077.8	3,632.0	137,709.7	11,173.1	302.7	11,475.8	3	5
Price Contingencies	742,164.5	11,323.8	753,488.2	61,847.0	943.6	62,790.7	2	25
<b>Total PROJECT COSTS</b>	<b>3,856,112.5</b>	<b>77,034.4</b>	<b>3,933,146.9</b>	<b>321,342.7</b>	<b>6,419.5</b>	<b>327,762.2</b>	<b>2</b>	<b>129</b>

5.02 Project cost estimates are summarized in Tables 5.01 and 5.02, and subcomponent summaries given in Annex 4. Detailed cost tables are given in Project Files C1-C5. Cost by year are shown in Annex 4.

B. Proposed Financing

5.03 External financing for the project would be provided by the proposed IDA credit of US\$165 M and by USAID financing of US\$80.0 M representing 50% and 24%, respectively, of total project costs, net of taxes and duties. GOI and the four state governments would supply the remaining US\$83 M under their Seventh Plan. The proposed IDA credit would be made to GOI on standard terms and conditions. The proceeds of the IDA credit would be channeled to the Ministry of Environment and Forests and to the participating states in accordance with arrangements applicable at the time for central assistance to states for development projects. The USAID funds would be made available, US\$3 M as a grant and US\$77 M as loan funds, on its standard terms and would be similarly channeled to the Ministry and participating states. The balance of project financing would come from state government sources and GOI as indicated in the table below. Participating states have included these subprojects in their draft Seventh Development Plans and provided sufficient funds in their annual budgets to cover the cost of the subprojects in the first year.

Table 5.03: PROJECT FINANCING 1/

Component	Local Support		IDA	USAID	Total
	Source	Amount			
----- US\$ M -----					
Gujarat	GOG/GOI	16	62	31	108
Himachal Pradesh	GOHP/GOI	11	24	12	48
Rajasthan	GOR/GOI	8	17	9	33
Uttar Pradesh	GOUP/GOI	46	61	27	134
GOI Support Office	GOI	2.5	1.5	1	5
Total		83	165	80	328
Percentage		26	50	24	100
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Foreign Exchange		82.4	160.0	79.0	321.4
Local Costs		0.5	5.0	0.9	6.4

1/ The figures in this table include contingencies.

5.04 Retroactive financing by IDA of up to US\$14.5 M would be provided to cover the following expenditures incurred after October 1, 1984: nursery development, advance soil works for plantations, and incremental staff employed on 1985 planting operation.

### C. Procurement

5.05 For items to be financed by IDA, the following procurement procedures would be applied.

5.06 Civil Works (US\$24.5 M). Requirements would consist mainly of housing of standardized design, office and training facilities and small inspection huts, which would not attract international bids as they would be widely scattered both geographically and over time. Larger contracts (over Rs 100,000) would be awarded on the basis of competitive bidding following local advertisement and in accordance with established state procedures which are satisfactory to IDA. The local contracting industry in India is well developed and adequate competition would be offered. Contracts would be handled through the Public Works Department or Forest Department. Smaller civil works (inspection huts) located in remote areas would be built departmentally by force account.

5.07 Vehicles, Equipment and Furniture (US\$11.7 M). These items are needed in small quantities and are available locally. As adequate maintenance facilities and availability of spare parts would be important, locally made vehicles of types already used by government departments would be procured according to well-established government procedures which are acceptable to IDA. Usually items such as cars, motorcycles, bicycles, barbed wire and office furniture and equipment would be purchased on rate contract approved by the Director General of Supplies and Disposals, GOI, or otherwise sanctioned by the state government. Such purchases are made from firms with whom the state Department of Stores Purchase, the state government's central purchasing organization, has entered into a rate contract valid for a particular period, generally one year. The Stores Purchase Department calls for tenders, evaluates and enters into rate contract with the lowest evaluated bidder, following procedures adopted by DGSD. Other items (e.g., polythene bags) would be procured by field officers through local competitive bidding.

5.08 For all contracts for civil works, vehicles, equipment and furniture estimated to cost US\$100,000 or more, before bids are invited, IDA would be furnished for its comments, the text of the invitations to bid and the specification, other bidding and draft contract documents together with a description of the advertising procedures to be followed for the bidding. Orders for purchase of minor equipment, furniture and supplies would be

bulked wherever possible and purchased according to established local bidding procedures, except where valued at less than US\$50,000 and not in the rate contract list, when they would be purchased by prudent shopping through normal trade channels. Assurances on procurement procedures mentioned in paras 6.06-6.08 were obtained during negotiations.

5.09 The balance of project costs (US\$291.6 M) would consist of plantation activities and fuel-saving devices (US\$211.4 M), adaptive research, support to state agricultural universities and special studies and evaluation (US\$0.4 M), training (US\$5.4 M), technical assistance (US\$0.3 M), incremental salaries and travel allowances (US\$53.8 M), and incremental office and vehicles operating expenditure (US\$20.3 M) which would not involve procurement. All of the above figures include contingencies, which amount to US\$62.8 M. Procurement arrangements are summarized in the table below.

Table 5.04: PROCUREMENT ARRANGEMENTS  
(US\$ Millions)

	-- Procurement Method			-- <u>NA</u>	Total <u>Cost</u>
	<u>ICB</u>	<u>LCB</u>	<u>OTHER</u>		
Civil Works	-	5.9 (3.0)	18.6 (9.3)	-	24.5 (12.3)
Vehicles and Equipment	-	-	11.7 (1.9)	-	11.7 (1.9)
Training	-	-	-	5.4 (2.7)	5.4 (2.7)
Support to SAUs, Special Studies and Tech'l Ass'ce	-	-	-	0.7 (0.3)	0.7 (0.3)
Plantation Activities and Fuel Saving Devices	-	-	-	211.4 (126.8)	211.4 (126.8)
Salaries & Allowances	-	-	-	53.8 (18.8)	53.8 (18.8)
Vehicle and Office O&M and Other Expenditures	-	-	-	20.3 (2.2)	20.3 (2.2)
	-	5.9 (3.0)	30.3 (11.2)	291.6 (150.8)	327.8 (165.0)

(Figures in parentheses are amounts to be financed by the credit.)

#### D. Disbursement

5.10 Project funds would be disbursed over five-and-a-half years and completed by September 1990, about six months after project completion, coterminus with the Seventh Five-year Plan Period on March 31, 1990. The estimated disbursement schedule for the proposed IDA credit and the USAID funds is given in Annex 5. This is to be compared with the eight year disbursement period for the forestry and fisheries subsector in South Asia and in India. While experience with social forestry projects in India is admittedly limited, disbursement of the first two social forestry credits (in Gujarat and Uttar Pradesh) will be completed by or before their closing dates, i.e., within six years and these states would account for a substantial part of the proposed NSFP. The other states (Rajasthan and Himachal Pradesh), although new to IDA financing in this subsector, have experience with social forestry which should enable them to carry out their projects in a timely manner. Furthermore, the retroactive financing proposed to enable the states to prepare for the initial year planting season should help plantation activities to move rapidly. Civil works and procurement of vehicles would also be early in the implementation period and the declining disbursement rate proposed to be applied to incremental staff costs and vehicle operating and maintenance costs should also favor rapid disbursement of the credit.

5.11 The proposed IDA credit of US\$165.0 M would be disbursed as follows:

- (a) Field activities, including farm forestry and nursery development; tree ownership on government waste land; community wasteland plantations; and reforestation of degraded forests and strip plantations on government land; fuel savings devices: 60% of total costs;
- (b) Incremental staff salaries: 30% of total costs, to be financed on a declining basis: year 1, 50%; year 2, 41%; year 3, 31%; year 4, 26% and year 5, 21%;
- (c) Travel allowances: 62% of total costs, to be financed on a declining basis: year 1, 100%; year 2, 85%; year 3, 75%; year 4, 55%; and year 5, 40%;
- (d) Civil works including building maintenance: 50% of total costs;
- (e) Vehicles: 100% of ex-factory price or 75% of purchase price if procured locally;
- (f) Vehicle operating costs: 50% of total costs, to be financed on a declining basis: year 1, 100%; year 2, 80%; year 3, 50%; year 4, 30% and none in year 5;

- (g) Furniture and equipment: 100% of c.i.f. costs if imported; 100% of ex-factory price if locally manufactured or 75% of purchase price if procured locally; and
- (h) Staff training, farmer training, central workshops, technical assistance, special studies and research grants: 50% of total costs.

5.12 The proposed USAID assistance of US\$80.0 M would be disbursed as follows:

- (a) Field activities, including farm forestry and nursery development; tree ownership on government waste land ; community wasteland plantations; and reforestation of degraded forests and strips plantations on government land; promotion of fuel savings devices: 30% of total costs;
- (b) Incremental staff salaries: 30% of total costs, to be financed on a declining basis: year 1, 50%; year 2, 41%; year 3, 31%; year 4, 26%; and year 5, 21%;
- (c) Staff training, farmer training, central workshops, technical assistance, special studies and research grants: 50% of total costs.

5.13 Disbursements against expenditures for the following items would be made against certified statements of expenditures: (a) staff salaries, operating costs, local training and plantation costs; (b) civil works contracts not exceeding Rs 300,000 and those carried out under force account; (c) locally procured vehicles, equipment and furniture costing Rs 150,000 or less, (d) research, studies and local consultant costs. The documentation for these expenditures would not be submitted to IDA for review but would be retained by state governments and GOI. These documents would be available for inspection by IDA during project review missions. Certificates of expenditures would be audited at least once every year and a report submitted to IDA within nine months of the end of each fiscal year. Disbursements against all other items and excluding the above would be contingent upon full and satisfactory documentation. All disbursement applications would be submitted to IDA through the Department of Economic Affairs (DEA) of GOI. Assurances covering the above were obtained during negotiations.

5.14 Similarly, USAID loan funds (US\$77 M) would be disbursed against plantation costs, fuelwood saving devices, and staff salaries upon receipt of certified statements of expenditure. As stated above, these would be forwarded by the cognizant project authority to the IBRD office in New Delhi. IDA would review each statement and effect disbursement from Washington of its share of the various line items as described in para 5.11. IDA would then forward a copy of the certified statement to USAID/New Delhi along with

a statement of the IDA funds disbursed against the statement. USAID would then initiate disbursement of its share as reflected in para 5.12.

5.15 USAID grant funds (US\$3 M) would be used to finance project "software" activities identified as line items for domestic staff training, international staff training, farmer training and extension, technical assistance, special studies and evaluation, research operations and grants to state agricultural universities. In those instances where these activities are undertaken directly by the implementation agencies themselves, grant funds would be disbursed upon receipt of certified statements of expenditure processed in the manner described above for loan funds. In those instances where the implementing agency contracts with or grants funds to a separate party such as a state agricultural university, non-governmental organization or independent research groups to provide services, USAID would disburse against certified statements of expenditure, providing the original contracts or grant agreements were reviewed and approved by USAID prior to their execution. Finally, in certain instances it is expected that USAID may be asked by the implementing agencies to arrange for the provision of certain services on their behalf. In these cases direct financing, most likely through direct USAID contracts, would be in order. International staff training is the best example of this situation, although it may also arise in the provision of Indian or expatriate technical assistance or in making certain domestic staff training, special studies, evaluation and research arrangements. IDA and USAID will continually consult on the most effective means of sharing the cost of such activities. It may be, for example, that in some instances, IDA may fully finance an individual activity and in others USAID would bear all costs. Ultimately, however, it is expected that cost of all such "software" activities would be equally shared by IDA and USAID as reflected in Annex 5 on disbursements.

#### E. Accounts and Audit

5.16 Assurances were obtained that separate accounts would be kept of expenditures made under the project, the principal format having been agreed with the Accountant General. In each state, the forest department, at headquarters and throughout its field offices, would maintain separate project accounts in a readily identifiable form under a separate budget head with subheads corresponding to disbursement categories specified in the staff appraisal report. For the purpose of control of expenditures, divisional accounts would be consolidated in the headquarters office while budgeted expenditures would be consolidated and rendered to the Accountant General of the state every month. The normal auditing procedures within the states would continue to apply. These consist of an internal audit on the basis of spot checks every six months and random annual checks including physical verification of inventory ledgers, external audits carried out annually by the Accountant General (Audit) GOI, and the forestry department's own annual

spot check of stores and equipment. All project accounts would be audited annually for each fiscal year, in accordance with sound auditing principles, consistently applied, and the audit reports, together with certified copies of project accounts, submitted to IDA and USAID within nine months after the end of the fiscal year. Such reports and audits would show, inter alia, that the funds withdrawn were used for the purpose intended, that goods have been received or work performed, and that payments have been made. All reports would be submitted by the states through the Special Secretary of Forests to the DEA, GOI, for onward transmission to IDA and USAID.

## VI. PRODUCTION, MARKETING, FINANCIAL RESULTS AND COST RECOVERY

### A. Production

6.01 The main output from both farm forestry (which accounts for about 77% of plantings in the proposed project) as well as plantations established on government and community lands would be fuelwood and poles. Other important products would be bamboo, small timber, fodder leaves and grasses, fruits and minor forest products. Most plantation designs include a mixture of fuelwood, fruit and fodder producing species, with local variations such as greater emphasis on bamboos in Gujarat and fodder in H.P.

6.02 In all cases, and as far as practicable, plantation designs stress quick-maturing and coppicing species which enable early harvesting, thinning and lopping to provide household fuelwood needs as well as allow for natural regeneration. The species have been chosen for their adaptability in social forestry situations and many are truly multi-purpose. The relative quantities by category of products could vary somewhat in reality; for instance, trees grown for pole production could be sold for fuelwood and vice versa, depending on farmer or market requirements. Production which is based on yields experienced to date, are shown below in Table 6.01.

**Table 6.01 ESTIMATED PRODUCTION AT FULL DEVELOPMENT <sup>a/</sup>**

		Uttar Pradesh	Gujarat	Rajasthan	Himachal Pradesh
Fuelwood	mt	740,000	3,900,000	491,000	-
-conifer	mt	-	-	-	26,200
-broadleaf	mt	-	-	-	2,700,000
Poles	no	14,800,000	22,000,000	6,700,000	-
Small timber	cu m	89,000	-	38,300	-
Bamboo	no	-	6,800,000	-	-
Grass	mt	67,000	82,000,000	8,110	180,000
Leaf fodder	mt	-	860,000	800	2,900,000
Dry fodder	mt	-	50,000	-	-
Stemwood	cu m	-	-	-	520,000
Edible flower	mt	8,000	-	-	-
Fruit (inc. Ber)	mt	5,600	13,350	12,000	-
Neem seeds	mt	-	2,250	-	-
Bidi leaves	mt	-	304	-	-
Seed pods	mt	-	-	59,000	-
Fallen wood/lops	mt	-	-	8,200	-
Oilseeds	mt	5,000	-	-	-
Cocoons (000 nos)		60,000	-	40,000	-
Other tree by products	mt	-	-	40,000	-

<sup>a/</sup> Full development years vary by products depending on gestation periods and rotation cycles. For the major products, it is Years 10-15 in Uttar Pradesh, Gujarat and Rajasthan and Years 26 and 50 in Himachal Pradesh.

#### B. Marketing of Produce

6.03 A considerable proportion of the farm forestry produce beyond the producers' own immediate requirements would be marketed in the form of sawlogs, poles or fuelwood. Other products like lop and top, fallen twigs, fodder leaves, grasses, fruits and minor forest products would be largely home-consumed or sold to the local market on an intermittent basis. It is expected that there would be no marketing constraint to the incremental production from the farm forestry component; the products would go to assuage a growing scarcity for fuelwood and fodder, indicated by 6% per year real price increases in recent years as well as by extensive wood pilferage and overgrazing on government and community lands in all the states covered by the project.

6.04 The produce from tree tenure schemes for the landless and poor would mainly go to beneficiary participants in these schemes. The products from planting on community wastelands would be distributed more broadly, with free collection of fallen wood and minor forest products by local villagers (including innovative features such as free headloads to harvest laborers employed by the Forest Department in Gujarat), and produce sharing between panchayats and forest departments, the latter for cost recovery purposes. In departmentally-managed plantations, forest departments would appropriate the bulk of the harvest; it is intended, however, actively to encourage participation in management by local communities (whether groups of farmers or panchayats) as soon as practicable, with the forest departments continuing to supervise and provide technical guidance.

6.05 Panchayats would generally sell their share of product by local auction (a fairly established process); however, forest extension officers would seek innovative arrangements for more direct distribution of part of the produce to local households, the poorer which are generally unlikely to be able to purchase their fuel and other wood needs. While promoting such direct distribution, however, there is a need to raise enough revenues from auctions to hold panchayat interest and recover departmental costs.

6.06 The same concerns hold for produce from departmental plantations. Forest departments generally auction their harvests at rural and urban depots, invariably supplying sawmillers, timber merchants, packing case industry and others who can afford to purchase their wood needs. Attempts to channel part of this produce to rural households include proposals for free collection of fallen wood, grasses and minor forest products by locals, as well as free headloads to laborers recruited for harvesting; allocation of up to 10% of harvest for free distribution to the local needy; and sales of part of the harvest at concessional rates of 20-80% of market price. These proposals have been put forward mainly in Gujarat, with variations in the other states.

6.07 Given the shortage of forest products and fuelwood in India and the multi-product nature of most trees, market saturation is not expected to be a problem. In isolated instances, a glut of poles may be realized but these could always be converted to small timber or fuelwood. Where earlier plantings are reaching maturity, modest marketing assistance for small growers is provided (as in Gujarat) and market information functions are incorporated in the extension services.

6.08 The distribution modes showing the proportions of the benefits from production to be shared by individual farmers, local poor households, village panchayats and forest departments for each plantation model in each of the four states are presented in Project Files C1-C4. Other distribution modes that could be tested in the course of the project include sale at concessional prices or on a 'ration basis' to enable easy access to wood products

by both rural and urban poor households. The forest departments in each state will, as emphasized during appraisal, review different mechanisms for produce distribution and exchange experiences with other states in order to develop improved but practical measures.

6.09 The wood balance situation in each of the four states is generally not well known. Inventory figures are non-existent, and consequently little is known about growth. Removal estimates are reasonable for legal harvests, but either illegal removal or farm forests contribute far more than expected. The current situation strongly suggests, however, that there are dramatic imbalances in each state although there is little basis for either projecting future balances or planning efficient long-term programs for closing the gap between growth and renewals in critical commodities like fuelwood. For these reasons, the Bank requires that states with social forestry projects develop a reasonable information base to estimate wood balances by fuelwood and roundwood, to project consumption levels vis-a-vis alternative energy resources, and to predict future supply responses. Assurances were obtained from all states that they would continue to revise and update these studies at least biannually.

### C. Financial Results and Cost Recovery

6.10 The cash flows for plantation models (taken over a 30 year period) also show the analyses of financial rates of return to the model and to forest departments, and cost recovery to the departments. The detailed tables are in Project File C6, and the results are summarized in Table 6.02.

6.11 Costs and returns have been calculated in 1985 financial prices. Farmers' labor inputs and products accruing to rural households have been valued at imputed prices equal to financial wages and prices. This implicitly assumes that the farmer has the option to use his labor or the plantation products at home or offer them for sale at market rates. The analysis shows healthy financial rates of return for most models, mostly in the 11-35% range except for strip plantations on government wastelands in Gujarat and Rajasthan (4-8%). These lower rates of return are the result of high investment costs (mainly borne by forest departments) and the exemption of part of the plantations from harvest (for aesthetic, shade and demonstration purposes).

6.12 Financial rates of return to the forest departments for the various plantation models are substantially lower than the returns on the models themselves (see columns 1 and 2 of Table 6.02). Despite these low FRRs, investments are justified considering the economic benefits and other unquantified benefits (para 7.10). In about half of the cases, the FRR for forest department undertakings is zero or negative. The departments in Rajasthan and Himachal Pradesh do not intend to recover costs in six of their models

(see column 7 of Table 5.02). In the remaining models, forest departments generally recoup from 100 to 200% of their initial cost outlays in nominal terms. These figures reflect undiscounted costs and returns in 1985 prices, whereas actual net present values at 12% discount rate are generally negative, indicating a measure of Government subsidy over time (see Column 8 of Table 6.02).

6.13 The particular mix of plantation models proposed in each state as indicated by plantation targets (Column 9, Table 6.02) reflects a number of objectives of this Project. Among these concerns are (i) the emphasis on the development and financing of lower cost models (such as farm forestry), (ii) relative financial rates of return (such as fewer strip plantations and more planting on wastelands); (iii) emphasis on more direct distribution of benefits to individual beneficiaries and panchayats (as in private wasteland plantings by small and marginal farmers and community woodlots); as well as (iv) cases where forest departments would be able to recover the direct cost of field investments at least in nominal terms.

**Table 6.02: FINANCIAL RATES OF RETURN AND COST RECOVERY**  
(per ha basis)

State/Model /a	FRR of Model %	FRR of FD %	% of Benefits to			Total Cost to FD in nominal terms (over 30 yrs) Rs/ha	Returns to FD as % of Cost to FD	NPV to FD (at 12% Discount Rate)	Plantation Targets ha
			Villagers	Panchayat	Forest Dept.				
Column	1	2	3	4	5	6	7	8	9
<b>UTTAR PRADESH</b>									
A. Farm Forestry x	58.0	-	100 x	-	-	-	-	-	201 mill seedlings (134,000 ha equiv)
<b>B. <u>Tree Tenure for Poor and Landless</u> (Beneficiary Managed)</b>									
1A. Roadside Strip Plantation	10.9	0.5	76	-	24	18,941	112	-14,254	900
1B. Railside Strip Plantation	10.0	-2.5	85	-	15	19,387	71	-17,699	310
2. Group Farm Forestry (Unirrigated block plantations)	23.1	2.4	84	-	16	8,804	186	-6,930	11,000
3. Irrigated Blocks (Arjun)	36.3	negative	100	-	-	15,600	0	-13,036	1,000
<b>C. <u>Plantings on Community Wastelands</u> (Joint Dept.-Panchayat Managed)</b>									
1. Community Woodlots, Rainfed	19.2	2.3	64	18	18	8,804	186	-6,930	14,000
<b>D. <u>Plantings on Government Wastelands</u> (Dept.-Managed)</b>									
2A. Roadside Strip Plantations	10.9	3.4	52	-	48	23,941	178	-12,033	600
2B. Railside Strip Plantations	10.0	0.6	70	-	30	24,387	114	-16,801	140
<b>GUJARAT</b>									
<b>A. <u>Agroforestry</u></b>									
1. Farm Forestry x	31.6	- x	100	-	-	-	-	-	300 mill seedlings (200,000 ha equiv)
2. Private Wasteland Planting by Small and Marginal Farmers	25.9	negative	100	-	-	2,583	0	-2,131	30,500
<b>C. <u>Plantings on Community Wastelands</u></b>									
1. Community Woodlots, Rainfed	20.1	8.8	35	33	32	5,723	301	-1,349	20,000
2. Community Woodlots, Irrigated	34.8	11.8	6	44	49	112,287	145	2,822	5,000
3. Community Tree Fodder Lots	12.5	8.3	18	41	41	3,767	430	-1,069	10,000
<b>D. <u>Plantings on Government Wastelands</u></b>									
1. Rehabilitation of Degraded Areas	15.7	14.3	11	-	89	6,215	590	1,305	30,400
2. Strip Plantations	5.9	-1.0	24	38	38	21,818	85	-11,604	15,000
3. Urban Fuelwood Plantations	17.4	13.0	14	-	86	112,287	157	5,149	2,500

**Table 6.02: FINANCIAL RATES OF RETURN AND COST RECOVERY (cont)**  
(per ha basis)

State/Model /a	FRR of Model %	FRR of FD %	% of Benefits to			Total Cost to FD in nominal terms (over 30 yrs) Rs/ha	Returns to FD as % of Cost to FD	NPV to FD (at 12% Discount Rate)	Plantation Targets ha
			Villagers %	Panchayat %	Forest Dept. %				
Column	1	2	3	4	5	6	7	8	9
<b>RAJASTHAN</b>									
<b>A. Agroforestry</b>									
1. Farm Forestry	23.5	-	100	-	-	-	-	-	120 mill seedlings (80,000 ha equiv)
x									
3. Improved (Grafted Bar) Orchards	99.4	negative	100	-	-	125	0	-112	400,000 plants (4,000 ha equiv)
x									
<b>B. Tree Tenure for Poor and Landless</b>									
2. Household Farm Forestry									
- per ha basis )	18.7	negative	100	-	-	2,276	0	-2,071	7,500
- per participant basis )	15.0	negative	100	-	-	5,690	0	-4,181	
<b>C. Planting on Community Wastelands</b>									
1. Community Woodlots	12.8	negative	27	73	-	4,807	0	-4228	5,000
<b>D. Planting on Government Wastelands</b>									
1. Rehabilitation of Degraded Forests	31.4	5.9	17	-	83	3,068	217	-957	20,000
2A Roadside Strip Plantations	6.3	0.8	12	33	55	32,125	109	-11,949	2,500
2B Railside Strip Plantations	3.7	-8.2	23	49	27	28,220	42	-11,387	1,000
2C Canal-side Strip Plantations	7.7	4.4	9	19	72	32,125	159	-9,007	300
2D Flood Control and Tank Embankments	23.1	7.5	30	35	35	7,659	196	-969	500
<b>HIMACHAL PRADESH</b>									
<b>A. Agroforestry</b>									
1. Farm Forestry	33.8	-	100%	-	-	-	-	-	53,000 ha equiv
x									
2. Private Wasteland Plantation Group Farm Forestry	38.9	negative	100%	-	-	2,824	0	-2,483	13,000
<b>B. Tree Tenure</b>									
2. Group Farm Forestry Government Lands	35.3	1.2	96	-	4	4,225	143	-3,548	1,180 ha equiv
<b>C. Community Wastelands</b>									
1. Woodlots Self Help (Panchayat Managed)	35.3	1.2	1	95	4	4,225	70	-3,548	1,000
2. Woodlots (Dept.-Managed)	35.3	1.2	72	-	28	4,225	933	-1,124	40,000
<b>D. Government Wasteland</b>									
1. Rehabilitation of Degraded Areas	22.4	13.6	26	-	74	5,125	1,219	1,216	5,000

/a For complete schematic presentation of models, see Table 4.02, page 20.

## VII. BENEFITS AND RISKS

### A. Benefits

7.01 Social forestry represents an ideal project in many ways for dealing with poverty in rural areas, as well as for dealing with energy scarcity at household levels and avoiding further degradation of land. The most direct beneficiaries under the proposed project would be farmers planting trees on their own lands. Through species selection, wide dispersion of nurseries, seedling distribution methods and extension efforts, more small farmers would be involved than has been initially experienced with social forestry projects. Under the proposed project about 6 to 8 M farmers, mainly small and marginal (under four ha), are expected to participate in NSFP in the four states. Other beneficiaries would be the rural and semi-urban population in these states who depend heavily on such forest produce as firewood, small timber and poles for their everyday needs. The rural poor, including landless laborers, small and marginal farmers, members of tribal groups and other disadvantaged communities would be particularly benefitted by the additional output generated by the project and by part of the output from plantations on public land that would be distributed to them for their labor or at low prices. Indirect benefits would flow to the population as a whole from the improvement in wood balances and energy supplies in these states, as well as from environmental enhancement.

### Institutional Development

7.02 The institutional development, which is the core of NSFP, would represent the most important long-term benefit of the project, for it would help to enable and to sustain increased economic and environmental development not only in the states directly benefitting but also, by establishing the central Social Forestry Support Office, in all states and territories of India. Both at the state level and at the center, greater coordination of various schemes which support social forestry would make more efficient use of the resources invested in them. With the substantial increase in social forestry which is called for under the Prime Minister's new Ten Point Program and the Seventh Five Year Plan, such institutional strengthening is of utmost importance.

7.03 In the states, the forest departments would be reorganized to give more emphasis to social forestry activities and social forestry. Forest department planning, training, extension and monitoring and evaluation capabilities would be strengthened. Efforts would be made to involve local communities in the planning and management of village woodlots and other community forestry schemes. This would also involve strengthening the linkages between social forestry and agricultural extension, as well as other closely related rural development activities. The small nurseries which

would be promoted by the project, beyond benefitting their operators with an additional source of funds, could in time be taken over by them, ultimately leading to development of a network of privately operated nurseries.

#### Production Impact

7.04 The incentive for small farmers under farm forestry is substantial since they would retain all of the revenues from any of the produce sold. Less obvious would be the impact on production from more equitable arrangements for distribution of the product under other social forestry schemes. Much of the reason why wood flow imbalances and forest degradation occurs is that most people do not have a vested interest in harvesting at sustainable rates and investing to increase future sustainable rates on community or government lands. This is the difficulty of common property and common-access property rights that exist on much of the legal forest, revenue lands and marginal cultivated lands used in social forestry. By sharing in the benefits the poor have a greater vested interest in making social forestry work.

7.05 The project would promote improved production methods and cost reduction in seedling production and distribution and in management of plantations, including protection. Research efforts supported by the project would also be directed to cost reduction.

7.06 The project would also help to improve flexibility in production. Given the relatively short growing period required before harvesting many of these plantations (five to eight years), through improved planning, including wood balance and other marketing studies, production could be directed to meet expected priority needs, taking into account social objectives and financial return.

#### Conservation

7.07 The project would have positive enviornmental impact. The imbalance between timber growth and removals is causing rapid depletion of timber inventories and degradation of soil and water resources, coupled with a disproportionate negative impact on the rural poor. Pressures on existing forest land have mounted in recent years, and will continue to do so if fuelwood shortages are allowed to become even more acute. The project would help to ease these pressures, while at the same time restoring trees to many areas now degraded and subject to erosion. As indicated above, by greater involving of the rural poor and rural communities in social forestry and giving them a stronger interest to invest in increases in future sustainable harvesting rates, it may be possible to improve the wood flow imbalance and reverse forest degradation.

### Employment Generation

7.08 Project-financed plantations would generate about 100 M laborer-days of work on establishment and maintenance, usually extending over a six year period for each plantation area started during the five years of the project. These activities provide a major source of employment for landless people, especially women. Direct incremental employment in the forest departments would be relatively small under the four state projects: about 10,000 new jobs created in social forestry operations, including 5,156 key positions (mainly field staff, see Table 3.03). Incremental employment has been kept to a minimum in the interest of not burdening state budgets and sustainability after the project period. The 4,300 small nurseries would provide employment for approximately 9,000 farmers and others operating them, not counting occasional nursery labor.

### B. Economic Analysis

7.09 The economic rate of return on the Project is 27% and for each of the four States the rates are as follows: Uttar Pradesh 25%, Gujarat 26%, Rajasthan 17%, and Himachal Pradesh 34%. For details see Table 7.01 and Annex 6. These Base Case results have been computed on the following basis:

- (i) All costs taken are base costs, including physical contingencies;
- (ii) investment costs are taken over project period (Years 1-6) including pre-project year (Year 0), and without replacements;
- (iii) 100% of staff costs for project period and 100% of extension staff costs for Year 7-15 have been taken; this provides for forest departments' supervision and extension for individual schemes for at least ten years with eventual handing over to local beneficiaries or panchayats;
- (iv) 100% of other recurrent project costs for the project period and 100% of costs of extension components only in Years 7-15 for the reasons indicated in (iii) above; and
- (v) plantation recurrent costs are taken through Year 31.

7.10 The rates calculated underestimate the real returns by not including other important external benefits of the project, amongst others:

- (i) demonstration effect of highly visible plantings on private, community and government wastelands and peripheries of houselots and fields, which have made important contributions to greater

community and political awareness and uptake of the social forestry program;

- (ii) tangible benefits from replacement of tree cover, arrest of soil erosion and land degradation and consequences for improved soil productivity over the medium and long-term;
- (iii) improved socio-ecological environment including aesthetic, shade, improved health and other effects from trees, smokeless stoves, etc.;
- (iv) improved efficiency in project implementation arising from and learning effects from project monitoring and evaluation, cost effective plantation protection measures, nursery layout and propagation techniques, research trials, and exchange of experiences between states which would be actively fostered by the Central support office;
- (v) increase in productivity that could be attributed to time savings by the local communities, particularly women, resulting from vastly improved access to nearby woodlots and other planted sites for their fuel and fodder collection needs;
- (vi) time savings resulting from the use of improved stoves, crematoria, and pressure cookers; and
- (vii) increase in agricultural productivity as a result of returning animal dung and agricultural wastes to the fields, in cases where they would otherwise be collected to meet fuel needs.

7.11 In the calculation of economic costs and benefits, all values are in 1985 constant prices at exchange rate of Rs 12 = US\$1. The economic analysis has been made in border rupees, using a standard conversion factor of 0.8 and specific conversion factors which are described in Project File C6, Item 3. Due to seasonal unemployment and under employment, wage rates vary, for example, in Gujarat from highs of about Rs 13 in seasons of peak agricultural demand to lows of Rs 8 in other periods. It is estimated that 25% of social forestry activities take place in the season of high wages, giving a weighted shadow wage rate for unskilled labor which comes to about 70% of the financial wages which have been prescribed under the Minimum Wages Act in each of the states. Traded goods and services have been valued on the basis of their financial c.i.f. import prices, adjusted by tax rates, foreign exchange component and local material and labor inputs. The opportunity cost of land is taken to approximate zero in the economic rate of return calculations as the social forestry plantings are either on very poor, highly overgrazed and marginal lands with virtually no displacement of agricultural crops, or on

peripheries with no shade or deleterious effects on field crops. Departmental plantings are on wastelands and no land value has been imputed. A summary of economic and financial prices used are shown in Annex 7.

C. Sensitivity Analysis

7.12 As summarized in the Table 7.01 below, the economic rate of return shows little sensitivity to changes in most variables. Total benefits would have to decrease by 67% for the rate of return of the project to fall below the opportunity cost of capital at 12%; alternatively, total project cost would have to increase by 201%. Under the unfavorable circumstances of both a reduction in benefits by 20% and an increase of costs by 20% (or a lag in the benefit stream by one year), the economic rate of return for the project would still be 21% and in every state it would equal or exceed the opportunity cost of capital.

Table 7.01: ECONOMIC RATES OF RETURN AND SENSITIVITY ANALYSES 1/  
(Percentage)

	<u>Economic Rate of Return</u>				
	Gujarat	Himachal Pradesh	Rajasthan	Uttar Pradesh	NSFP
Base Case	26	34	17	25	27
Total Benefits down 20%	22	31	14	21	23
lagged 1 yr.	22	30	15	21	24
Total Costs up 20%	23	32	14	22	24
Total Costs up 20% and benefits down 20%	19	28	12	18	21
	<u>Switching Values</u>				
Total benefits	-59	-87	-42	-56	-67
Total Project Costs	144	647	71	127	201

a/ Opportunity cost of capital = 12%.

#### D. Project Risks

7.13 The project faces no major risks that might endanger its overall viability during the five-year implementation period. The forest departments have sufficient capacity and experience to implement the departmental plantation schemes and sufficient funds have been earmarked in the state budgets to cover these projects. Shortage of funds could become a problem, however, should the state over-extend itself on forestry or other programs. In farm forestry, the levels of seedling distribution under the state subprojects should be easily attainable even with the limitations on free seedling distribution called for under the project. While farmer acceptance of higher levels of seedling distribution is unlikely to be a problem, and wastage and survival rates should be within reasonable limits, risks of such losses would be increased if other seedling distribution programs in these states under various centrally sponsored and donor schemes should create an over-supply of planting stock or over-extend the staff and other resources available. Therefore, the participating states gave assurances during negotiations that they would inform the Association about any major developments concerning social forestry programs carried out by their forest departments, in order to enable the Association to evaluate the impact, if any, these developments might have on project-financed activities.

7.14 The extension staff employed by the forest departments under NSFP have been kept to a minimum by supplementing field contacts with farmers through the agricultural extension services, which would give advice on proper tree planting and maintenance techniques. This approach necessarily involves certain risks since it depends on effective coordination and cooperation between the forest department and the agricultural department. To minimize the risks, the two services in each state have undertaken to exchange memoranda of understanding or issue government orders outlining how this cooperation would be effected and the responsibilities of each. Where improved professional extension service promoted by the Bank is just being established—in Himachal Pradesh and Uttar Pradesh—this necessarily involves more uncertainty than in the other states where T&V agricultural extension services are well established and arrangements are already underway for the forestry departments to work through agricultural extension in their farm forestry programs.

7.15 Since it is expected that farmers under the project would plant a large proportion of trees for sale as poles, timber or other products of higher value than firewood, there is also a theoretical risk of market saturation. Given the apparent shortages of wood products this risk is considered remote. The wood supply and demand studies to be carried out under the project would help to provide the data needed to effectively monitor the situation. Wood balance studies to develop a basis for estimating consumption and planning future supplies are needed if social forestry is

to become a sustainable social and economic basis for continued rural development and alleviation of rural poverty.

7.16 The five-year implementation period of NSFP will not assure that all the institutional changes are made which would put social forestry on a socially and economically sustainable basis after the current period of major donor funding. Social forestry represents a means of creating assets and giving ownership and control of those assets to rural poor people. Tree and fodder tenurial rights and the assignment of those rights to poor people is a difficult problem which cannot be dealt with in a short period of time in a large democratic society. NSFP would make a major contribution towards changing the nature of tenures on various products of public and common land.

#### VIII. AGREEMENTS REACHED AND RECOMMENDATIONS

8.01 During negotiations, assurances were obtained from GOI and from the states involved on the following:

- (a) The project states would by March 31, 1988 carry out studies of the organizational issues in their forest departments, which would include, inter alia, the relationship of various social forestry schemes (para 2.22);
- (b) The project states would review current arrangements concerning procedures for selecting participants for private wasteland planting schemes, tree tenure schemes, community managed woodlots and tree fodder plantations, the rights and responsibilities of these participants and the procedures for advising them of their rights and responsibilities; where Government orders and instructions, including proforma agreements, are not comprehensive, the states would take appropriate remedial action by December 31, 1985 (para 3.05);
- (c) The project states would undertake socio-economic studies to ascertain farmer response to charging for seedlings, as a basis for determining a program of action for implementing the principle of full cost recovery; the results of these studies would be discussed with the Association at the time of the mid-term review (para 3.16), and thereafter they would start implementing their programs; until such programs are undertaken, for the project, each state would gradually reduce free distribution of project seedlings in accordance with a schedule agreed with IDA and seedlings above the free limit would be charged for at rates, also agreed with IDA, which would progressively be increased to cover the direct cost of production (para 3.10);

- (d) Each state would undertake a joint review of the project with GOI, IDA and USAID promptly after the third year's planting program, and not later than March 31, 1988 (para 3.16);
- (e) Each state would revise policies governing provision of vehicles and travel allowances, as needed, to ensure requisite mobility for field staff (para 3.17);
- (f) By December 31, 1985, both Himachal Pradesh and Uttar Pradesh would make arrangements to ensure that their Departments of Forest and Department of Agricultural Extension Services cooperate to provide social forestry extension services to farmers (para 3.18);
- (g) By December 31, 1985, Rajasthan would sanction the position of Conservator for Planning, Monitoring and Evaluation, and Uttar Pradesh would sanction the positions of Additional Chief Conservator of Forests and a Conservator of Forests for Planning; (para 3.23);
- (h) By April 30, 1986 GOI would furnish to the Association the proposed structure of the central forestry organization (para 3.30);
- (i) By April 30, 1985 GOI would sanction and by October 31, 1986 fill the position of the head of the Central Social Forestry Support Office and thereafter maintain that position and those of the Chief Project Economist and the Deputy IGF/Monitoring and Evaluation (para 3.31);
- (j) The Government of Himachal Pradesh would maintain a single line of command from the circle Conservator down for field staff, and a steering committee headed by the Forestry Secretary would meet at least quarterly to discuss and assign work priorities (para 4.05);
- (k) Each state would undertake monitoring and evaluation of its project in accordance with the Guidelines agreed by GOI and the Bank and would forward summary results to IDA and USAID at least once a year (para 4.07);
- (l) In order to ensure the coordination of forestry activities among all state agencies, the project states would maintain coordination committees for social forestry activities (4.09);
- (m) Each state would prepare and submit semi-annual progress reports, and the Social Forestry Support Office would prepare a project completion report (para 4.10);
- (n) The participating states and GOI would implement procurement procedures satisfactory to IDA (para 5.08);

- (o) Each state would prepare and present to GOI for transmission to IDA and USAID administrative and financial data regarding progress of the project, including procurement of goods and services, civil works, expenditures, audits and requests for disbursement in accordance with the schedules agreed (paras 5.13 and 5.16);
- (p) Each state would continue to revise and update its wood balance study at least biannually (para 6.09); and
- (q) The project states would inform the Association about any major developments concerning social forestry programs carried out by their forest departments, in order to enable the Association to evaluate the impact, if any, these developments might have on project-financed activities (para 7.13).

8.02 To encourage the prompt implementation of the project and to recognize the early initiatives taken by GOI and the state governments to implement the project, it is recommended that retroactive financing by IDA up to a total of US\$14.5 M be made available for expenditures incurred after October 1, 1984 (para 5.04).

8.03 With the above assurances, the proposed project would be suitable for a credit of SDRs 166.1 M (US\$165.0 M) to GOI on standard IDA terms.

INDIA

SOCIAL FORESTRY PROGRAM DURING SIXTH FIVE YEAR PLAN (1980-85)

A. PHYSICAL ACHIEVEMENTS 1/

	----- Centrally Sponsored Schemes -----				----- Donor-Assisted Schemes -----				State	Total 2/		
	Rural Fuel Wood Program (RFP-Min. Ag.)	Drought Prone Areas Program (DPAP-Min RD) 3/	Small & Margi- nal Farmers (SMFP-Min Ag)	Natl Rural Employment Program NREP-MinRd 4/	Other Integrated Rural Dev't. (Min-Rd)	World Bank	USAID	SIDA	CIDA	(Estimated) State Schemes 5/	Non- Plan	TOTAL
Andhra Pradesh	23,387	43,580	52,820	19,365	*	-	-	-	55,285	93,000	*	287,437
Assam	14,874	-	21,440	763	*	-	-	-	-	10,000	*	47,077
Bihar	25,335	24,648	93,920	22,864	*	-	-	-	-	56,000	*	222,767
Gujarat	13,891	14,092	34,880	15,776	*	274,280	-	-	-	105,000	*	457,919
Haryana	14,169	10,654	14,880	10,544	*	28,972	-	-	-	57,000	*	136,219
Himachal Pradesh	12,120	-	11,040	2,702	*	-	-	-	-	33,000	*	58,862
Jammu & Kashmir	1,000	102	12,000	2,207	*	16,887	-	-	-	23,000	*	55,196
Karnataka	17,272	14,823	28,000	49,083	*	49,669	-	-	-	53,000	*	211,847
Kerala	10,746	-	24,160	3,751	*	5,905	-	-	-	13,000	*	57,562
Madhya Pradesh	29,103	21,373	73,280	25,830	*	-	19,819	-	-	181,000	*	349,405
Maharashtra	6,019	28,836	47,630	4,751	*	-	18,333	-	-	135,000	*	240,569
Manipur	22,750	-	4,160	810	*	-	-	-	-	14,000	*	41,720
Meghalaya	33,910	-	3,840	453	*	-	-	-	-	5,000	*	43,203
Mizoram	7,719	-	3,360	-	*	-	-	-	-	10,000	*	21,079
Orissa	19,339	26,840	50,240	84,511	*	-	-	5,653	-	70,000	*	256,583
Punjab	12,006	-	18,880	5,577	*	-	-	-	-	15,000	*	51,463
Rajasthan	26,700	78,010	37,760	30,615	*	-	-	-	-	50,000	*	223,085
Sikkim	1,460	-	640	180	*	-	-	-	-	5,000	*	7,280
Tamil Nadu	26,820	19,492	60,480	15,563	*	-	-	52,288	-	132,000	*	306,643
Tripura	5,430	-	2,720	22,808	*	-	-	-	-	4,000	*	34,958
Uttar Pradesh	19,067	20,350	141,920	40,604	*	95,071	-	-	-	145,000	*	462,012
West Bengal	7,215	31,091	53,600	7,426	*	62,351	-	-	-	68,000	*	229,683
(UTs)	19,976	-	16,160	-	*	-	-	-	-	23,000	*	59,136
<b>TOTAL 2/</b>	<b>370,308</b>	<b>333,891</b>	<b>807,810</b>	<b>366,183</b>	<b>*</b>	<b>533,135</b>	<b>37,152</b>	<b>57,941</b>	<b>55,285</b>	<b>1,300,000</b>	<b>*</b>	<b>3,861,705</b>

- 1/ Data trees planted under farm forestry were converted to hectares by dividing number planted by 1500.  
 2/ Since "Other Integrated Rural Development" and "Non-Plan" figures were not available, Totals do not reflect full extent of social forestry; also see footnote 3/ below.  
 3/ DPAP: figures up to 1983/84.  
 4/ NREP: figures from 1980-84, and up to June 1984.  
 5/ These are Plan figures, and GOI suggests that actual achievements may be much higher.

INDIA

SOCIAL FORESTRY PROGRAM DURING SIXTH FIVE YEAR PLAN (1980-85)

B. FINANCIAL POSITION 1/  
(Rs. M)

	----- Centrally Sponsored Schemes -----					---- Donor-Assisted Schemes ----				State	Total 2/	
	Rural Fuel Wood Program (RFP-Min. Ag.)	Drought Prone Areas Program (DPAP-Min RD) 3/	Small & Margi- nal Farmers (SMFP-Min Ag)	Natl Rural Employment Program NREP-MinRd 4/	Other Integrated Rural Dev't. (Min-Rd)	World Bank	USAID	SIDA	CIDA	(Estimated) State Schemes 5/	Non- Plan	TOTAL
Andhra Pradesh	63.673	40.545	16.350	*	*	-	-	-	56.508	50.0	*	227.076
Assam	44.667	-	6.7	*	*	-	-	-	-	15.0	*	66.367
Bihar	68.07	35.486	29.35	*	*	-	-	-	-	52.7	*	185.606
Gujarat	57.136	35.684	10.9	*	*	671.383	-	-	-	652.3	*	1,427.403
Haryana	49.9	27.3	4.5	*	*	114.62	-	-	-	92.9	*	289.22
Himachal Pradesh	45.1	-	3.45	*	*	-	-	-	-	75.0	*	123.55
Jammu & Kashmir	5.0	4.09	2.876	*	*	76.686	-	-	-	65.0	*	153.652
Karnataka	67.878	52.151	8.75	*	*	117.78	-	-	-	100.0	*	346.559
Kerala	38.425	-	7.375	*	*	88.75	-	-	-	19.8	*	154.35
Madhya Pradesh	177.017	76.322	22.95	*	*	-	217.287	-	-	235.5	*	729.076
Maharashtra	28.792	50.546	14.8	*	*	-	167.28	-	-	337.5	*	598.918
Manipur	99.223	-	1.3	*	*	-	-	-	-	19.3	*	119.823
Meghalaya	16.388	-	.75	*	*	-	-	-	-	13.0	*	30.138
Nagaland	275.39	-	1.05	*	*	-	-	-	-	6.5	*	282.94
Orissa	48.306	27.065	15.7	*	*	-	-	18.468	-	50.0	*	159.539
Punjab	39.372	-	5.9	*	*	-	-	-	-	53.5	*	98.772
Rajasthan	75.843	33.625	11.8	*	*	-	-	-	-	117.8	*	239.068
Sikkim	6.89	-	.2	*	*	-	-	-	-	15.0	*	22.09
Tamil Nadu	61.75	27.879	14.875	*	*	-	-	292.988	-	420.0	*	817.492
Tripura	9.457	-	.85	*	*	-	-	-	-	10.0	*	20.307
Uttar Pradesh	57.457	45.524	44.075	*	*	528.374	-	-	-	487.5	*	1,162.95
West Bengal	18.891	64.992	16.75	*	*	162.71	-	-	-	93.8	*	357.143
(UTs)	36.725	-	10.05	*	*	-	-	-	-	36.7	*	83.475
<b>TOTAL 2/</b>	<b>1,391.35</b>	<b>521.209</b>	<b>251.301</b>	<b>*</b>	<b>*</b>	<b>1,760.323</b>	<b>384.567</b>	<b>311.456</b>	<b>56.508</b>	<b>3,018.8</b>	<b>*</b>	<b>7,695.514</b>

1/ Since final figures were not yet available by compilation of this table, the figures include an estimate of expenditures in last 6 months.

2/ Since "Other Integrated Rural Development" and "Non-Plan" figures were not available, Totals do not reflect full extent of social forestry; also see footnote 3/ below.

3/ DPAP: figures up to 1983/84.

4/ NREP: Figures from 1980-84, and up to June 1984.

5/ These are Plan figures, and GOI suggests that actual achievements may be much higher.

INDIA

NATIONAL SOCIAL FORESTRY PROJECT

Comparative Figures on Social Forestry Projects

	Uttar Pradesh	Gujarat	West Bengal	J & K	Haryana	Karnataka	Kerala	NSFP
<b>A. <u>Plantation Type</u> (% Distribution)</b>								
Farm Forestry	8%	10%	56%	43%	45%	80%	81%	77%
Block/Degraded Forests	26%	26%	16%	39%	-	13%	14%	5.5%
Strip Plantations	51%	32%	22%	2.2%	14%	4%	2%	2%
Village Woodlots	6%	31%	6%	11.3%	18%	-	-	12.5%
Other	9%	1%	-	4.5%	23%	3%	3%	2%
<b>B. <u>Costs</u> (% Total Base Cost)</b>								
Plantation & Nurseries	30.5%	60.8%	69.3%	60.2	62%	63.4%	56.0%	66%
Research	.8%	.7%	.1%	.1	.2%	.2%	.5%	1%
Training	2.9	1.5%	1.8%	4.5%	1.8%	1.7%	6.0%	4%
Organization and Management*	41.9	35.6%	28.4%	31.6%	34.1%	34.7%	37%	29%
Other	23.9	1.4%	.4%	3.6%	1.9%	-	1.5%	-
<b>Total Project Costs (100%)</b>	\$46.5 M	\$76.0 M	\$43.5 M	\$27.9 M	\$39.2 M	\$56.6 M	\$54.5 M	\$330 M

\* Includes all maintenance and evaluation, extension and planning activities.

INDIANATIONAL SOCIAL FORESTRY PROJECTSpecies Information(a) Fuel, Timber and Fodder Species

	<u>Uttar Pradesh</u>	<u>Rajasthan</u>	<u>Gujarat</u>	<u>Himachal Pradesh</u>
Acacia catechu (s)	-	-	X	x
A. nilotica/arabica (s)	x	x	x	x
A. tortilis (s)	-	x	x	-
A. auriculiformis	X	-	-	-
Alnus sp. (s)	-	-	-	X
Ailanthus excelsa	-	-	X	-
Albizzia leebck	X	X	X	X
Albizzia stipulata	-	-	-	x
Azadirachta indica	X	X	-	-
Bauhinia sp.	-	-	-	X
Casuarina equisetifolia	-	-	X	-
Cassia siamea	-	X	-	-
Ceiba pentandra (Semul)	-	-	-	X
Dalbergia Sissoo	x	x	x	x
Eucalyptus tereticornis (hibrid) <u>1/</u>	x	x	x	x
Grewia oppositifolia	-	-	-	X
Leucaena leucocephala (s)	X	X	X	-
Prosopis juliflora/Chilensis (s)	x	x	x	-
P. cineraria (s)	-	X	X	-
Quercus incana, Q. semicarpifolia, Q. dilatata <u>2/</u>	-	-	-	X
Tectona grandis	-	-	X	-
Bambusa spp.	-	X	X	X
Dendrocalmus strictus	X	X	X	-
Pinus roxburghii	-	-	-	x
Pinus wallichiana	-	-	-	-
Populus ciliata	-	-	-	X
Robinia pseudacacia	-	-	-	x
Shorea robusta	-	-	-	X
Terminalia belerica	X	-	-	X
Terminalia arjuna	X	-	-	-
Toona ciliata	-	-	-	X

x = Most commonly used species

s = Trees commonly direct sown

1/ Small quantities of other Eucalyptus may also be used.2/ In addition, of high altitudes in H.P., spruces, firs, deodar, birch, horse-chestnut, wanut, cherry, willow and maple may be used.

(b) Fruit Trees

	<u>Uttar</u> <u>Pradesh</u>	<u>Rajasthan</u>	<u>Gujarat</u>	<u>Himachal</u> <u>Pradesh</u>
Anacardium occidentale (cashew)	-	-	X	-
Annona squamosa	-	-	X	-
Artocarpus heterophyllus	X	-	-	-
Cordia trichotoma	-	X	X	-
Emblica officinalis	-	-	X	X
Feronia elephantum	-	-	X	-
Madhuca indica	-	-	X	-
Mangifera indica (mango)	X	X	X	x
Psidium guyava (guava)	-	-	X	X
Moringa oleifera	X	-	X	-
Morus alba. (mulberry)	-	-	X	X
Porgamia pinnata	X	-	-	-
Pithecolobium dulce	-	X	X	-
Sesbania sp.	X	X	X	-
Syzygium cuminii	-	-	X	-
Tamarindus indica (Tamarind)	X	X	X	-
Zizyphus mauritania (Ber)	x	X	x	x

INDIA  
NATIONAL SOCIAL FORESTRY PROJECT  
Project Components by Year  
(RUPEES '000)

	Base Costs					Total		
	0	1	2	3	4	5	RUPEES	(US\$ '000)
<b>A. GUJARAT</b>								
1. ORGANIZATION AND MANAGEMENT	-	19,375.8	18,496.4	19,484.4	19,585.4	16,714.6	93,656.7	7,804.7
2. PHYSICAL TARGETS	42,256.8	144,270.3	166,339.4	182,918.8	199,276.4	156,347.3	891,409.0	74,284.1
3. RESEARCH	-	1,023.2	854.2	758.5	673.6	671.1	3,980.7	331.7
4. EXTENSION	-	626.0	538.1	540.6	538.1	538.1	2,781.0	231.7
5. TRAINING	-	1,332.2	1,551.0	1,420.8	1,418.3	1,230.7	6,953.0	579.4
6. PLANNING	-	278.9	328.5	328.5	340.0	340.0	1,616.0	134.7
7. MONITORING AND EVALUATION	-	1,352.2	854.4	854.4	854.4	932.6	4,847.9	404.0
<b>Sub-Total GUJARAT</b>	<b>42,256.8</b>	<b>168,258.6</b>	<b>188,962.1</b>	<b>206,306.1</b>	<b>222,686.3</b>	<b>176,774.3</b>	<b>1,005,244.3</b>	<b>83,770.4</b>
<b>B. HIMACHAL PRADESH</b>								
1. ORGANIZATION AND MANAGEMENT	-	25,428.2	26,305.7	22,025.5	25,167.7	25,650.3	124,577.4	10,381.5
2. PHYSICAL TARGETS	17,389.0	43,743.6	51,479.8	59,560.4	67,028.8	44,942.1	284,143.7	23,678.6
3. RESEARCH	-	1,404.6	930.3	1,644.0	790.4	855.8	5,625.1	468.8
4. EXTENSION	-	899.4	916.9	626.3	1,314.0	616.7	4,373.2	364.4
5. TRAINING	-	1,621.0	3,270.0	2,434.9	2,357.5	2,303.7	11,987.1	998.9
6. MONITORING AND EVALUATION	-	3,722.3	2,755.0	4,964.6	2,416.7	2,458.1	16,316.7	1,359.7
<b>Sub-Total HIMACHAL PRADESH</b>	<b>17,389.0</b>	<b>76,819.1</b>	<b>85,657.7</b>	<b>91,255.7</b>	<b>99,075.0</b>	<b>76,826.7</b>	<b>447,023.2</b>	<b>37,251.9</b>
<b>C. RAJASTHAN</b>								
1. ORGANIZATION AND MANAGEMENT	-	16,722.2	14,242.2	12,721.0	12,716.3	14,670.3	71,071.9	5,922.7
2. PHYSICAL TARGETS	2,412.9	18,464.3	36,510.5	42,298.9	54,055.8	46,269.8	200,012.2	16,667.7
3. RESEARCH	-	626.1	391.1	439.7	392.9	392.9	2,242.7	186.9
4. EXTENSION	-	2,217.3	2,435.9	1,604.0	1,695.7	1,695.7	9,648.6	804.1
5. TRAINING	-	3,860.9	932.5	973.7	973.7	973.7	7,714.4	642.9
6. MONITORING AND EVALUATION	-	2,046.6	1,865.5	1,856.2	1,856.2	1,856.2	9,480.7	790.1
<b>Sub-Total RAJASTHAN</b>	<b>2,412.9</b>	<b>43,937.4</b>	<b>56,377.6</b>	<b>59,893.5</b>	<b>71,690.6</b>	<b>65,858.6</b>	<b>300,170.5</b>	<b>25,014.2</b>
<b>D. UTTAR PRADESH</b>								
1. ORGANIZATION AND MANAGEMENT	-	44,821.4	76,200.3	100,009.8	128,991.3	135,434.7	485,457.5	40,454.8
2. PHYSICAL TARGETS	55,125.3	86,352.7	110,188.0	120,661.6	123,428.2	94,091.6	589,847.5	49,154.0
3. RESEARCH	-	1,441.1	1,647.8	1,118.4	1,120.4	1,124.6	6,452.3	537.7
4. EXTENSION	-	3,067.9	7,265.1	11,507.1	17,179.2	18,977.3	57,996.6	4,833.1
5. TRAINING	-	14,624.2	32,010.6	29,294.0	7,933.6	7,806.7	91,669.1	7,639.1
6. PLANNING	-	437.1	948.6	651.8	651.8	651.8	3,341.2	278.4
7. MONITORING AND EVALUATION	-	1,627.7	1,144.5	1,144.5	1,196.6	1,196.6	6,309.8	525.8
<b>Sub-Total UTTAR PRADESH</b>	<b>55,125.3</b>	<b>152,372.2</b>	<b>229,404.8</b>	<b>264,387.1</b>	<b>280,501.2</b>	<b>259,283.3</b>	<b>1,241,073.9</b>	<b>103,422.8</b>
<b>E. CENTRAL SUPPORT OFFICE</b>								
	-	13,949.3	9,080.7	8,469.0	8,469.0	8,469.0	48,437.0	4,036.4
<b>Total BASELINE COSTS</b>	<b>117,184.1</b>	<b>455,336.6</b>	<b>569,482.9</b>	<b>630,311.4</b>	<b>682,422.1</b>	<b>587,211.9</b>	<b>3,041,948.9</b>	<b>253,495.7</b>
Physical Contingencies	5,859.2	21,426.5	27,138.1	29,318.4	29,877.8	24,089.7	137,709.7	11,475.8
Price Contingencies	-	20,010.6	77,658.9	149,190.7	235,362.0	271,266.0	753,488.2	62,790.7
<b>Total PROJECT COSTS</b>	<b>123,043.3</b>	<b>496,773.7</b>	<b>674,280.0</b>	<b>808,820.4</b>	<b>947,661.9</b>	<b>882,567.6</b>	<b>3,933,146.9</b>	<b>327,762.2</b>
Taxes	-	13,972.9	9,704.3	9,720.4	9,593.5	4,150.3	47,141.4	3,928.5
Foreign Exchange	1,194.8	14,670.7	15,532.8	16,427.5	16,846.2	12,342.5	77,034.4	6,419.5

INDIA  
NATIONAL SOCIAL FORESTRY PROJECT  
Project Components by Year

Totals Including Contingencies  
(RUPEES '000)

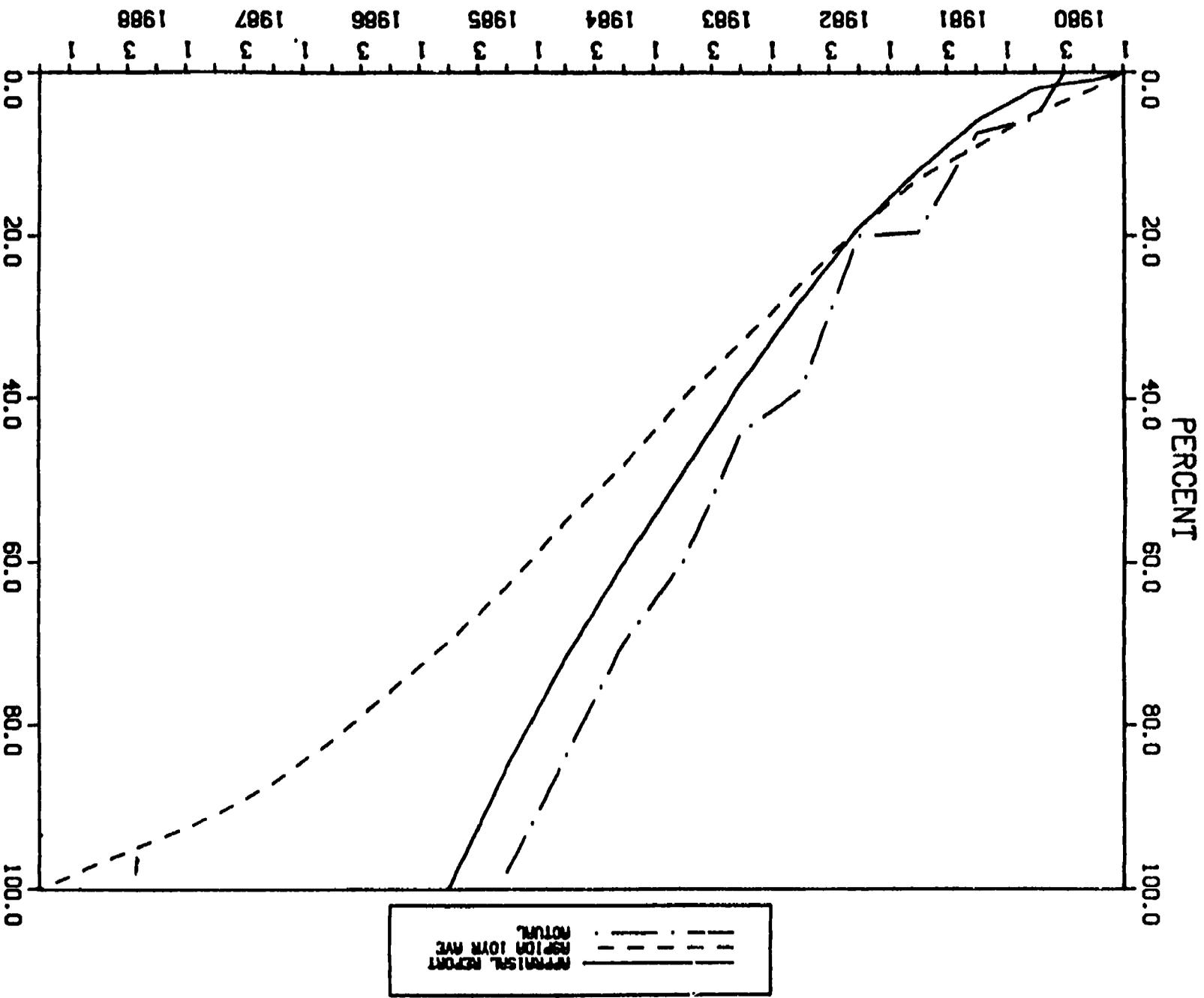
Totals Including Contingencies  
(US\$ '000)

	0	1	2	3	4	5	Total	0	1	2	3	4	5	Total
<b>A. GUJARAT</b>														
1. ORGANIZATION AND MANAGEMENT	-	21,147.3	21,854.5	24,904.6	27,140.6	24,872.8	119,935.8	-	1,742.3	1,820.9	2,075.4	2,261.7	2,074.4	9,994.6
2. PHYSICAL TARGETS	44,369.7	157,980.7	177,477.1	235,628.3	278,587.0	237,073.0	1,150,975.7	3,697.5	13,158.4	16,458.1	19,635.7	23,288.9	19,754.1	95,914.6
3. RESEARCH	-	1,118.0	1,012.0	973.4	935.7	1,011.4	5,059.5	-	93.2	84.3	81.1	78.0	84.3	420.9
4. EXTENSION	-	478.7	432.3	689.2	744.2	807.4	3,551.8	-	54.6	52.7	57.4	42.0	67.3	296.0
5. TRAINING	-	1,432.4	1,834.3	1,829.5	1,970.8	1,832.5	8,926.5	-	121.0	152.5	151.7	144.2	154.4	743.9
6. PLANNING	-	298.3	375.7	467.6	457.4	496.3	2,035.3	-	24.9	31.3	34.0	38.1	41.4	149.6
7. MONITORING AND EVALUATION	-	1,439.4	978.5	1,041.6	1,151.7	1,348.1	6,019.3	-	121.6	81.5	88.5	96.0	114.0	501.6
<b>Sub-Total GUJARAT</b>	<b>44,369.7</b>	<b>184,054.8</b>	<b>224,176.4</b>	<b>245,485.1</b>	<b>310,907.4</b>	<b>247,581.4</b>	<b>1,296,494.8</b>	<b>3,697.5</b>	<b>15,337.9</b>	<b>18,481.4</b>	<b>22,123.8</b>	<b>25,909.0</b>	<b>22,291.8</b>	<b>108,041.2</b>
<b>B. HIMACHAL PRADESH</b>														
1. ORGANIZATION AND MANAGEMENT	-	27,316.0	30,778.1	27,457.4	34,538.7	38,217.6	158,527.8	-	2,276.3	2,544.8	2,304.8	2,879.9	3,184.8	13,210.6
2. PHYSICAL TARGETS	18,258.5	47,876.4	41,122.6	76,723.2	93,611.0	48,144.5	345,805.8	1,521.5	3,989.7	5,093.5	6,393.6	7,806.6	5,678.9	30,483.8
3. RESEARCH	-	1,541.2	1,479.6	2,142.6	1,076.8	1,267.2	7,107.4	-	128.4	90.0	178.4	89.7	105.6	592.3
4. EXTENSION	-	976.8	1,043.3	781.6	1,841.0	994.5	5,565.2	-	81.4	88.6	45.1	153.4	75.4	443.9
5. TRAINING	-	1,740.8	3,084.3	3,092.4	3,245.7	3,438.3	15,423.5	-	144.7	323.9	257.7	270.5	286.5	1,285.3
6. MONITORING AND EVALUATION	-	4,042.6	3,167.2	4,421.6	3,256.7	3,596.2	20,484.3	-	336.9	263.9	535.1	271.4	299.7	1,707.0
<b>Sub-Total HIMACHAL PRADESH</b>	<b>18,258.5</b>	<b>83,513.8</b>	<b>101,097.1</b>	<b>114,818.8</b>	<b>137,657.7</b>	<b>115,570.3</b>	<b>572,916.1</b>	<b>1,521.5</b>	<b>4,939.5</b>	<b>8,424.8</b>	<b>9,734.9</b>	<b>11,471.5</b>	<b>9,630.9</b>	<b>47,743.0</b>
<b>C. RAJASTHAN</b>														
1. ORGANIZATION AND MANAGEMENT	-	18,282.8	16,690.6	15,971.7	17,151.7	21,447.0	89,543.6	-	1,523.6	1,390.9	1,331.0	1,429.3	1,787.3	7,442.0
2. PHYSICAL TARGETS	2,533.5	20,208.7	43,349.4	54,487.7	75,547.9	78,159.9	246,287.1	211.1	1,484.1	3,612.4	4,540.6	6,295.7	5,846.7	22,190.6
3. RESEARCH	-	683.7	450.0	550.6	532.4	577.6	2,794.3	-	57.0	37.5	45.9	44.4	48.1	232.9
4. EXTENSION	-	2,428.7	2,856.5	2,085.2	2,383.7	2,499.4	12,093.6	-	282.4	238.0	167.1	192.0	208.3	1,087.8
5. TRAINING	-	4,314.0	1,074.3	1,217.0	1,319.2	1,430.0	9,354.4	-	339.5	89.5	101.4	109.9	119.2	779.5
6. MONITORING AND EVALUATION	-	2,195.6	2,124.5	2,293.0	2,487.8	2,699.2	11,806.1	-	185.0	177.0	191.1	267.3	224.9	983.3
<b>Sub-Total RAJASTHAN</b>	<b>2,533.5</b>	<b>48,113.5</b>	<b>64,545.3</b>	<b>76,525.2</b>	<b>99,342.7</b>	<b>98,813.1</b>	<b>391,873.3</b>	<b>211.1</b>	<b>4,067.2</b>	<b>5,545.4</b>	<b>6,377.1</b>	<b>8,278.6</b>	<b>8,234.4</b>	<b>32,656.1</b>
<b>D. UTTAR PRADESH</b>														
1. ORGANIZATION AND MANAGEMENT	-	48,320.7	88,894.6	126,467.5	176,538.1	200,787.1	641,190.0	-	4,042.6	7,487.9	10,539.0	14,710.8	16,732.3	53,432.5
2. PHYSICAL TARGETS	57,881.6	94,511.1	130,827.5	155,430.9	172,581.8	142,672.8	753,825.7	4,823.5	7,875.9	16,902.3	12,952.6	14,375.2	11,889.4	62,818.8
3. RESEARCH	-	1,545.7	1,937.4	1,403.5	1,525.6	1,441.4	8,073.7	-	128.8	141.5	117.0	127.1	138.5	672.8
4. EXTENSION	-	3,327.2	8,740.4	15,031.0	24,291.9	28,726.1	80,116.6	-	277.3	728.4	1,252.6	2,024.3	2,393.8	6,676.4
5. TRAINING	-	15,924.6	39,075.7	38,814.1	10,896.3	11,636.9	116,347.6	-	1,327.1	3,256.3	3,234.5	908.0	949.7	9,695.6
6. PLANNING	-	444.8	1,398.9	811.7	880.7	935.5	4,211.6	-	38.7	91.6	67.6	73.4	79.6	351.0
7. MONITORING AND EVALUATION	-	1,736.6	1,311.5	1,422.9	1,616.7	1,754.0	7,841.7	-	144.7	109.3	118.6	134.7	146.2	653.5
<b>Sub-Total UTTAR PRADESH</b>	<b>57,881.6</b>	<b>146,020.8</b>	<b>271,086.1</b>	<b>339,381.4</b>	<b>388,243.0</b>	<b>388,193.8</b>	<b>1,611,604.9</b>	<b>4,823.5</b>	<b>13,835.1</b>	<b>22,637.2</b>	<b>28,281.8</b>	<b>32,353.6</b>	<b>32,349.5</b>	<b>134,306.6</b>
<b>E. CENTRAL SUPPORT OFFICE</b>	<b>-</b>	<b>15,070.8</b>	<b>10,575.2</b>	<b>10,469.7</b>	<b>11,511.1</b>	<b>12,489.0</b>	<b>60,235.8</b>	<b>-</b>	<b>1,255.9</b>	<b>881.3</b>	<b>884.1</b>	<b>959.3</b>	<b>1,040.7</b>	<b>5,021.3</b>
<b>Total PROJECT COSTS</b>	<b>123,043.3</b>	<b>496,773.7</b>	<b>674,280.0</b>	<b>808,820.4</b>	<b>947,641.9</b>	<b>882,567.6</b>	<b>3,933,146.9</b>	<b>10,253.6</b>	<b>41,377.8</b>	<b>54,190.0</b>	<b>67,401.7</b>	<b>78,971.8</b>	<b>73,547.3</b>	<b>327,762.2</b>

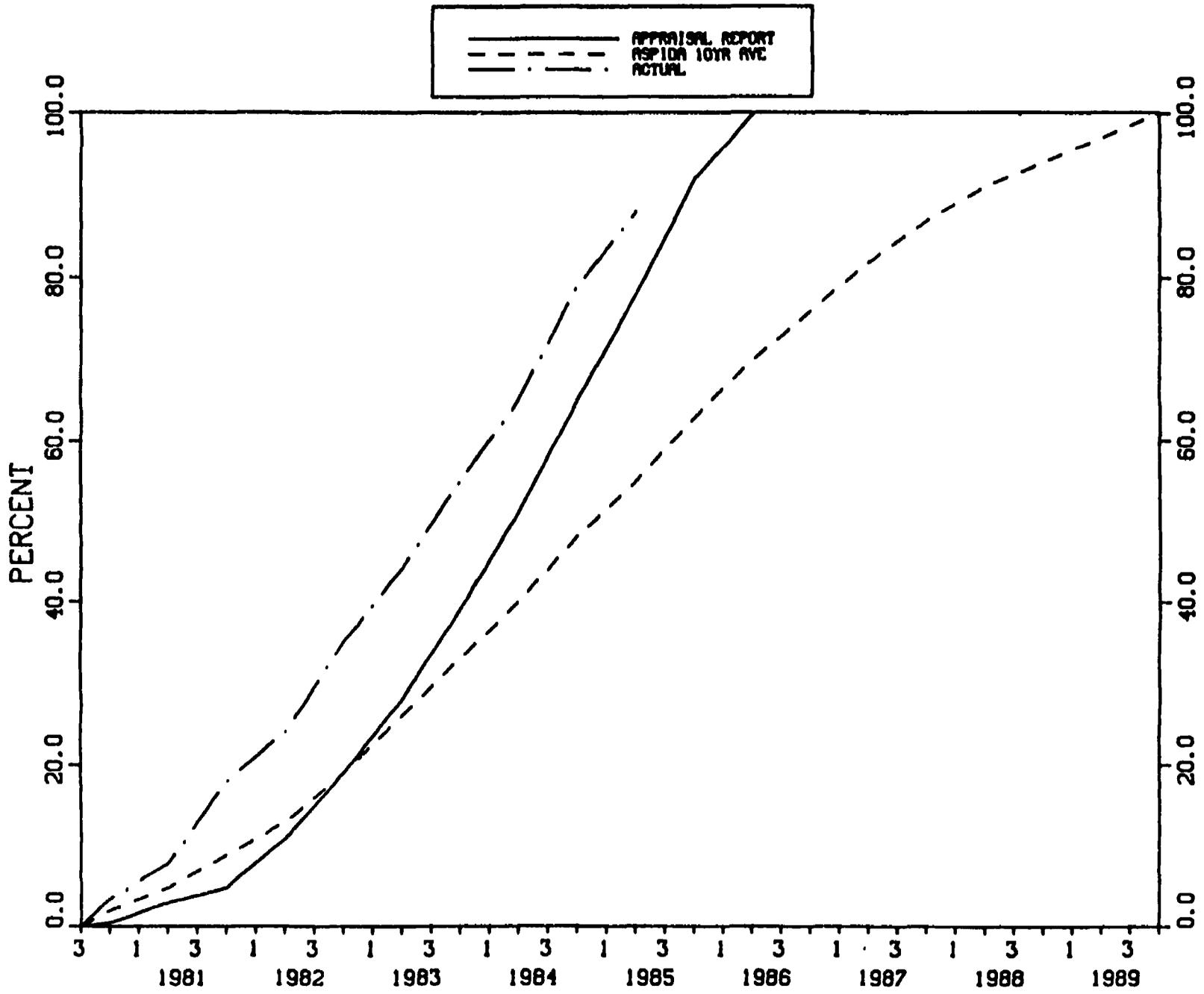
INDIANATIONAL SOCIAL FORESTRY PROJECTDisbursement Schedule  
(US\$ M)

<u>Calendar Year</u>	<u>Quarter</u>	<u>IDA FY</u>	<u>Quarter</u>	<u>Disbursement</u>		<u>Cumulative</u>	<u>%</u>
				<u>For Quarter IDA</u>	<u>USAID</u>		
1985	I	FY85	III	-	-	-	-
	II		IV	-	-	-	-
	III	FY86	I	-	-	-	-
	IV		II	6.2	3.1	9.3	3.8%
1986	I	FY86	III	10.9	5.2	25.4	10.4%
	II		IV	-	-	-	-
	III	FY87	I	10.9	5.3	41.6	17.0%
	IV		II	-	-	-	-
1987	I	FY87	III	15.0	7.1	63.7	26.0%
	II		IV	-	-	-	-
	III	FY88	I	15.0	7.1	85.8	35.0%
	IV		II	-	-	-	-
1988	I	FY88	III	17.4	8.2	111.4	45.5%
	II		IV	-	-	-	-
	III	FY89	I	17.4	8.2	137.0	55.9%
	IV		II	-	-	-	-
1989	I	FY89	III	19.6	9.6	166.2	67.8%
	II		IV	-	-	-	-
	III	FY90	I	19.6	9.6	195.4	79.8%
	IV		II	-	-	-	-
1990	I	FY90	III	16.5	8.3	220.2	89.9%
	II		IV	-	-	-	-
	III	FY91	I	16.5	8.3	245.0	100.0%
	IV		II	-	-	-	-
<b>Total</b>				<b>165.0</b>	<b>80.0</b>	<b>245.0</b>	<b>100%</b>

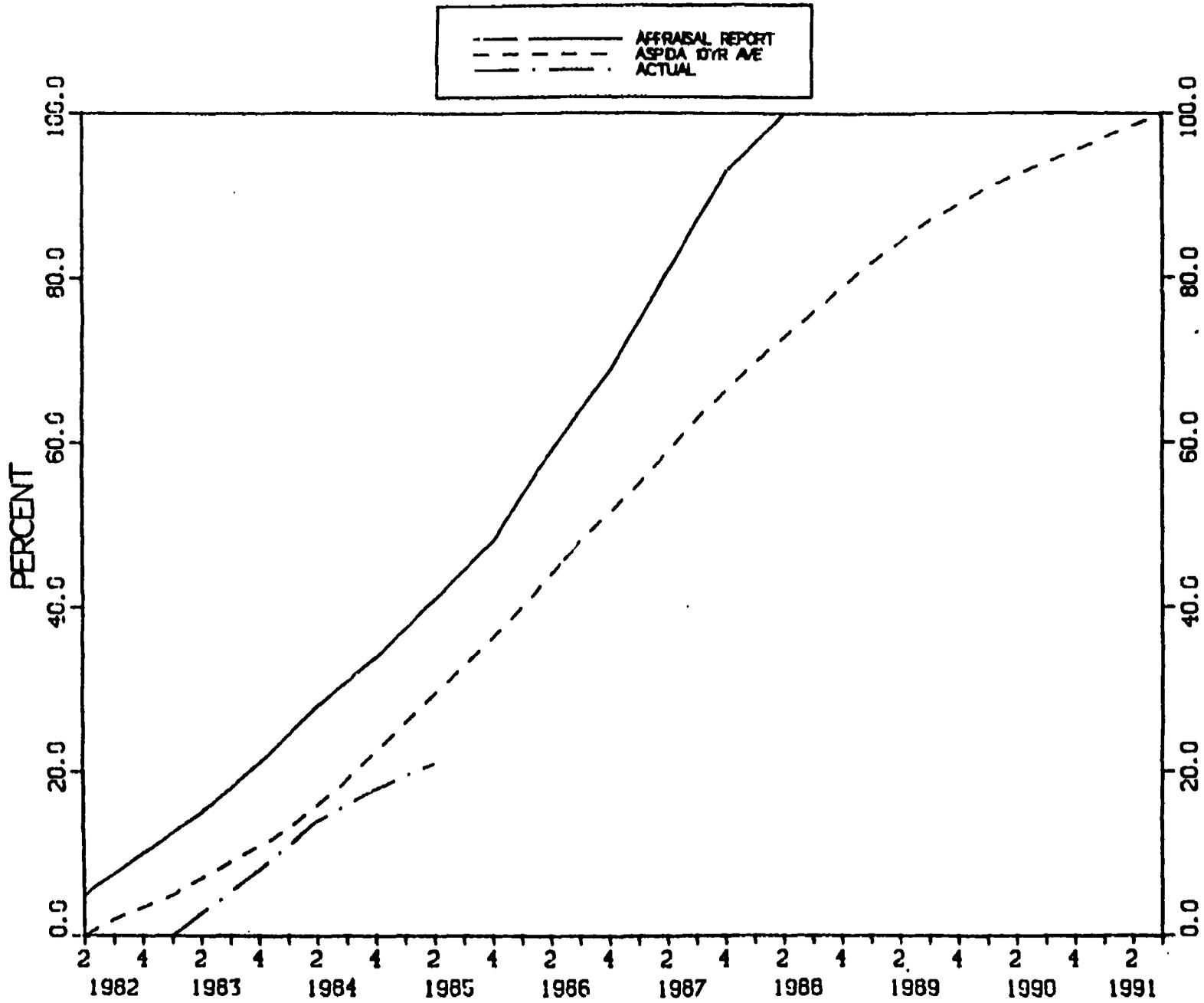
INDIA-U.P. SOCIAL FORESTRY-CR25  
DISBURSEMENT PROFILE



INDIA-GUJURAT COMM. FORESTRY-CR961  
DISBURSEMENT PROFILE

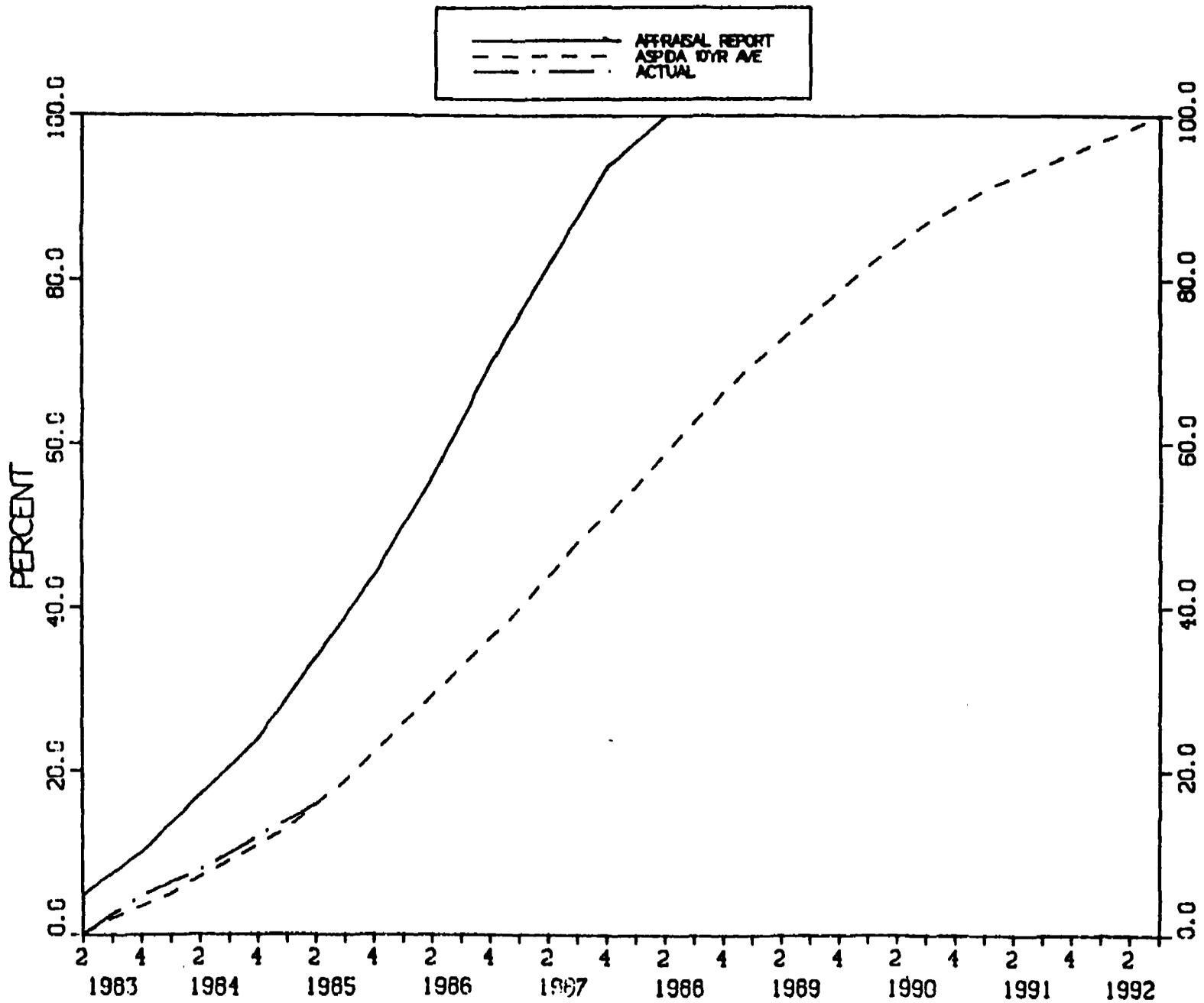


INDIA-W.B. SOCIAL FORESTRY-CR1178  
 DISBURSEMENT PROFILE



NDIA-HJK SOCIAL FORESTRY-CR1286

DISBURSEMENT PROFILE



NATIONAL SOCIAL FORESTRY

TOTAL PROJECT COST-BENEFIT AND SENSITIVITY ANALYSIS

RS 000

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
<b>COSTS</b>																								
GILMART COSTS	73151	148320	181921	201703	215289	242618	26917	37682	23746	13671	13991	13991	13991	13991	13991	13626	13626	13626	13626	13626	13626	13626	13626	13626
HIMACHAL PRADESH COSTS	12480	69187	81397	90800	99724	87041	19285	12240	7000	5629	4982	4282	4282	4282	4282	4282	3791	3791	3791	3791	3791	3791	3791	3791
RAJASTHAN COSTS	1639	34290	40777	49054	70740	73977	21664	16177	11142	9777	9129	8229	8229	8229	8229	7028	7028	7028	7028	7028	7028	7028	7028	7028
UTTAR PRADESH COSTS	40750	134824	217044	230493	246404	232396	44213	32766	24895	23743	22763	21735	21735	21735	21735	3913	3913	3913	3913	3913	3913	3913	3913	3913
TOTAL PROJECT COSTS	148220	384621	541138	592932	646615	538232	134180	98785	66371	33022	50875	48257	48257	48257	48257	28358	28358	28358	28358	28358	28358	28358	28358	28358
<b>BENEFITS</b>																								
GILMART BENEFITS	-	1827	2242	4349	88913	164804	173989	384485	499945	512484	548215	583231	607481	727695	343347	444816	473148	470876	470840	467576	385288	385786	328532	
HIMACHAL PRADESH BENEFITS	-	724	7663	13806	24870	33701	43562	44956	70216	283497	338043	531349	724312	899433	897464	928191	938046	947886	939843	948329	998190	1014371	1077048	
RAJASTHAN BENEFITS	-	11	74	157	2087	8248	31314	41573	51182	105421	92647	117605	138848	186675	117413	97385	88257	104383	118254	121373	184486	38736	98991	
UTTAR PRADESH BENEFITS	-	1298	2397	128495	172270	182218	438859	458281	393542	456615	473721	490826	213692	345838	445886	438886	471884	483886	421886	483450	282592	287534		
TOTAL PROJECT BENEFITS	-	1963	11277	22999	244367	379232	431082	949993	1079544	1416868	1476829	1703386	1761807	1561425	1703262	1923538	1938057	1993470	2038822	2128184	1889525	1573486	1695225	
<b>NET BENEFITS</b>																								
NET BENEFITS TOTAL PROJECT	-148220	-384621	-541138	-592932	-646615	-538232	-134180	-98785	-66371	-33022	-50875	-48257	-48257	-48257	-48257	-28358	-28358	-28358	-28358	-28358	-28358	-28358	-28358	-28358

INDIA  
NATIONAL SOCIAL FORESTRY  
TOTAL PROJECT COST-BENEFIT AND SENSITIVITY ANALYSIS  
RS 000

	24	25	26	27	28	29	30	31
<b>COSTS</b>								
GILMART COSTS	13626	13626	13626	13626	13626	13626	13626	13626
HIMACHAL PRADESH COSTS	3791	3791	3791	3791	3791	3791	3791	3791
RAJASTHAN COSTS	7028	7028	7028	7028	7028	7028	7028	7028
UTTAR PRADESH COSTS	3913	3913	3913	3913	3913	3913	3913	3913
TOTAL PROJECT COSTS	28358	28358	28358	28358	28358	28358	28358	28358
<b>BENEFITS</b>								
GILMART BENEFITS	528184	541816	410578	444364	472306	287436	290896	242913
HIMACHAL PRADESH BENEFITS	1148439	1219467	1214418	1278750	1335882	1461462	1472287	2834241
RAJASTHAN BENEFITS	104389	122013	168431	189788	114553	121147	51419	28157
UTTAR PRADESH BENEFITS	448877	597419	444242	476162	488082	499922	215922	143618
TOTAL PROJECT BENEFITS	2242031	2481716	2225863	2329644	2411742	2389967	1946525	3248929
<b>NET BENEFITS</b>								
NET BENEFITS TOTAL PROJECT	2213673	2443337	2225863	2348704	2383384	2281608	1912167	3220571

Internal Rates of Return of Net Streams  
NBSRNT01 26.701

SWITCHING VALUES AT 12%

STREAM	APPRAISAL VALUE	SWITCHING VALUE	PERCENTAGE CHANGE
BTOTPROJ	6,244,856.73	2,881,945.62	-44.76%
CTOTPROJ	2,881,945.62	6,244,856.73	200.87%

NPV @ 12% = 4,182,091.1  
IRR = 26.9%

SENSITIVITY TESTS

TEST CASE	TEST CASE VARIATIONS	PRESENT VALUE AT OCC OF 12.00%	NPV AS A % OF PRESENT COSTS AT OCC OF 12.00%	INTERNAL RATE OF RETURN
BASE CASE		4182091.1	200.9%	26.9%
TEST CASE 1	BTOTPROJ LAB 1 YEARS	3518942.2	168.6%	23.5%
TEST CASE 2	BTOTPROJ BOMM 20%	2927279.8	140.7%	23.3%
TEST CASE 3	CTOTPROJ UP 20%	3765496.0	150.7%	23.9%
TEST CASE 4	CTOTPROJ BOMM 20%	2512886.6	100.6%	20.6%

COST-BENEFIT BASE CASE ANALYSIS AND SENSITIVITY TEST

IN 000

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<b>COSTS</b>																				
<b>I. OVERHEAD COST</b>																				
INVESTMENT COST /a	5219	16490	19077	19877	13768	6438	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STAFF SALARIES AND ALLOWANCES /b	-	7267	8495	9498	9886	9847	188	188	188	188	188	188	188	188	188	188	188	188	188	188
OTHER RECURRENT COST /c	-	5818	5167	5354	5428	5477	257	257	257	257	257	257	257	257	257	257	257	257	257	257
<b>SUBTOTAL</b>	<b>5219</b>	<b>28767</b>	<b>28139</b>	<b>28729</b>	<b>29662</b>	<b>21782</b>	<b>365</b>													
<b>II. FARM FORESTRY PROMOTERS COST</b>																				
ECONOMIC COST TO PRODUCERS	44528	54688	63888	66688	66368	23578	13488	5888	3368	1688	-	-	-	-	-	-	-	-	-	-
<b>III. PLANTATION INVESTMENT AND MAINTENANCE COST</b>																				
PRIVATE WASTELAND PLANTING	1626	4968	7882	8845	18415	9453	4883	5338	5338	5338	5338	5338	5338	5338	5338	5338	5338	5338	5338	5338
COMMUNITY WOODLOTS IRRIGATED	2475	9486	13385	16815	20456	17721	18938	7171	3881	788	788	788	788	788	788	788	788	788	788	788
COMMUNITY WOODLOTS RAINFOREST	3488	11966	14134	15466	15766	12566	5237	2458	1488	1488	1488	1488	1488	1488	1488	1488	1488	1488	1488	1488
COMMUNITY TREE FINDER LOTS	462	1748	3173	4499	5485	4988	2889	2214	2188	2188	2188	2188	2188	2188	2188	2188	2188	2188	2188	2188
REHABILITATED DEGRADED FORESTS	6443	18429	19487	28963	26755	19466	13616	6128	2284	851	851	851	851	851	851	851	851	851	851	851
STRIP PLANTATION	7939	23783	28884	38366	38944	23562	8316	4673	2888	2888	2888	2888	2888	2888	2888	2888	2888	2888	2888	2888
URBAN FUELWOOD PLANTATION	998	3762	3397	7942	18288	9448	6228	2211	358	358	358	358	358	358	358	358	358	358	358	358
<b>SUBTOTAL</b>	<b>23412</b>	<b>65153</b>	<b>98782</b>	<b>108894</b>	<b>119927</b>	<b>97316</b>	<b>53212</b>	<b>32197</b>	<b>20821</b>	<b>13626</b>										
<b>TOTAL PROJECT COST</b>	<b>78151</b>	<b>108328</b>	<b>181921</b>	<b>201783</b>	<b>215289</b>	<b>142618</b>	<b>69817</b>	<b>37682</b>	<b>23766</b>	<b>15671</b>	<b>13991</b>	<b>13991</b>	<b>13991</b>	<b>13991</b>	<b>13991</b>	<b>13626</b>	<b>13626</b>	<b>13626</b>	<b>13626</b>	<b>13626</b>
<b>BENEFITS</b>																				
<b>I. FARM FORESTRY BENEFITS</b>																				
ECONOMIC RETURNS FROM FARM FORESTRY	-	-	-	-	76888	76888	76888	276488	276488	276488	276488	276488	276488	276488	276488	276488	276488	276488	276488	276488
<b>II. PLANTATION BENEFITS</b>																				
PRIVATE WASTELAND PLANTING	-	74	163	261	389	521	548	563	38888	48826	51837	59379	62731	4942	25518	38892	36724	38968	37398	6888
COMMUNITY WOODLOTS IRRIGATED	-	64	128	488	864	1248	1568	1888	42888	43884	45488	48992	49132	10832	33584	35416	35994	34872	34568	8712
COMMUNITY WOODLOTS RAINFOREST	-	-	-	88	288	56856	57888	57128	57288	58328	35472	34688	35984	33984	34824	38748	38748	49444	58748	58748
COMMUNITY TREE FINDER LOTS	-	168	888	1888	1888	2888	3616	4256	4726	3826	5216	5368	5488	3568	5688	5688	5688	5688	5688	5688
REHABILITATED DEGRADED FORESTS	-	125	262	418	5733	11563	17994	24421	33817	34838	91815	96312	109826	185746	184488	35745	48168	33846	36438	36363
STRIP PLANTATION DEPARTMENT MANAGED	-	24	48	288	528	768	984	1288	24788	25268	25748	26228	26944	3848	14588	14582	14684	14118	13894	2982
URBAN FUELWOOD PLANTATION	-	-	-	-	176	12864	12882	15774	19848	19546	15162	16776	18661	21877	21284	12856	12824	13852	16944	16896
<b>SUBTOTAL</b>	<b>-</b>	<b>446</b>	<b>1681</b>	<b>2686</b>	<b>9798</b>	<b>83182</b>	<b>94285</b>	<b>185223</b>	<b>228561</b>	<b>238822</b>	<b>289131</b>	<b>383847</b>	<b>327887</b>	<b>287881</b>	<b>263443</b>	<b>184652</b>	<b>195764</b>	<b>198892</b>	<b>195576</b>	<b>128192</b>
<b>III. FUEL SAVING DEVICE BENEFITS</b>																				
CHULAS	-	528	1856	1384	2112	2648	2648	2648	2648	2648	2648	2648	2648	2648	2648	2648	2648	2648	2648	2648
CHENAPETIA	-	51	186	138	211	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264
<b>SUBTOTAL</b>	<b>-</b>	<b>581</b>	<b>1162</b>	<b>1742</b>	<b>2323</b>	<b>2984</b>														
<b>TOTAL BENEFITS</b>	<b>-</b>	<b>1827</b>	<b>2242</b>	<b>4349</b>	<b>88913</b>	<b>164886</b>	<b>173889</b>	<b>384685</b>	<b>499945</b>	<b>512486</b>	<b>568515</b>	<b>583221</b>	<b>687481</b>	<b>287685</b>	<b>343347</b>	<b>464836</b>	<b>475148</b>	<b>478876</b>	<b>474968</b>	<b>487576</b>
<b>NET BENEFIT</b>																				
<b>BUMAY NET BENEFIT</b>	<b>-78151</b>	<b>-147493</b>	<b>-179678</b>	<b>-197734</b>	<b>-126376</b>	<b>22188</b>	<b>104772</b>	<b>347883</b>	<b>476119</b>	<b>496733</b>	<b>354224</b>	<b>367248</b>	<b>397618</b>	<b>273614</b>	<b>329256</b>	<b>438489</b>	<b>441522</b>	<b>456458</b>	<b>461334</b>	<b>393849</b>

NATIONAL SOCIAL FORESTRY PROJECT-GUJARAT

COST-BENEFIT BASE CASE ANALYSIS AND SENSITIVITY TEST

RS 000

	21	22	23	24	25	26	27	28	29	30	31
<b>COSTS</b>											
<b>I. OVERHEAD COST</b>											
INVESTMENT COST /a	-	-	-	-	-	-	-	-	-	-	-
STAFF SALARIES AND ALLOWANCES /b	-	-	-	-	-	-	-	-	-	-	-
OTHER RECURRENT COST /c	-	-	-	-	-	-	-	-	-	-	-
<b>SUBTOTAL</b>	-	-	-	-	-	-	-	-	-	-	-
<b>II. FARM FORESTRY PRODUCERS COST</b>											
ECONOMIC COST TO PRODUCERS	-	-	-	-	-	-	-	-	-	-	-
<b>III. PLANTATION INVESTMENT AND MAINTENANCE COST</b>											
PUBLIC WASTELAND PLANTING	5338	5338	5338	5338	5338	5338	5338	5338	5338	5338	5338
COMMUNITY WOOLLOTS IRRIGATED	700	700	700	700	700	700	700	700	700	700	700
COMMUNITY WOOLLOTS RAINFED	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
COMMUNITY TREE FODDER LOTS	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
REHABILITATED DEGRADED FORESTS	851	851	851	851	851	851	851	851	851	851	851
STRIP PLANTATION	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
URBAN FUELWOOD PLANTATION	350	350	350	350	350	350	350	350	350	350	350
<b>SUBTOTAL</b>	13626	13626	13626	13626	13626	13626	13626	13626	13626	13626	13626
<b>TOTAL PROJECT COST</b>	13626	13626	13626	13626	13626	13626	13626	13626	13626	13626	13626
<b>BENEFITS</b>											
<b>I. FARM FORESTRY BENEFITS</b>											
ECONOMIC RETURNS FROM FARM FORESTRY	76800	76800	76800	76800	76800	76800	76800	76800	76800	-	-
<b>II. PLANTATION BENEFITS</b>											
PRIVATE WASTELAND PLANTING	28442	27193	29516	34333	38313	5456	23657	28365	34257	32948	35428
COMMUNITY WOOLLOTS RAINFED	32696	33312	34792	36272	38552	15696	39040	39040	39904	39104	39808
COMMUNITY WOOLLOTS IRRIGATED	49444	50740	50740	49444	50740	50740	49344	50540	50380	48924	2392
COMMUNITY TREE FODDER LOTS	5600	5600	5600	5600	5600	5600	5600	5600	5600	5600	21400
REHABILITATED DEGRADED FORESTS	84900	84813	91354	91650	96234	33790	36612	36537	40921	33672	77662
STRIP PLANTATION DEPARTMENT MANAGED	11922	12216	12834	13476	14418	5856	19400	19400	19812	19532	59256
URBAN FUELWOOD PLANTATION	12372	13008	15792	17940	18576	11856	11220	14352	16848	16212	3464
<b>SUBTOTAL</b>	225576	226082	240828	248722	262432	131194	184980	193922	207732	197992	240009
<b>III. FUEL SAVING DEVICE BENEFITS</b>											
CHULAS	2640	2640	2640	2640	2640	2640	2640	2640	2640	2640	2640
CHENATORIA	264	264	264	264	264	744	264	264	264	264	264
<b>SUBTOTAL</b>	2904	2904	2904	2904	2904	2904	2904	2904	2904	2904	2904
<b>TOTAL BENEFITS</b>	305280	305786	320532	328104	341816	410578	464364	473386	507436	208896	242913
<b>NET BENEFIT</b>											
<b>GUJARAT NET BENEFIT</b>	291653	292160	304906	314480	328190	374952	450738	439679	274810	182270	229287

/a INCLUDES FUEL SAVING DEVICES.

/b STAFF SALARIES AND ALLOWANCES ATTRIBUTED TO NSFP BEING 100% OF TOTAL STAFF SALARIES AND ALLOWANCES IN YEARS 1 TO 4 AND 100% OF EXTENSION STAFF SALARIES AND ALLOWANCES IN YEARS 7 TO 10.

/c OTHER RECURRENT COSTS ATTRIBUTED TO NSFP BEING 100% OF TOTAL OTHER RECURRENT COSTS IN YEARS 1 TO 4 AND 10% OF EXTENSION OTHER RECURRENT COSTS IN YEARS 7 TO 10.

INDIA

NATIONAL SOCIAL FORESTRY PROJECT-GUJARAT

Economic Cost and Benefit Streams

Internal Rates of Return of Net Streams

NBENG 26.00Z

SWITCHING VALUES AT 12Z

STREAM	APPRAISAL VALUE	SWITCHING VALUE	PERCENTAGE CHANGE
BTOTG	1,781,670.21	729,417.47	-59.06Z
CTOTG	729,417.47	1,781,670.21	144.26Z

NPV @ 12Z = 1,052,252.7  
IRR = 26Z

SENSITIVITY TESTS

TEST CASES	TEST CASE VARIATIONS	PRESENT VALUE AT OCC OF 12.00Z	NPV AS A % OF PRESENT COSTS AT OCC OF 12.00Z	INTERNAL RATE OF RETURN
BASE CASE		1052252.7	144.3Z	26.0Z
TEST CASE 1	BTOTG LAG 1 YEARS	861359.5	118.1Z	22.3Z
TEST CASE 2	BTOTG DOWN 20Z	695918.7	95.4Z	22.0Z
TEST CASE 3	CTOTG UP 20Z	906369.2	103.5Z	22.7Z
TEST CASE 4	CTOTG UP 20Z BTOTG DOWN 20Z	550035.2	62.8Z	19.0Z

INDIA  
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NATIONAL SOCIAL FORESTRY PROJECT-HIMACHAL PRADESH  
-----  
COST-BENEFIT BASE CASE ANALYSIS AND SENSITIVITY TEST  
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RS 000  
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>COSTS</b>														
<b>I. OVERHEAD COST</b>														
INVESTMENT COST /a	4410.000	18871.000	21018.000	20408.000	21955.000	14785.000	-	-	-	-	-	-	-	-
STAFF SALARIES AND ALLOWANCES /b	-	16094.000	14238.000	16357.000	16441.000	16554.000	391.000	391.000	391.000	391.000	391.000	391.000	391.000	391.000
OTHER RECURRENT COST /c	-	2264.000	2615.000	2876.000	3211.000	3565.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
<b>SUBTOTAL</b>	<b>4410.000</b>	<b>37229.000</b>	<b>39871.000</b>	<b>39841.000</b>	<b>41627.000</b>	<b>34904.000</b>	<b>491.000</b>	<b>491.000</b>	<b>491.000</b>	<b>491.000</b>	<b>491.000</b>	<b>491.000</b>	<b>491.000</b>	<b>491.000</b>
<b>II. FARM FORESTRY PRODUCERS COST</b>														
ECONOMIC COST TO PRODUCERS-AGRO FORESTRY AND FARM WOOLLOTS	-	11130.000	15505.000	19880.000	22925.000	26040.000	8820.000	5180.000	1890.000	1330.000	700.000	-	-	-
<b>III. PLANTATION INVESTMENT AND MAINTENANCE COST</b>														
PRIVATE WASTELAND PLANTING	896.700	2958.550	3748.450	4419.650	5319.300	4500.650	1902.600	1454.000	992.600	819.000	819.000	819.000	819.000	819.000
GROUP FARM FORESTRY	85.909	292.091	526.000	493.636	834.818	647.818	217.636	138.091	94.818	74.435	74.435	74.435	74.435	74.435
COMMUNITY WOOLLOTS-SELF HELP	-	94.500	274.000	418.950	567.700	718.350	539.000	183.050	116.900	79.000	63.000	63.000	63.000	63.000
COMMUNITY WOOLLOTS-RAINFED	6378.750	15781.500	19278.000	22459.500	25041.750	17850.000	6442.750	4240.250	3038.000	2520.000	2520.000	2520.000	2520.000	2520.000
REHABILITATED DEGRADED FORESTS	708.750	1701.000	2173.500	2887.500	3384.250	2380.000	852.250	551.250	385.000	315.000	315.000	315.000	315.000	315.000
<b>SUBTOTAL</b>	<b>8070.109</b>	<b>20827.641</b>	<b>24020.909</b>	<b>31079.236</b>	<b>35171.818</b>	<b>24097.018</b>	<b>9974.236</b>	<b>6548.641</b>	<b>4627.318</b>	<b>3808.255</b>	<b>3791.455</b>	<b>3791.455</b>	<b>3791.455</b>	<b>3791.455</b>
<b>TOTAL PROJECT COST</b>	<b>12480.109</b>	<b>69186.641</b>	<b>81396.909</b>	<b>90800.236</b>	<b>99723.818</b>	<b>87041.018</b>	<b>19285.236</b>	<b>12239.641</b>	<b>7008.318</b>	<b>5629.255</b>	<b>4982.455</b>	<b>4282.455</b>	<b>4282.455</b>	<b>4282.455</b>
<b>BENEFITS</b>														
<b>I. FARM FORESTRY BENEFITS</b>														
ECONOMIC RETURNS FROM FARM FORESTRY	-	-	-	-	-	-	-	-	-	105600.000	228800.000	349600.000	528000.000	704000.000
<b>II. PLANTATION BENEFITS</b>														
PRIVATE WASTELAND PLANTING	-	-	1260.000	2770.800	4443.600	6278.400	8275.200	8424.000	11515.200	14974.400	18852.000	22483.600	26439.200	26387.600
GROUP FARM FORESTRY	-	-	54.545	173.455	354.727	549.818	797.455	834.727	1130.909	1719.273	2464.618	3480.582	4435.345	4995.200
COMMUNITY WOOLLOTS-SELF HELP	-	-	-	60.000	160.000	297.000	448.600	675.600	708.000	1031.600	1517.000	2169.400	2966.400	3917.760
COMMUNITY WOOLLOTS-RAINFED	-	-	4050.000	9129.000	14712.000	20826.000	27321.000	28320.000	50163.000	73424.000	99848.400	127216.200	156121.600	154983.600
REHABILITATED DEGRADED FORESTS	-	-	450.000	900.000	1500.000	2250.000	3000.000	3000.000	3000.000	2850.000	2700.000	2500.000	2250.000	1850.000
<b>SUBTOTAL</b>	<b>-</b>	<b>-</b>	<b>5814.545</b>	<b>13633.255</b>	<b>21173.127</b>	<b>30261.218</b>	<b>39842.255</b>	<b>41256.327</b>	<b>64517.109</b>	<b>94199.273</b>	<b>125344.018</b>	<b>158049.842</b>	<b>192812.545</b>	<b>191734.160</b>
<b>NET BENEFIT</b>														
* TOTAL FUELWOOD SAVING DEVICES-BENEFITS	-	924.180	1848.360	2772.540	3696.720	3699.300	3699.600	3699.300	3699.300	3699.300	3699.300	3699.300	3699.300	3699.300
<b>TOTAL BENEFITS</b>	<b>-</b>	<b>924.180</b>	<b>7662.905</b>	<b>15805.795</b>	<b>24869.847</b>	<b>33960.518</b>	<b>43561.555</b>	<b>44955.627</b>	<b>70216.409</b>	<b>203498.573</b>	<b>358043.318</b>	<b>531349.162</b>	<b>724511.845</b>	<b>899433.460</b>
<b>NET BENEFIT</b>														
HIMACHAL PRADESH NET BENEFIT	-12480.109	-48262.461	-73734.004	-74994.442	-74853.971	-53140.500	24274.318	32715.984	63208.091	197869.318	353060.844	527064.787	720229.391	895151.005

INDIA  
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NATIONAL SOCIAL FORESTRY PROJECT-HIMACHAL PRADESH  
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COST-BENEFIT BASE CASE ANALYSIS AND SENSITIVITY TEST  
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RS 000  
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	15	16	17	18	19	20	21	22	23	24	25	26	27
<b>COSTS</b>													
<b>I. OVERHEAD COST</b>													
INVESTMENT COST /a	-	-	-	-	-	-	-	-	-	-	-	-	-
STAFF SALARIES AND ALLOWANCES /b	391.000	-	-	-	-	-	-	-	-	-	-	-	-
OTHER RECURRENT COST /c	100.000	-	-	-	-	-	-	-	-	-	-	-	-
<b>SUBTOTAL</b>	<b>491.000</b>	<b>-</b>											
<b>II. FARM FORESTRY PRODUCERS COST</b>													
<b>ECONOMIC COST TO PRODUCERS</b>													
-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>III. PLANTATION INVESTMENT AND MAINTENANCE COST</b>													
PRIVATE WASTELAND PLANTING	819.000	819.000	819.000	819.000	819.000	819.000	819.000	819.000	819.000	819.000	819.000	819.000	819.000
GROUP FARM FORESTRY	74.455	74.455	74.455	74.455	74.455	74.455	74.455	74.455	74.455	74.455	74.455	74.455	74.455
COMMUNITY WOOLLOTS-SELF HELP (PANCHAYAT-MANAGED)	63.000	63.000	63.000	63.000	63.000	63.000	63.000	63.000	63.000	63.000	63.000	63.000	63.000
COMMUNITY WOOLLOTS-RAINFED (DEPT.-MANAGED)	2520.000	2520.000	2520.000	2520.000	2520.000	2520.000	2520.000	2520.000	2520.000	2520.000	2520.000	2520.000	2520.000
REHABILITATED DEGRADED FORESTS	315.000	315.000	315.000	315.000	315.000	315.000	315.000	315.000	315.000	315.000	315.000	315.000	315.000
<b>SUBTOTAL</b>	<b>3791.455</b>												
<b>TOTAL PROJECT COST</b>	<b>4282.455</b>	<b>3791.455</b>											
<b>BENEFITS</b>													
<b>I. FARM FORESTRY BENEFITS</b>													
<b>ECONOMIC RETURNS FROM FARM FORESTRY</b>													
704000.000	704000.000	704000.000	704000.000	704000.000	704000.000	704000.000	704000.000	718400.000	773400.000	837600.000	910400.000	992000.000	1054000.000
<b>II. PLANTATION BENEFITS</b>													
PRIVATE WASTELAND PLANTING	25892.000	28716.000	29932.400	31244.000	32653.200	34157.600	37267.920	37715.320	38116.720	38472.120	38781.520	29076.560	29194.760
GROUP FARM FORESTRY	4559.855	4793.369	5154.255	5549.944	5734.255	6012.727	6473.745	7103.855	7089.382	7587.634	5104.582	4838.327	4950.744
COMMUNITY WOOLLOTS-SELF HELP	3890.960	3856.000	4133.600	4342.240	4421.000	4909.000	5228.000	5132.560	5459.000	5765.370	6051.520	6317.600	4123.120
COMMUNITY WOOLLOTS-RAINFED	153722.000	174666.000	180356.200	187249.600	194594.000	201549.000	225469.000	224420.400	229003.200	231284.200	231430.000	168398.600	168852.000
REHABILITATED DEGRADED FORESTS	1700.000	8520.000	8570.000	10960.000	13700.000	14200.000	16050.000	15900.000	20100.000	24250.000	24000.000	12000.000	11930.000
<b>SUBTOTAL</b>	<b>189764.815</b>	<b>220492.109</b>	<b>228146.455</b>	<b>239386.664</b>	<b>251303.255</b>	<b>261630.007</b>	<b>290490.345</b>	<b>292272.135</b>	<b>299768.302</b>	<b>307359.276</b>	<b>305367.622</b>	<b>220711.087</b>	<b>219050.644</b>
<b>NET BENEFIT</b>													
<b>TOTAL FUELWOOD SAWING DEVICES-BENEFITS</b>													
3699.300	3699.300	3699.300	3699.300	3699.300	3699.300	3699.300	3699.300	3699.300	3699.300	3699.300	3699.300	3699.300	3699.300
<b>TOTAL BENEFITS</b>													
897444.115	920191.409	935845.755	947085.904	959002.555	969329.307	998189.645	1014371.435	1077047.402	1148650.576	1219446.922	1216410.387	1278749.944	
<b>NET BENEFIT</b>													
<b>HIMACHAL PRADESH NET BENEFIT</b>													
893181.660	924399.955	932054.300	943294.449	955211.100	965537.053	994398.191	1010579.980	1073276.147	1144867.122	1215675.447	1212618.933	1274958.409	

NATIONAL SOCIAL FORESTRY PROJECT-HIMACHAL PRADESH

COST-BENEFIT BASE CASE ANALYSIS AND SENSITIVITY TEST

Rs 000

	28	29	30	31
<b>COSTS</b>				
<b>I. OVERHEAD COST</b>				
INVESTMENT COST /a	-	-	-	-
STAFF SALARIES AND ALLOWANCES /b	-	-	-	-
OTHER RECURRENT COST /c	-	-	-	-
<b>SUBTOTAL</b>	-	-	-	-
<b>II. FARM FORESTRY PRODUCERS COST</b>				
ECONOMIC COST TO PRODUCERS-AGRO FORESTRY AND FARM WOOLLOTS	-	-	-	-
<b>III. PLANTATION INVESTMENT AND MAINTENANCE COST</b>				
PRIVATE WASTELAND PLANTING	819,000	819,000	819,000	819,000
GROUP FARM FORESTRY	74,455	74,455	74,455	74,455
COMMUNITY WOOLLOTS-SELF HELP	43,000	43,000	43,000	43,000
COMMUNITY WOOLLOTS-RAINFED	2520,000	2520,000	2520,000	2520,000
REHABILITATED DEGRADED FORESTS	315,000	315,000	315,000	315,000
<b>SUBTOTAL</b>	<b>3791,455</b>	<b>3791,455</b>	<b>3791,455</b>	<b>3791,455</b>
<b>TOTAL PROJECT COST</b>	<b>3791,455</b>	<b>3791,455</b>	<b>3791,455</b>	<b>3791,455</b>
<b>BENEFITS</b>				
<b>I. FARM FORESTRY BENEFITS</b>				
ECONOMIC RETURNS FROM FARM FORESTRY	1100800,000	1170400,000	1240000,000	2472000,000
<b>II. PLANTATION BENEFITS</b>				
PRIVATE WASTELAND PLANTING	29309,960	29422,160	29531,360	44196,000
GROUP FARM FORESTRY	5040,000	5053,600	5161,236	6452,291
COMMUNITY WOOLLOTS-SELF HELP	4183,640	4242,840	4300,720	4257,200
COMMUNITY WOOLLOTS-RAINFED	167600,000	170344,200	170744,000	207496,000
REHABILITATED DEGRADED FORESTS	15140,000	18300,000	18050,000	12040,000
<b>SUBTOTAL</b>	<b>223302,400</b>	<b>227342,800</b>	<b>227706,116</b>	<b>350541,571</b>
<b>NET BENEFIT</b>				
TOTAL FUELWOOD SAVING DEVICES-BENEFITS	3699,300	3699,300	3699,300	3699,300
<b>TOTAL BENEFITS</b>	<b>1335601,700</b>	<b>1401462,100</b>	<b>1472207,416</b>	<b>2834240,871</b>
<b>NET BENEFIT</b>				
HIMACHAL PRADESH NET BENEFIT	1332010,245	1397670,645	1468495,962	2630449,416

Internal Rates of Return of Net Streams  
 IRR = 34.9%

SWITCHING VALUES AT 12%

STREAM	APPRAISAL VALUE	SWITCHING VALUE	PERCENTAGE CHANGE
<b>BTOTHP</b>	<b>2,321,170.93</b>	<b>310,632.07</b>	<b>-86.62%</b>
<b>CTOTHP</b>	<b>310,632.07</b>	<b>2,321,170.93</b>	<b>647.24%</b>

NPV @ 12% = 2,010,530.1  
 IRR = 34.1%

SENSITIVITY TESTS

TEST CASES	TEST CASE VARIATIONS	PRESENT VALUE AT DCC OF 12.00%	NPV AND % OF PRESENT COSTS AT DCC OF 12.00%	INTERNAL RATE OF RETURN
BASE CASE		2010530.1	647.2%	34.1%
TEST CASE 1	BTOTHP LOW 1 YEARS	1761041.2	547.2%	30.2%
TEST CASE 2	BTOTHP DOWN 20%	1546303.9	477.0%	26.9%
TEST CASE 3	CTOTHP UP 20%	1940411.5	522.7%	31.5%
TEST CASE 4	CTOTHP UP 20% BTOTHP DOWN 20%	1404177.3	398.2%	20.4%

/a INCLUDES FUEL SAVING DEVICES.  
 /b STAFF SALARIES AND ALLOWANCES ATTRIBUTED TO NSFP BEING 100% OF TOTAL STAFF SALARIES AND ALLOWANCES IN YEARS 1 TO 6 AND 100% OF EXTENSION STAFF SALARIES AND ALLOWANCES IN YEARS 7 TO 10.  
 /c OTHER RECURRENT COSTS ATTRIBUTED TO NSFP BEING 100% OF TOTAL OTHER RECURRENT COSTS IN YEARS 1 TO 6 AND 100% OF EXTENSION OTHER RECURRENT COSTS IN YEARS 7 TO 10.

INDIA  
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NATIONAL SOCIAL FORESTRY PROJECT-RAJASTHAN  
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COST-BENEFIT BASE CASE ANALYSIS AND SENSITIVITY TEST  
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RS 000  
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>COSTS</b>														
<b>I. OVERHEAD COST</b>														
INVESTMENT COST /a	168,000	21927,000	18054,000	11978,000	11171,000	6861,000	-	-	-	-	-	-	-	-
STAFF SALARIES AND ALLOWANCES /b	-	4374,000	7614,000	11432,000	13054,000	14483,000	934,000	934,000	934,000	934,000	934,000	934,000	934,000	934,000
OTHER RECURRENT COST /c	-	551,000	848,000	1107,000	1323,000	1451,000	267,000	267,000	267,000	267,000	267,000	267,000	267,000	267,000
<b>SUBTOTAL</b>	<b>168,000</b>	<b>26874,000</b>	<b>26534,000</b>	<b>24337,000</b>	<b>25556,000</b>	<b>22995,000</b>	<b>1291,000</b>	<b>1291,000</b>	<b>1291,000</b>	<b>1291,000</b>	<b>1291,000</b>	<b>1291,000</b>	<b>1291,000</b>	<b>1291,000</b>
<b>II. FARM FORESTRY PRODUCERS COST</b>														
ECONOMIC COST TO PRODUCERS-IMPROVED (GRAFTED) ORCHARDS	-	700,000	700,000	875,000	1138,000	-	-	-	-	-	-	-	-	-
ECONOMIC COST TO PRODUCERS-AGRO FORESTRY AND FARM WOODLOTS	-	1853,000	18770,000	24410,000	30870,000	34125,000	11270,000	6930,000	2590,000	1750,000	910,000	-	-	-
<b>SUBTOTAL</b>	<b>-</b>	<b>2553,000</b>	<b>19770,000</b>	<b>27485,000</b>	<b>32008,000</b>	<b>34125,000</b>	<b>11270,000</b>	<b>6930,000</b>	<b>2590,000</b>	<b>1750,000</b>	<b>910,000</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>III. PLANTATION INVESTMENT AND MAINTENANCE COST</b>														
HOUSEHOLD FARM FORESTRY	-	143,500	1047,150	2443,900	4110,050	3947,950	244,750	244,750	244,750	244,750	244,750	244,750	244,750	244,750
COMMUNITY WOODLOTS	-	448,900	2725,100	3339,350	4517,050	3794,000	854,700	577,500	525,000	525,000	525,000	525,000	525,000	525,000
REHABILITATED DEGRADED FORESTS	-	747,600	3979,100	5418,200	6904,100	7642,600	4376,000	4376,000	4376,000	4376,000	4376,000	4376,000	4376,000	4376,000
ROADSIDE STRIP PLANTATION	1251,390	2894,000	4127,120	5414,000	6706,630	6597,740	2168,600	1540,700	1023,400	700,000	700,000	700,000	700,000	700,000
CANALSIDE STRIP PLANTATION	-	250,278	537,103	701,140	842,393	516,778	305,480	253,470	222,660	222,660	222,660	222,660	222,660	222,660
RAILSIDE STRIP PLANTATION	-	218,540	978,800	1401,470	2040,640	2043,490	1250,400	1074,500	900,000	900,000	900,000	900,000	900,000	900,000
FLOOD CONTROL AND TANK ENHANCEMENT	19,250	101,710	136,710	157,710	178,710	180,460	119,000	105,000	105,000	105,000	105,000	105,000	105,000	105,000
<b>TOTAL PROJECT COST</b>	<b>1630,640</b>	<b>34299,100</b>	<b>60777,023</b>	<b>69953,930</b>	<b>78747,923</b>	<b>75997,048</b>	<b>21644,260</b>	<b>16177,170</b>	<b>11142,000</b>	<b>9778,600</b>	<b>9130,600</b>	<b>8228,600</b>	<b>8228,600</b>	<b>8228,600</b>
<b>BENEFITS</b>														
<b>I. FARM FORESTRY BENEFITS</b>														
ECONOMIC RETURNS FROM IMPROVED (GRAFTED) ORCHARDS	-	-	-	-	-	1331,200	2828,000	4492,000	6454,000	6454,000	6454,000	6454,000	6454,000	6454,000
ECONOMIC RETURNS FROM FARM FORESTRY	-	-	-	-	-	2000,000	20000,000	24000,000	29600,000	32000,000	37200,000	46800,000	56000,000	64000,000
<b>SUBTOTAL</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3331,200</b>	<b>22828,000</b>	<b>28492,000</b>	<b>34256,000</b>	<b>38454,000</b>	<b>43654,000</b>	<b>53254,000</b>	<b>62454,000</b>	<b>70454,000</b>
<b>II. PLANTATION BENEFITS</b>														
HOUSEHOLD FARM FORESTRY	-	-	6,000	24,000	154,000	450,000	1706,000	3334,000	4674,000	5130,000	5130,000	5130,000	8498,000	15174,000
COMMUNITY WOODLOTS	-	-	8,000	16,000	28,000	40,000	192,000	344,000	572,000	800,000	800,000	960,000	6424,000	6744,000
REHABILITATED DEGRADED FOREST LANDS	-	-	32,000	72,000	1840,000	4048,000	6208,000	8000,000	8000,000	8000,000	8000,000	8000,000	8000,000	33040,000
ROADSIDE STRIP PLANTATION	-	2,400	5,600	9,600	14,400	80,600	161,400	262,400	383,600	1379,600	1664,200	3899,400	7450,000	8983,600
CANALSIDE STRIP PLANTATION	-	-	0,400	1,040	1,400	2,400	14,520	28,440	44,820	63,000	804,120	927,640	1301,720	1456,000
RAILSIDE STRIP PLANTATION	-	-	1,600	3,200	5,600	8,000	74,400	140,800	240,400	340,000	340,000	340,000	1484,000	1624,000
FLOOD CONTROL AND TANK ENHANCEMENT	-	0,000	1,600	2,400	3,200	45,200	86,400	127,600	168,800	210,000	210,000	1050,000	1012,000	974,000
<b>SUBTOTAL</b>	<b>-</b>	<b>3,200</b>	<b>35,200</b>	<b>126,240</b>	<b>2046,000</b>	<b>4874,200</b>	<b>8442,720</b>	<b>13037,640</b>	<b>14883,620</b>	<b>16722,600</b>	<b>17740,320</b>	<b>23107,040</b>	<b>35349,720</b>	<b>69996,000</b>
<b>III. FUEL SAVING DEVICE BENEFITS</b>														
CREMATORIA	-	7,920	18,480	29,040	42,240	42,240	42,240	42,240	42,240	42,240	42,240	42,240	42,240	42,240
<b>TOTAL BENEFITS</b>	<b>-</b>	<b>11,120</b>	<b>73,760</b>	<b>157,280</b>	<b>2089,120</b>	<b>8247,640</b>	<b>31313,760</b>	<b>41572,500</b>	<b>51181,840</b>	<b>105420,640</b>	<b>93646,560</b>	<b>117005,280</b>	<b>130047,960</b>	<b>100694,640</b>
<b>NET BENEFIT</b>														
<b>RAJASTHAN NET BENEFIT</b>	<b>-1630,640</b>	<b>-34278,900</b>	<b>-60703,243</b>	<b>-68974,678</b>	<b>-76678,803</b>	<b>-67749,428</b>	<b>7649,500</b>	<b>25395,330</b>	<b>40039,860</b>	<b>95442,040</b>	<b>84507,960</b>	<b>108776,680</b>	<b>130639,360</b>	<b>92466,040</b>

INDIA  
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 NATIONAL SOCIAL FORESTRY PROJECT-RAJASTHAN  
 -----  
 COST-BENEFIT BASE CASE ANALYSIS AND SENSITIVITY TEST  
 -----

RS 000  
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	15	16	17	18	19	20	21	22	23	24	25	26	27	28
<b>COSTS</b>														
<b>I. OVERHEAD COST</b>														
INVESTMENT COST /a	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STAFF SALARIES AND ALLOWANCES /b	934.000	-	-	-	-	-	-	-	-	-	-	-	-	-
OTHER RECURRENT COST /c	267.000	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>SUBTOTAL</b>	<b>1201.000</b>	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>II. FARM FORESTRY PRODUCERS COST</b>														
ECONOMIC COST TO PRODUCERS-IMPROVED (GRAFTED) ORCHARDS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECONOMIC COST TO PRODUCERS-AGRO FORESTRY AND FARM WOOLLOTS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>SUBTOTAL</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>III. PLANTATION INVESTMENT AND MAINTENANCE COST</b>														
HOUSEHOLD FARM FORESTRY	246.750	246.750	246.750	246.750	246.750	246.750	246.750	246.750	246.750	246.750	246.750	246.750	246.750	246.750
COMMUNITY WOOLLOTS	525.000	525.000	525.000	525.000	525.000	525.000	525.000	525.000	525.000	525.000	525.000	525.000	525.000	525.000
REHABILITATED DEGRADED FORESTS	4376.000	4376.000	4376.000	4376.000	4376.000	4376.000	4376.000	4376.000	4376.000	4376.000	4376.000	4376.000	4376.000	4376.000
ROADSIDE STRIP PLANTATION	700.000	700.000	700.000	700.000	700.000	700.000	700.000	700.000	700.000	700.000	700.000	700.000	700.000	700.000
CANALSIDE STRIP PLANTATION	222.600	222.600	222.600	222.600	222.600	222.600	222.600	222.600	222.600	222.600	222.600	222.600	222.600	222.600
RAILSIDE STRIP PLANTATION	980.000	980.000	980.000	980.000	980.000	980.000	980.000	980.000	980.000	980.000	980.000	980.000	980.000	980.000
FLOOD CONTROL AND TANK ENLARGEMENT	105.000	105.000	105.000	105.000	105.000	105.000	105.000	105.000	105.000	105.000	105.000	105.000	105.000	105.000
<b>TOTAL PROJECT COST</b>	<b>8228.600</b>	<b>7027.600</b>	<b>7027.600</b>	<b>7027.600</b>	<b>7027.600</b>	<b>7027.600</b>	<b>7027.600</b>	<b>7027.600</b>	<b>7027.600</b>	<b>7027.600</b>	<b>7027.600</b>	<b>7027.600</b>	<b>7027.600</b>	<b>7027.600</b>
<b>BENEFITS</b>														
<b>I. FARM FORESTRY BENEFITS</b>														
ECONOMIC RETURNS FROM IMPROVED (GRAFTED) ORCHARDS	6656.000	6656.000	6656.000	6656.000	6656.000	6656.000	6656.000	6656.000	6656.000	6656.000	6656.000	6656.000	6656.000	6656.000
ECONOMIC RETURNS FROM FARM FORESTRY	26000.000	26000.000	25600.000	26000.000	26000.000	26000.000	26000.000	26000.000	26000.000	26000.000	26000.000	26000.000	26000.000	26000.000
<b>SUBTOTAL</b>	<b>32656.000</b>	<b>32656.000</b>	<b>32256.000</b>	<b>32656.000</b>	<b>32656.000</b>	<b>32656.000</b>	<b>32656.000</b>	<b>32656.000</b>	<b>32656.000</b>	<b>32656.000</b>	<b>32656.000</b>	<b>32656.000</b>	<b>32656.000</b>	<b>32656.000</b>
<b>II. PLANTATION BENEFITS</b>														
HOUSEHOLD FARM FORESTRY	21730.000	24778.000	4270.000	4470.000	4770.000	5130.000	5130.000	5130.000	8490.000	15174.000	21730.000	24778.000	4270.000	4470.000
COMMUNITY WOOLLOTS	9616.000	9436.000	3072.000	3192.000	4348.000	4328.000	1600.000	1600.000	7104.000	6984.000	9616.000	9436.000	1120.000	1240.000
REHABILITATED DEGRADED FOREST LANDS	41600.000	41600.000	40140.710	8000.000	8000.000	8000.000	8000.000	8000.000	35040.000	41600.000	41600.000	40140.000	8000.000	8000.000
ROADSIDE STRIP PLANTATION	8221.000	9487.000	217.000	1014.000	1353.200	1709.000	1745.000	4133.000	5741.200	6990.000	8221.000	10054.000	974.200	1240.000
CANALSIDE STRIP PLANTATION	374.900	403.140	22.200	34.100	642.100	779.800	882.200	984.600	313.540	343.120	374.900	403.140	509.000	603.000
RAILSIDE STRIP PLANTATION	2234.000	2144.000	100.000	140.000	250.000	340.000	340.000	340.000	1484.000	1424.000	2234.000	2144.000	100.000	140.000
FLOOD CONTROL AND TANK ENLARGEMENT	936.000	936.000	96.000	134.000	172.000	210.000	210.000	1050.000	1012.000	974.000	936.000	936.000	96.000	134.000
<b>SUBTOTAL</b>	<b>84714.700</b>	<b>80804.740</b>	<b>55959.200</b>	<b>17804.500</b>	<b>20355.300</b>	<b>21476.000</b>	<b>10900.000</b>	<b>24037.600</b>	<b>57392.760</b>	<b>73491.120</b>	<b>84714.700</b>	<b>95933.140</b>	<b>15890.000</b>	<b>14435.000</b>
<b>III. FUEL SAVING DEVICE BENEFITS</b>														
CHURNATORIA	42.240	42.240	42.240	42.240	42.240	42.240	42.240	42.240	42.240	42.240	42.240	42.240	42.240	42.240
<b>TOTAL BENEFITS</b>	<b>117413.020</b>	<b>97504.900</b>	<b>80257.440</b>	<b>104502.740</b>	<b>118253.540</b>	<b>121395.040</b>	<b>100406.240</b>	<b>30735.040</b>	<b>90991.000</b>	<b>104309.360</b>	<b>123013.020</b>	<b>146431.380</b>	<b>109700.320</b>	<b>110353.200</b>
<b>NET BENEFIT</b>														
<b>RAJASTHAN NET BENEFIT</b>	<b>109184.420</b>	<b>96477.300</b>	<b>81229.040</b>	<b>97475.140</b>	<b>111225.940</b>	<b>114367.440</b>	<b>93378.640</b>	<b>43700.240</b>	<b>83063.000</b>	<b>97361.760</b>	<b>115903.420</b>	<b>153403.700</b>	<b>102760.720</b>	<b>107325.700</b>

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NATIONAL SOCIAL FORESTRY PROJECT-RAJASTHAN

COST-BENEFIT BASE CASE ANALYSIS AND SENSITIVITY TEST

RS 000

	29	30	31
<b>COSTS</b>			
<b>I. OVERHEAD COST</b>			
INVESTMENT COST /a	-	-	-
STAFF SALARIES AND ALLOWANCES /b	-	-	-
OTHER RECURRENT COST /c	-	-	-
<b>SUBTOTAL</b>	-	-	-
<b>II. FARM FORESTRY PRODUCERS COST</b>			
ECONOMIC COST TO PRODUCERS-IMPROVED (GRAFTED) ORCHARDS	-	-	-
ECONOMIC COST TO PRODUCERS-AGRO FORESTRY AND FARM WOOLLOTS	-	-	-
<b>SUBTOTAL</b>	-	-	-
<b>III. PLANTATION INVESTMENT AND MAINTENANCE COST</b>			
HOUSEHOLD FARM FORESTRY	244,750	244,750	244,750
COMMUNITY WOOLLOTS	525,000	525,000	525,000
REHABILITATED DEGRADED FORESTS	4376,000	4376,000	4376,000
ROADSIDE STRIP PLANTATION	700,000	700,000	700,000
CANALSIDE STRIP PLANTATION	222,400	222,400	222,400
RAILSIDE STRIP PLANTATION	900,000	900,000	900,000
FLOOD CONTROL AND TANK EMPOWERMENT	195,000	195,000	195,000
<b>TOTAL PROJECT COST</b>	<b>7927,400</b>	<b>7927,400</b>	<b>7927,400</b>
<b>BENEFITS</b>			
<b>I. FARM FORESTRY BENEFITS</b>			
ECONOMIC RETURNS FROM IMPROVED (GRAFTED) ORCHARDS	6454,000	6454,000	6454,000
ECONOMIC RETURNS FROM FARM FORESTRY	9400,000	26000,000	-
<b>SUBTOTAL</b>	<b>10354,000</b>	<b>32454,000</b>	<b>6454,000</b>
<b>II. PLANTATION BENEFITS</b>			
HOUSEHOLD FARM FORESTRY	4770,000	5130,000	5130,000
COMMUNITY WOOLLOTS	1470,000	1690,000	1700,000
REHABILITATED DEGRADED FOREST LANDS	8000,000	8000,000	8000,000
ROADSIDE STRIP PLANTATION	1538,000	1844,600	4475,400
CANALSIDE STRIP PLANTATION	677,940	794,520	63,000
RAILSIDE STRIP PLANTATION	250,000	340,000	340,000
FLOOD CONTROL AND TANK EMPOWERMENT	172,000	210,000	1050,000
<b>SUBTOTAL</b>	<b>17640,740</b>	<b>18721,120</b>	<b>21450,000</b>
<b>III. FUEL SAVING DEVICE BENEFITS</b>			
CREMATORIA	42,240	42,240	42,240
<b>TOTAL BENEFITS</b>	<b>12114,900</b>	<b>51419,360</b>	<b>28154,400</b>
<b>NET BENEFIT</b>			
<b>RAJASTHAN NET BENEFIT</b>	<b>114119,360</b>	<b>44391,760</b>	<b>21129,000</b>

Internal Rates of Return of Net Streams

INTERNAL RATE OF RETURN

SWITCHING VALUES AT IRR

STREAM	APPRAISAL VALUE	SWITCHING VALUE	PERCENTAGE CHANGE
BTOTR	457,407.00	267,206.93	-41.36%
CTOTR	267,206.93	457,407.00	71.18%

NPV @ 10% = 199,201  
IRR = 16.6%

SENSITIVITY TESTS

TEST CASES	TEST CASE VARIATIONS	PRESENT VALUE AT DCR OF 10.0%	NPV AS A % OF PRESENT VALUE AT DCR OF 10.0%	INTERNAL RATE OF RETURN
BASE CASE		199201.0	71.2%	16.6%
TEST CASE 1	BTOTR LAG 1 YEARS	140618.4	55.6%	14.0%
TEST CASE 2	BTOTR DOWN 20%	90719.4	36.0%	12.7%
TEST CASE 3	CTOTR UP 20%	136799.4	42.7%	14.3%
TEST CASE 4	CTOTR UP 20% DOWN 20%	45278.0	14.3%	11.5%

/a INCLUDES INVESTMENT COSTS OF FUEL SAVING DEVICES.  
/b STAFF SALARIES AND ALLOWANCES ATTRIBUTED TO NSFP BEING 100% OF TOTAL STAFF SALARIES AND ALLOWANCES IN YEARS 1 TO 4 AND 100% OF EXTENSION STAFF SALARIES AND ALLOWANCES IN YEARS 7 TO 15.  
/c OTHER RECURRENT COSTS ATTRIBUTED TO NSFP BEING 100% OF TOTAL OTHER RECURRENT COSTS IN YEARS 1 TO 4 AND 100% OF EXTENSION OTHER RECURRENT COSTS IN YEARS 7 TO 15.

INDIA  
 NATIONAL SOCIAL FORESTRY PROJECT-UTTAR PRADESH  
 COST-BENEFIT BASE CASE ANALYSIS AND SENSITIVITY TEST  
 RS 000

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>COSTS</b>															
<b>I. OVERHEAD COST</b>															
INVESTMENT COST /a	19355.00	55731.00	105997.00	97873.00	84187.00	72341.00	-	-	-	-	-	-	-	-	-
STAFF SALARIES AND ALLOWANCES /b	-	19882.00	38749.00	51860.00	71956.00	79459.00	5096.00	5096.00	5096.00	5096.00	5096.00	5096.00	5096.00	5096.00	5096.00
OTHER RECURRENT COST /c	-	3110.00	5341.00	7989.00	15190.00	21131.00	12746.00	12746.00	12746.00	12746.00	12746.00	12746.00	12746.00	12746.00	12746.00
<b>SUBTOTAL</b>	<b>19355.00</b>	<b>78723.00</b>	<b>150087.00</b>	<b>157722.00</b>	<b>171333.00</b>	<b>172931.00</b>	<b>17842.00</b>								
<b>II. FARM FORESTRY PRODUCERS COST</b>															
ECONOMIC COST TO PRODUCERS-AGRO FORESTRY AND FARM WOOLLOTS	23002.00	28952.00	34202.00	36120.00	38066.00	40040.00	13720.00	7896.00	2940.00	1988.00	1008.00	-	-	-	-
<b>III. PLANTATION INVESTMENT AND MAINTENANCE COST</b>															
ROADSIDE STRIP DEN. M'AGED	744.10	985.60	1915.90	2283.40	3227.70	1376.90	866.60	462.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00
RAILSIDE STRIP DEN. MANAGED	293.16	473.97	632.82	825.02	1036.84	470.75	289.64	148.61	43.40	43.40	43.40	43.40	43.40	43.40	43.40
GROUP FARM FORESTRY	-	2933.00	7112.00	15288.00	19488.00	10668.00	7252.00	3536.00	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00
COMMUNITY WOOLLOTS RAINFED	14665.00	17962.00	19103.00	14147.00	10647.00	5502.00	3388.00	2464.00	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00
ARJUN PLANTATIONS	1036.00	1596.00	1946.00	2128.00	2156.00	1148.00	616.00	294.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00
ROADSIDE STRIP DEPT. MANAGED	1488.20	1971.20	1599.50	1610.00	707.70	368.20	196.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
RAILSIDE STRIP DEPT. MANAGED	366.45	427.56	425.74	371.35	172.13	91.21	42.98	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60
<b>SUBTOTAL</b>	<b>18592.91</b>	<b>26349.33</b>	<b>32754.96</b>	<b>36652.77</b>	<b>37435.37</b>	<b>19625.66</b>	<b>12651.24</b>	<b>7028.21</b>	<b>3913.00</b>						
<b>TOTAL PROJECT COST</b>	<b>60949.91</b>	<b>134024.33</b>	<b>217043.96</b>	<b>230494.77</b>	<b>246834.37</b>	<b>232596.66</b>	<b>44213.24</b>	<b>32766.21</b>	<b>24495.00</b>	<b>23743.00</b>	<b>22763.00</b>	<b>21755.00</b>	<b>21755.00</b>	<b>21755.00</b>	<b>21755.00</b>
<b>BENEFITS</b>															
<b>I. FARM FORESTRY BENEFITS</b>															
ECONOMIC RETURNS FROM FARM FORESTRY	-	-	-	-	124000.00	128000.00	132000.00	384000.00	396000.00	532000.00	600000.00	412000.00	424000.00	140000.00	268000.00
<b>II. PLANTATION BENEFITS</b>															
ROADSIDE STRIP DEN. MANAGED	-	-	24.00	48.00	96.00	1921.00	1080.00	1944.00	1912.00	2760.00	936.00	972.00	1912.00	2824.00	3680.00
RAILSIDE STRIP DEN. MANAGED	-	-	9.60	21.60	36.00	318.40	401.20	465.60	527.20	654.40	340.80	439.20	544.00	653.20	845.60
GROUP FARM FORESTRY	-	-	-	240.00	720.00	1800.00	12060.00	21400.00	40080.00	39760.00	1760.00	10864.00	20572.00	40648.00	42544.00
COMMUNITY WOOLLOTS RAINFED	-	-	1200.00	2160.00	2880.00	36720.00	29840.00	22000.00	9120.00	9040.00	38960.00	34736.00	29888.00	17072.00	17696.00
ARJUN PLANTATIONS	-	-	4.80	9.60	614.40	2265.60	4667.20	7064.00	9660.00	11257.60	12456.00	12456.00	12456.00	12456.00	12456.00
ROADSIDE STRIP DEPT. MANAGED	-	-	48.00	96.00	120.00	1904.00	1872.00	960.00	944.00	48.00	1776.00	1888.00	1136.00	1192.00	384.00
RAILSIDE STRIP DEPT. MANAGED	-	-	12.00	21.60	28.80	365.60	295.20	225.60	156.00	22.40	386.40	345.60	296.40	244.00	112.00
<b>SUBTOTAL</b>	<b>-</b>	<b>-</b>	<b>1298.40</b>	<b>2596.80</b>	<b>4495.20</b>	<b>44277.60</b>	<b>50217.60</b>	<b>54859.20</b>	<b>62200.80</b>	<b>63542.40</b>	<b>56615.20</b>	<b>61720.80</b>	<b>66824.40</b>	<b>73692.00</b>	<b>77037.60</b>
<b>TOTAL BENEFITS</b>	<b>-</b>	<b>-</b>	<b>1298.40</b>	<b>2596.80</b>	<b>128495.20</b>	<b>172277.60</b>	<b>182217.60</b>	<b>438859.20</b>	<b>458200.80</b>	<b>595542.40</b>	<b>456615.20</b>	<b>473720.80</b>	<b>490824.40</b>	<b>213692.00</b>	<b>345037.60</b>
<b>NET BENEFIT</b>															
UTTAR PRADESH NET BENEFIT	-60949.91	-134024.33	-215745.56	-227897.97	-118339.17	-60318.46	138604.36	404092.99	433505.80	571799.40	433852.20	451965.80	469071.40	191937.00	323282.60

INDIA  
 NATIONAL SOCIAL FORESTRY PROJECT-UTTAR PRADESH  
 COST-BENEFIT BASE CASE ANALYSIS AND SENSITIVITY TEST

RS 000

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
<b>COSTS</b>															
<b>I. OVERHEAD COST</b>															
INVESTMENT COST /a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STAFF SALARIES AND ALLOWANCES /b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTHER RECURRENT COST /c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>SUBTOTAL</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>II. FARM FORESTRY PRODUCERS COST</b>															
<b>ECONOMIC COST TO PRODUCERS-AGRO FORESTRY AND FARM WOOLLOTS</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>III. PLANTATION INVESTMENT AND MAINTENANCE COST</b>															
ROADSIDE STRIP BEN. MANAGED	126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00	126.00
RAILSIDE STRIP BEN. MANAGED	43.40	43.40	43.40	43.40	43.40	43.40	43.40	43.40	43.40	43.40	43.40	43.40	43.40	43.40	43.40
GROUP FARM FORESTRY	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00	1540.00
COMMUNITY WOOLLOTS RAINFED	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00	1960.00
ARJUN PLANTATIONS	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00
ROADSIDE STRIP DEPT. MANAGED	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
RAILSIDE STRIP DEPT. MANAGED	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60	19.60
<b>SUBTOTAL</b>	<b>3913.00</b>														
<b>TOTAL PROJECT COST</b>	<b>3913.00</b>														
<b>BENEFITS</b>															
<b>I. FARM FORESTRY BENEFITS</b>															
<b>ECONOMIC RETURNS FROM FARM FORESTRY</b>	<b>376000.00</b>	<b>388000.00</b>	<b>400000.00</b>	<b>412000.00</b>	<b>548000.00</b>	<b>416000.00</b>	<b>132000.00</b>	<b>136000.00</b>	<b>388000.00</b>	<b>524000.00</b>	<b>372000.00</b>	<b>404000.00</b>	<b>416000.00</b>	<b>428000.00</b>	<b>144000.00</b>
<b>II. PLANTATION BENEFITS</b>															
ROADSIDE STRIP BEN. MANAGED	1320.00	1320.00	2044.00	2044.00	2808.00	1268.00	1284.00	1972.00	2024.00	2748.00	1372.00	1372.00	2024.00	2024.00	2676.00
RAILSIDE STRIP BEN. MANAGED	513.60	580.00	646.40	712.80	845.60	513.60	586.40	660.80	736.80	880.80	563.20	629.60	696.00	762.40	895.20
GROUP FARM FORESTRY	8624.00	16344.00	24064.00	39504.00	39504.00	8624.00	15744.00	22960.00	37392.00	37776.00	9680.00	16320.00	22940.00	36290.00	36290.00
COMMUNITY WOOLLOTS RAINFED	44576.00	37856.00	31136.00	17696.00	17696.00	44576.00	38336.00	32000.00	18848.00	18944.00	45920.00	37200.00	32480.00	19040.00	19040.00
ARJUN PLANTATIONS	12456.00	12456.00	12456.00	12456.00	12456.00	12456.00	12456.00	12456.00	12456.00	12456.00	12456.00	12456.00	12456.00	12456.00	12456.00
ROADSIDE STRIP DEPT. MANAGED	1872.00	1872.00	1128.00	1128.00	384.00	1768.00	1800.00	1140.00	1156.00	480.00	1784.00	1784.00	1132.00	1132.00	480.00
RAILSIDE STRIP DEPT. MANAGED	444.00	377.60	311.20	244.80	112.00	444.00	385.60	325.60	264.00	134.40	444.40	400.00	333.60	267.20	174.40
<b>SUBTOTAL</b>	<b>69805.60</b>	<b>70805.60</b>	<b>71805.60</b>	<b>73805.60</b>	<b>73805.60</b>	<b>69649.60</b>	<b>70592.00</b>	<b>71534.40</b>	<b>72076.80</b>	<b>73419.20</b>	<b>72241.60</b>	<b>72161.60</b>	<b>72081.60</b>	<b>71921.60</b>	<b>71921.60</b>
<b>TOTAL BENEFITS</b>	<b>445805.60</b>	<b>458805.60</b>	<b>471805.60</b>	<b>485805.60</b>	<b>621805.60</b>	<b>485649.60</b>	<b>202592.00</b>	<b>207534.40</b>	<b>460876.80</b>	<b>597419.20</b>	<b>444241.60</b>	<b>476161.60</b>	<b>488081.60</b>	<b>499921.60</b>	<b>215921.60</b>
<b>NET BENEFIT</b>															
<b>UTTAR PRADESH NET BENEFIT</b>	<b>441892.60</b>	<b>454892.60</b>	<b>467892.60</b>	<b>481892.60</b>	<b>617892.60</b>	<b>481736.60</b>	<b>198679.00</b>	<b>203621.40</b>	<b>456963.00</b>	<b>593506.20</b>	<b>460328.60</b>	<b>472248.60</b>	<b>484168.60</b>	<b>494008.60</b>	<b>212008.60</b>

## NATIONAL SOCIAL FORESTRY PROJECT-UTAR PRADESH

## COST-BENEFIT BASE CASE ANALYSIS AND SENSITIVITY TEST

RS 000

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## COSTS

## I. OVERHEAD COST

INVESTMENT COST /a -  
 STAFF SALARIES AND ALLOWANCES /b -  
 OTHER RECURRENT COST /c -

SUBTOTAL -

## II. FARM FORESTRY PRODUCERS COST

ECONOMIC COST TO PRODUCERS-ARBO FORESTRY AND FARM HOBBLOTS -

## III. PLANTATION INVESTMENT AND MAINTENANCE COST

ROADSIDE STRIP DEPT. MANAGED 126.00  
 RAILSIDE STRIP DEPT. MANAGED 43.40  
 GROUP FARM FORESTRY 1540.00  
 COMMUNITY HOBBLOTS RAISED 1760.00  
 ARJUN PLANTATIONS 140.00  
 ROADSIDE STRIP DEPT. MANAGED 84.00  
 RAILSIDE STRIP DEPT. MANAGED 19.60

SUBTOTAL 3913.00

TOTAL PROJECT COST 3913.00

## BENEFITS

## I. FARM FORESTRY BENEFITS

ECONOMIC RETURNS FROM FARM FORESTRY -

## II. PLANTATION BENEFITS

ROADSIDE STRIP DEPT. MANAGED 2440.00  
 RAILSIDE STRIP DEPT. MANAGED 1148.00  
 GROUP FARM FORESTRY 9480.00  
 COMMUNITY HOBBLOTS RAISED 113120.00  
 ARJUN PLANTATIONS 12000.00  
 ROADSIDE STRIP DEPT. MANAGED 3760.00  
 RAILSIDE STRIP DEPT. MANAGED 1222.40

SUBTOTAL 143610.40

TOTAL BENEFITS 143610.40

## NET BENEFIT

UTAR PROJECT NET BENEFIT 139705.40

## Internal Rates of Return of Net Streams

NRCRUP 24.94%

## SWITCHING VALUES AT IRR

STREAM	APPRAISAL VALUE	SWITCHING VALUE	PERCENTAGE CHANGE
BTOTUP	1,013,125.00	800,443.50	-20.85%
CTOTUP	800,443.50	1,013,125.00	126.52%

NPV @ IRR = 1,012,602.3  
 IRR = 25%

## SENSITIVITY TESTS

TEST CASES	TEST CASE VARIATIONS	PRESENT VALUE AT IRR OF 12.00%	NPV AS A % OF PRESENT COSTS AT IRR OF 12.00%	INTERNAL RATE OF RETURN
BASE CASE		1012602.3	126.52	25.02
TEST CASE 1	BTOTUP LAJ 1 YEARS	818410.8	102.22	21.42
TEST CASE 2	BTOTUP DOWN 20%	650227.1	81.22	20.92
TEST CASE 3	CTOTUP UP 20%	852573.6	86.82	21.62
TEST CASE 4	CTOTUP UP 20% BTOTUP DOWN 20%	809748.4	51.02	17.92

/a INCLUDES INVESTMENT COSTS OF FUEL SAWING DEVICES.

/b STAFF SALARIES AND ALLOWANCES ATTRIBUTED TO NSFP BEING 100% OF TOTAL STAFF SALARIES AND ALLOWANCES IN YEARS 1 TO 4 AND 60% OF EXTENSION STAFF SALARIES AND ALLOWANCES IN YEARS 7 TO 10.

/c OTHER RECURRENT COSTS ATTRIBUTED TO NSFP BEING 100% OF TOTAL OTHER RECURRENT COSTS IN YEARS 1 TO 4 AND 100% OF EXTENSION OTHER RECURRENT COSTS IN YEARS 7 TO 10.

## INDIA

## NATIONAL SOCIAL FORESTRY PROJECT

## Summary of Financial and Economic Prices

	Unit	Financial Prices (Rs)				Conversion Factor	Economic Prices (Rs)			
		UP	Rajasthan	Gujarat	HP		UP	Rajasthan	Gujarat	HP
Fuelwood	mt	500	200	200	-	0.8	400	160	160	-
-conifer	mt	-	-	-	300	0.8	-	-	-	240
-broadleaf	mt	-	-	-	400	0.8	-	-	-	320
Poles	no	25	14	13	-	0.8	20	11.2	10.4	-
Small timber	cu m	1500	400	-	-	0.8	1200	320	-	-
Bamboo	no	-	-	3	-	0.8	-	-	2.4	-
Leaf fodder	mt	-	-	50	150	0.8	-	-	40	120
Grass	mt	100	50	50	250	0.8	80	40	40	200
Dry fodder grass	mt	-	-	100	-	0.8	-	-	80	-
Stemwood	cu m	-	-	-	400	0.8	-	-	-	320
Edible flower	mt	2000	-	-	-	0.8	1600	-	-	-
Fruit	mt	1000	1000	1000	-	0.8	800	800	800	-
Ber fruit	mt	-	-	1500	-	0.8	-	-	1200	-
Neem seeds	mt	-	-	1000	-	0.8	-	-	800	-
Bidi leaves	mt	-	-	1000	-	0.8	-	-	800	-
Seed pods	mt	-	250	-	-	0.8	-	200	-	-
Fallen wood/lops	mt	-	200	-	-	0.8	-	160	-	-
Oilseeds	mt	1000	-	-	-	0.8	800	-	-	-
Cocoons	('000 nos)	250	-	-	-	0.8	200	-	-	-
Unskilled labour	mandays	9	9	13	10					
(Shadow wage rate)		6.3	6.3	9.1	7.0	0.8	5.0	5.0	7.3	5.6
Stoves	each	-	-	100	75	0.68	-	-	68	51
Crematoria	each	-	5000	4000	5000	0.8	-	4000	3200	4000

Detailed conversion factors are presented in Project Files.

INDIA

NATIONAL SOCIAL FORESTRY PROJECT

SELECTED DOCUMENTS AND DATA AVAILABLE IN THE PROJECT FILE

- B1 Gujarat Subproject, Project Preparation Report, Gujarat Community Forest Project Phase II, Gujarat State Forest Department, Vadodara, April 1984
- B2 Himachal Pradesh Subproject, Project Preparation Report National Social Forestry Project in Himachal Pradesh, Department of Forest Farming & Soil Conservation, Shimla, August 8, 1984
- B3 Rajasthan Subproject, Project Preparation Report, Social Forestry Project, Forest Department, Government of Rajasthan, Jaipur, March 1984.
- B4 Uttar Pradesh Subproject, Project Preparation Report, Uttar Pradesh Social Forestry Project Phase II (1984-1990) (Two Volumes) Social Forestry Directorate, U.P., February, 1984.
- B5 Project Paper, India National Social Forestry, USAID/India, (Unclassified), Department of State, Agency for International Development, Washington, D.C. 20523, April 23, 1985.
- B6 Government Orders and Proforma Agreements concerning private wasteland planting schemes, tree tenure schemes, community managed woodlots and tree fodder plantations: Uttar Pradesh, Government Order October 16, 1981 and Proforma Agreement; Gujarat, Proforma Agreements for Malki lands and Village Woodlots; Rajasthan, Allotment Rules; Himachal Pradesh, Government Order (Letter No. 1 Ft(F) 7-/81 dated 19 July 1984) "Social Forestry-Involvement of People" and No. FT60-36/78 (M) "Management of private areas under Section 38 of the Indian Forest Act - Raising of plantations thereon."
- C1 Project File Gujarat
  - Item 1 Description of the Project
  - Item 2 Organization and Training
  - Item 3 Research
  - Item 4 Cost Tables
  - Item 5 Distribution Modes, Rates of Return and Cost Recovery to Forest Department for Plantation Models

**C2 Project File Himachal Pradesh**

- Item 1 Description of the Project
- Item 2 Organization and Training
- Item 3 Research
- Item 4 Cost Tables
- Item 5 Distribution Modes, Rates of Return and Cost Recovery to Forest Department for Plantation Models
- Item 6 Copy of letter dated September 26, 1983 from the Secretary (Forests) to the Government of Himachal Pradesh, Management of Private Areas under Section 38 of the Indian Forest Act - Raising of plantation thereon.
- Item 7 Copy of letter dated July 19, 1984 from Secretary (Forests) to the Government of Himachal Pradesh to the Chief Conservator of Forests, "Social Forestry - Involvement of People."
- Item 8 Management of Private Areas under Section 38 of the India Forest Act - Raising of plantations thereon. Copy of letter dated December 20, 1984 from the Chief Conservator of Forests H.P. to all CFs/DFOs(T) in H.P.
- Item 9 Section 38 of the India Forest Act, 1927 (As modified up to December 1, 1973).

**C3 Project File Rajasthan**

- Item 1 Description of the Project
- Item 2 Organization and Training
- Item 3 Research
- Item 4 Cost Tables
- Item 5 Distribution Modes, Rates of Return and Cost Recovery to Forest Department for Plantation Models

**C4 Project File Uttar Pradesh**

- Item 1 Description of the Project
- Item 2 Organization and Training
- Item 3 Research
- Item 4 Cost Tables
- Item 5 Distribution Modes, Rates of Return and Cost Recovery to Forest Department for Plantation Models

**C5 Project File**

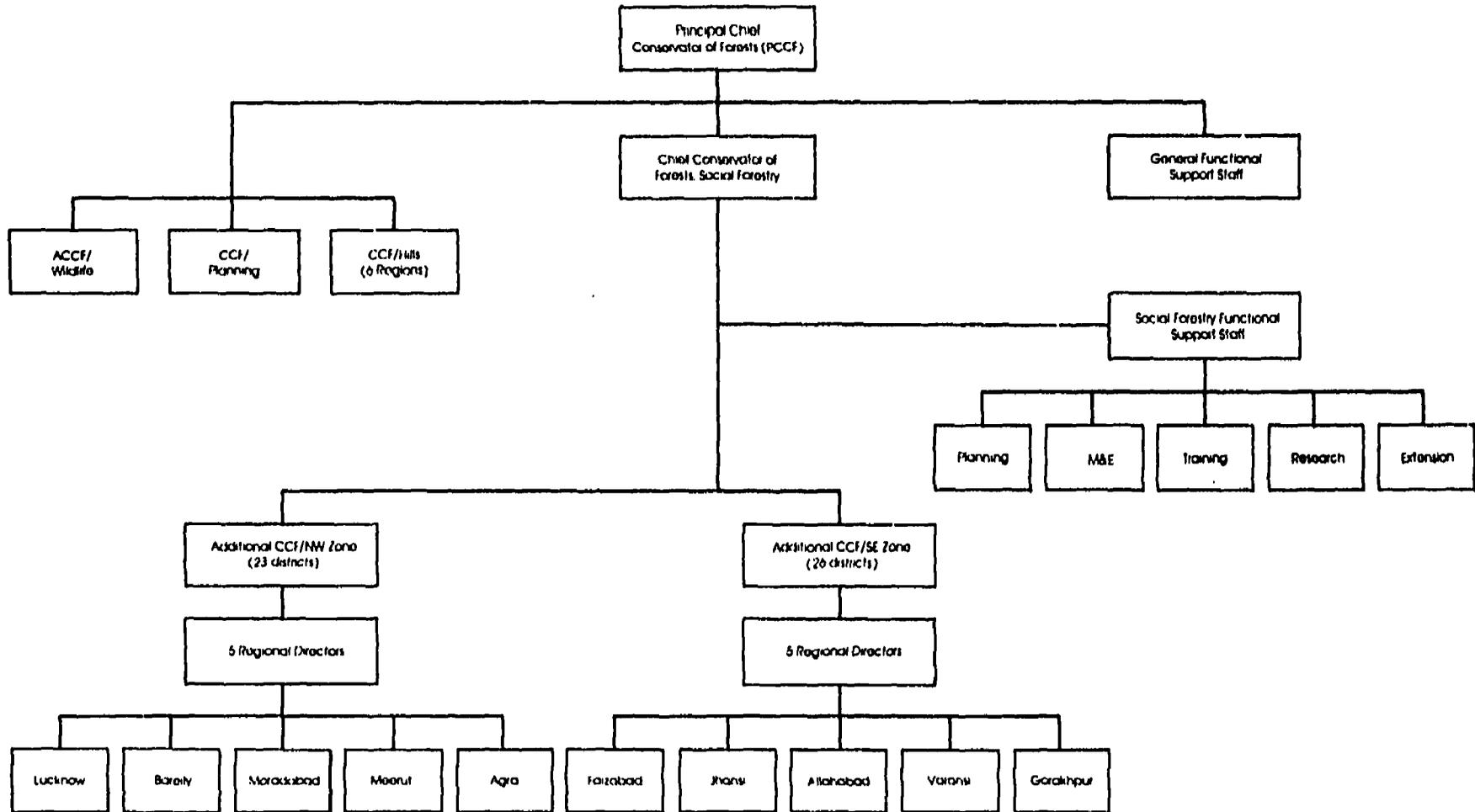
- Item 1 Description of GOI Subproject (Social Forestry Support Office)
- Item 2 Cost Tables Social Forestry Support Office
- Item 3 Cost Tables - Total Project
- Item 4 Management and Choice of Species in Social Forestry
- Item 5 Monitoring and Evaluation

- Item 6 Training Curricula in Social Forestry
- Item 7 Improved Stoves and Crematoria
- Item 8 Social Impact and Benefit
- Item 9 Improved Market Function as a Social Forestry Strategy
- Item 10 Potential Roles of Non-Governmental Organization in Social Forestry
- Item 11 Suggested Guidelines for Community Forest Management Plan
- Item 12 Social Forestry Management Planning Officer, Job Description
- Item 13 Tree Growing Farm Budgets

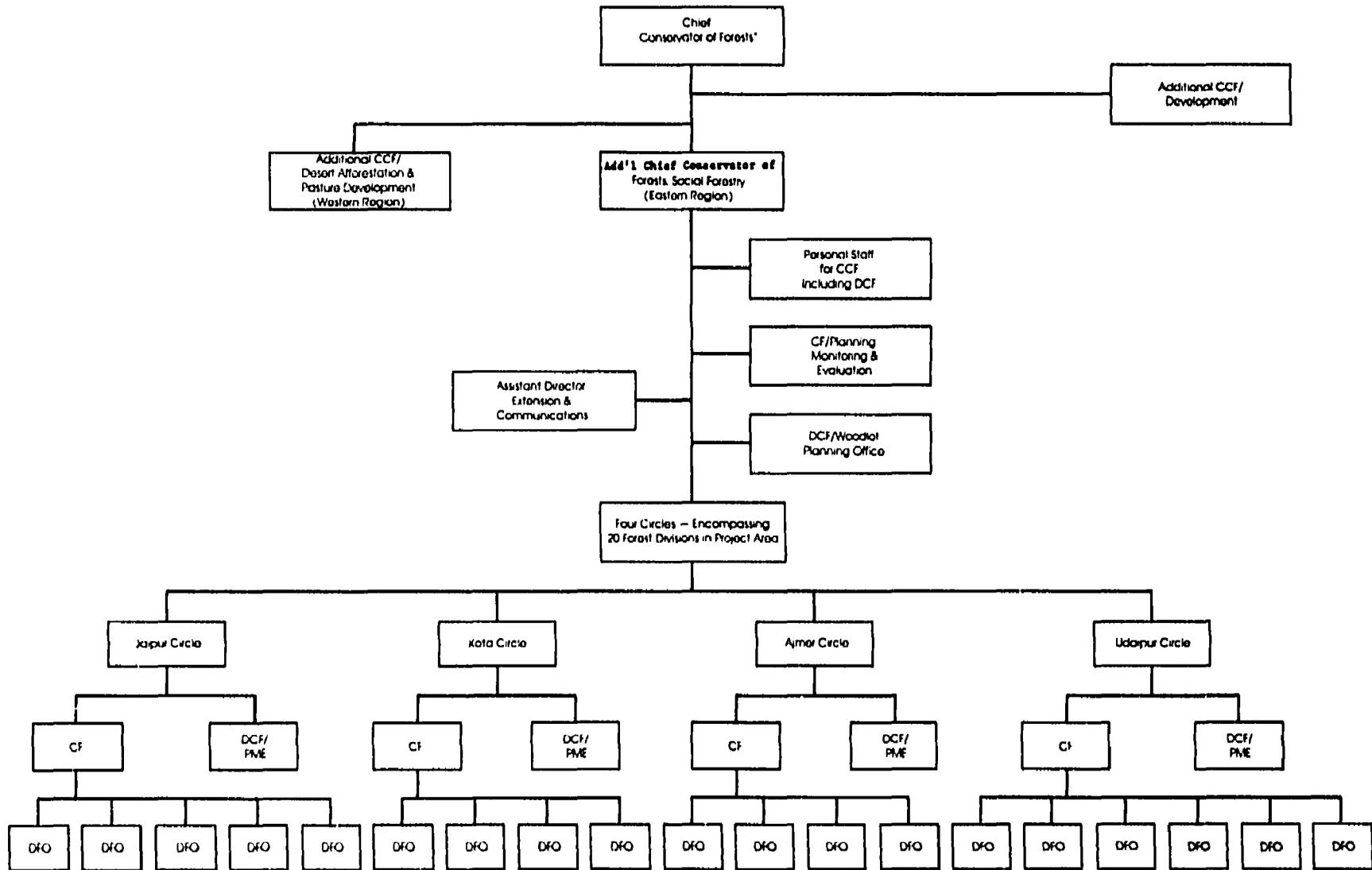
**C6 Project File - Cost Tables, Financial and Economic Analysis**

- Item 1 Inflation Rates Used.
- Item 2 Notes on Economic Analysis (Conversion Factors Used in Produce Economic Values and Specific Conversion Factors)
- Item 3 Summary of Distribution Modes - Plantation Outputs Accuring to FD, Panchayats and Individuals by % of Products
- Item 4 Summary of Plantation Establishment and Maintenance Costs for 4 States in Rs from Year 0

INDIA  
**NATIONAL SOCIAL FORESTRY PROJECT**  
 Proposed Forest Department Organization  
 Uttar Pradesh State  
 Organizational Chart

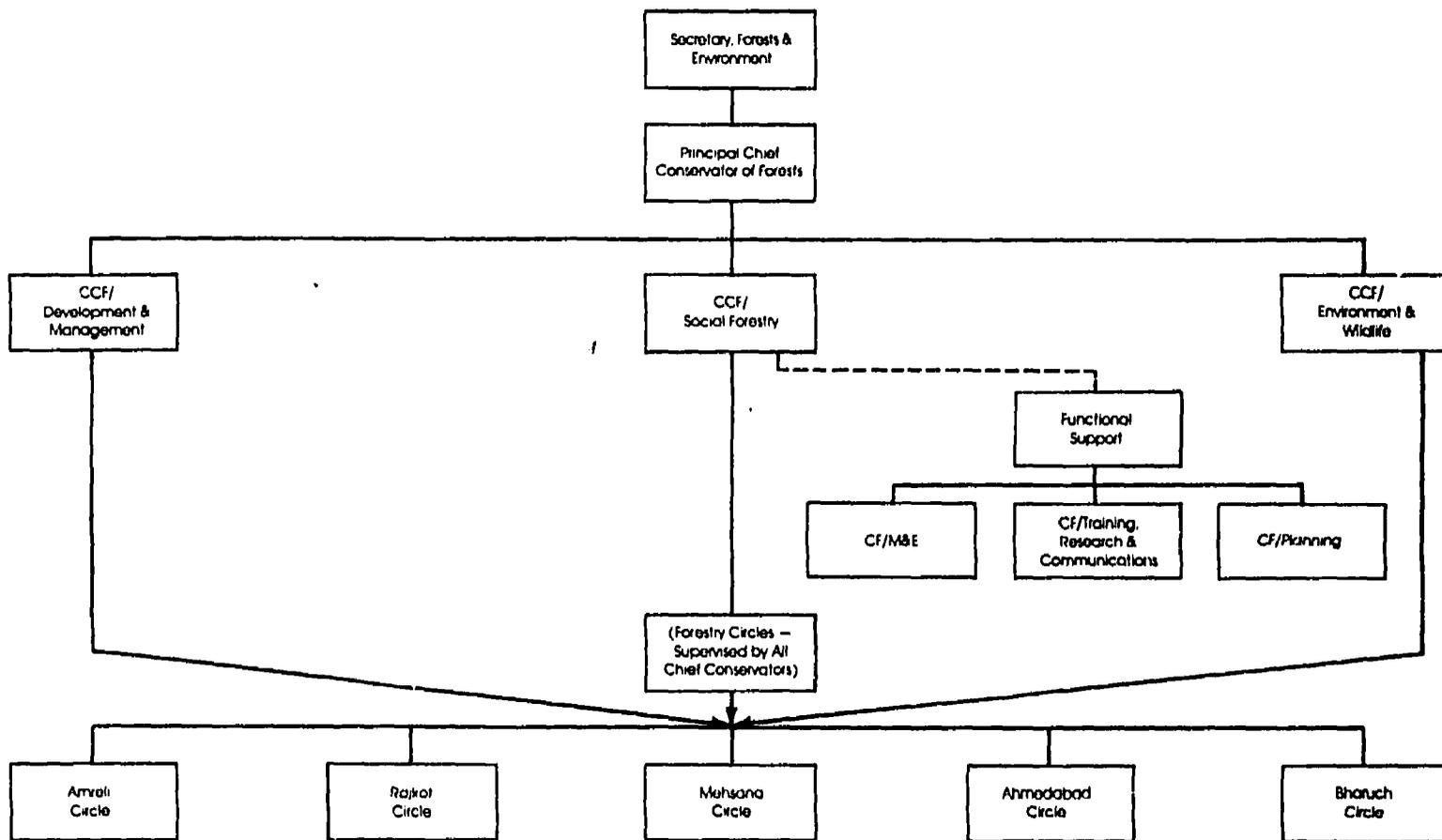


**INDIA**  
**NATIONAL SOCIAL FORESTRY PROJECT**  
**Proposed Forest Department Organization**  
**Rajasthan State**  
**Organizational Chart**

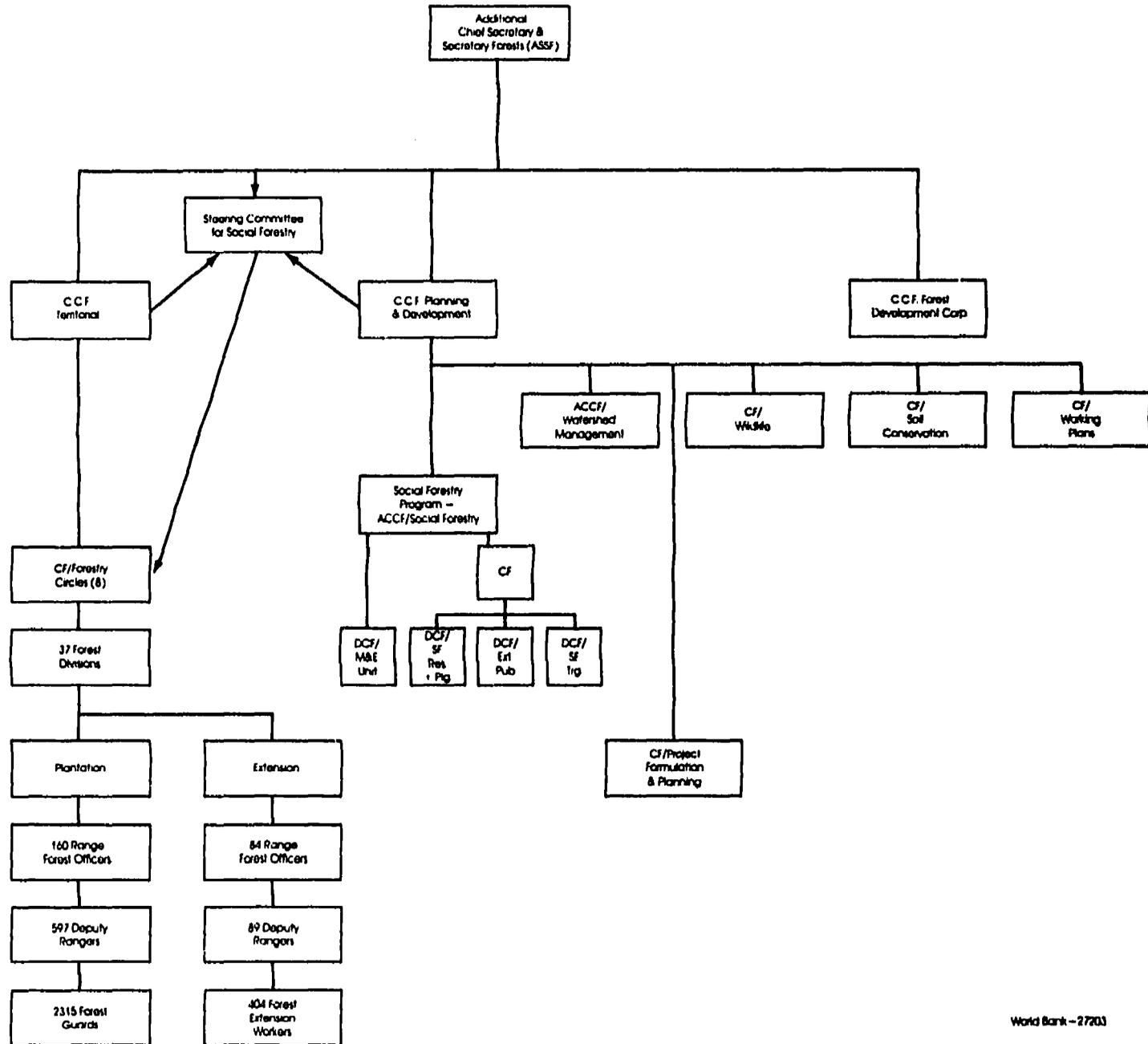


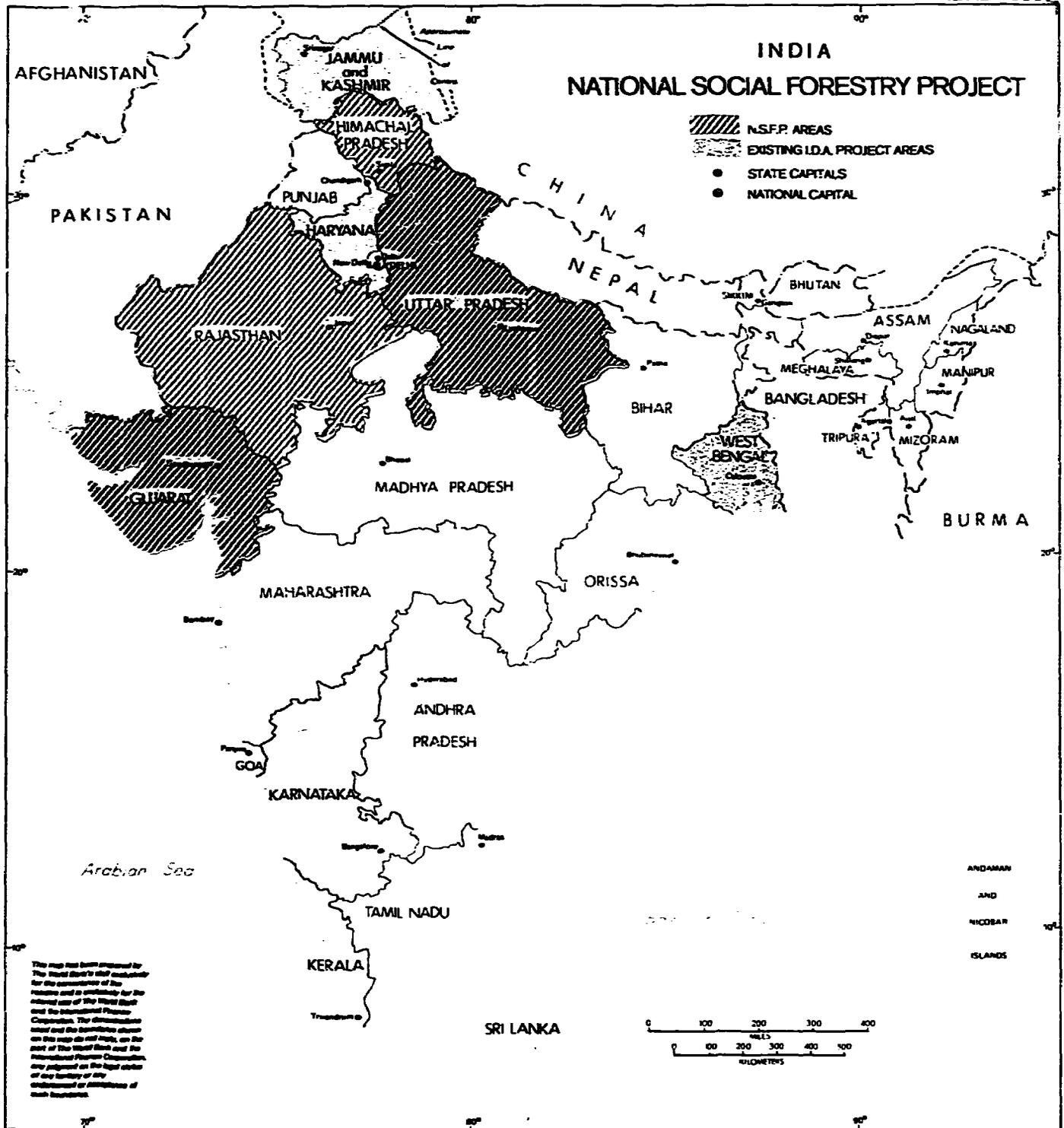
\*Also directly supervises territorial work in eastern regions and western regions

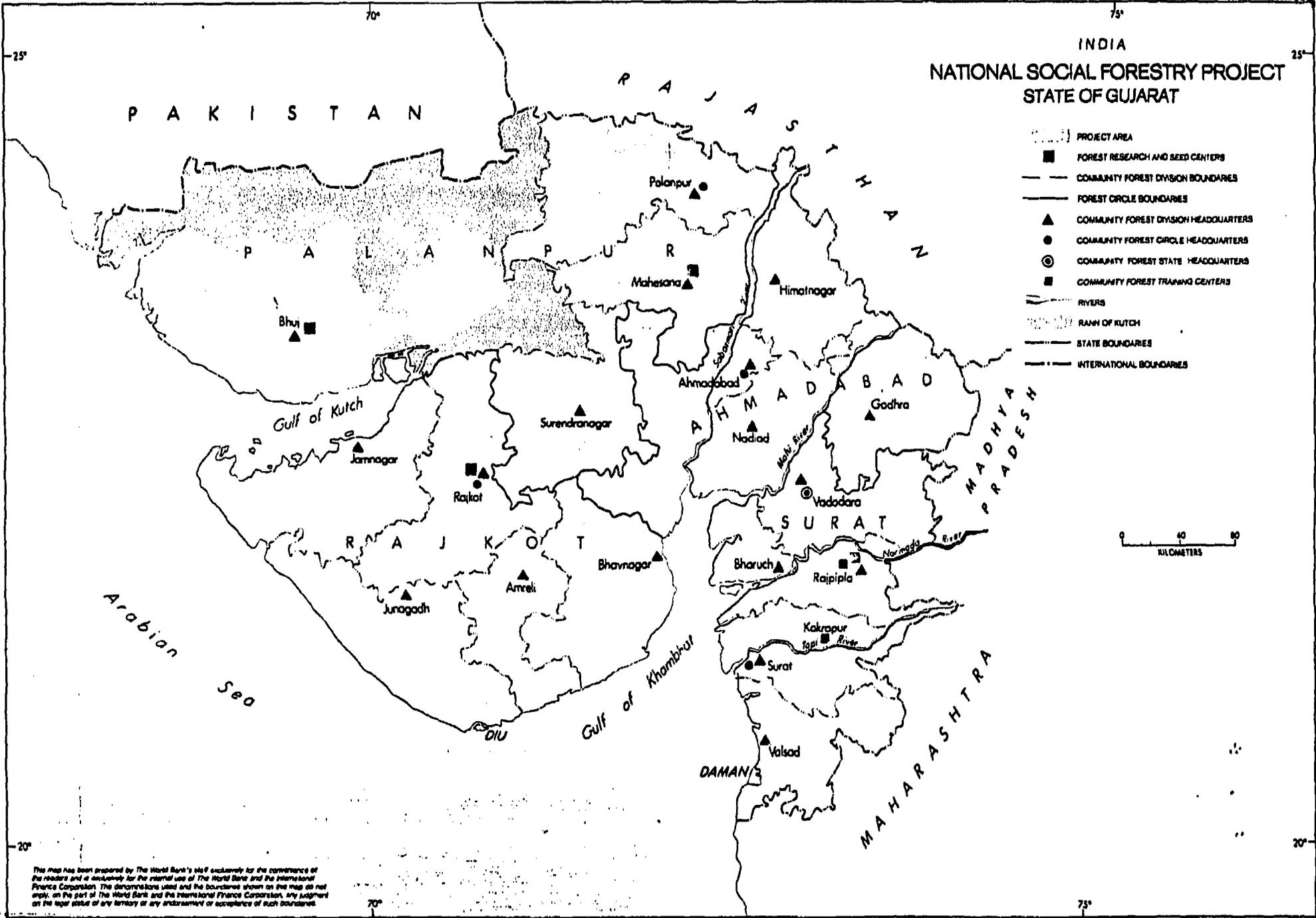
INDIA  
 NATIONAL SOCIAL FORESTRY PROJECT  
 Proposed Forest Department Organization  
 Gujarat State  
 Organizational Chart



INDIA  
**NATIONAL SOCIAL FORESTRY PROJECT**  
 Proposed Forest Department Organization  
 Himachal Pradesh State  
 Organizational Chart





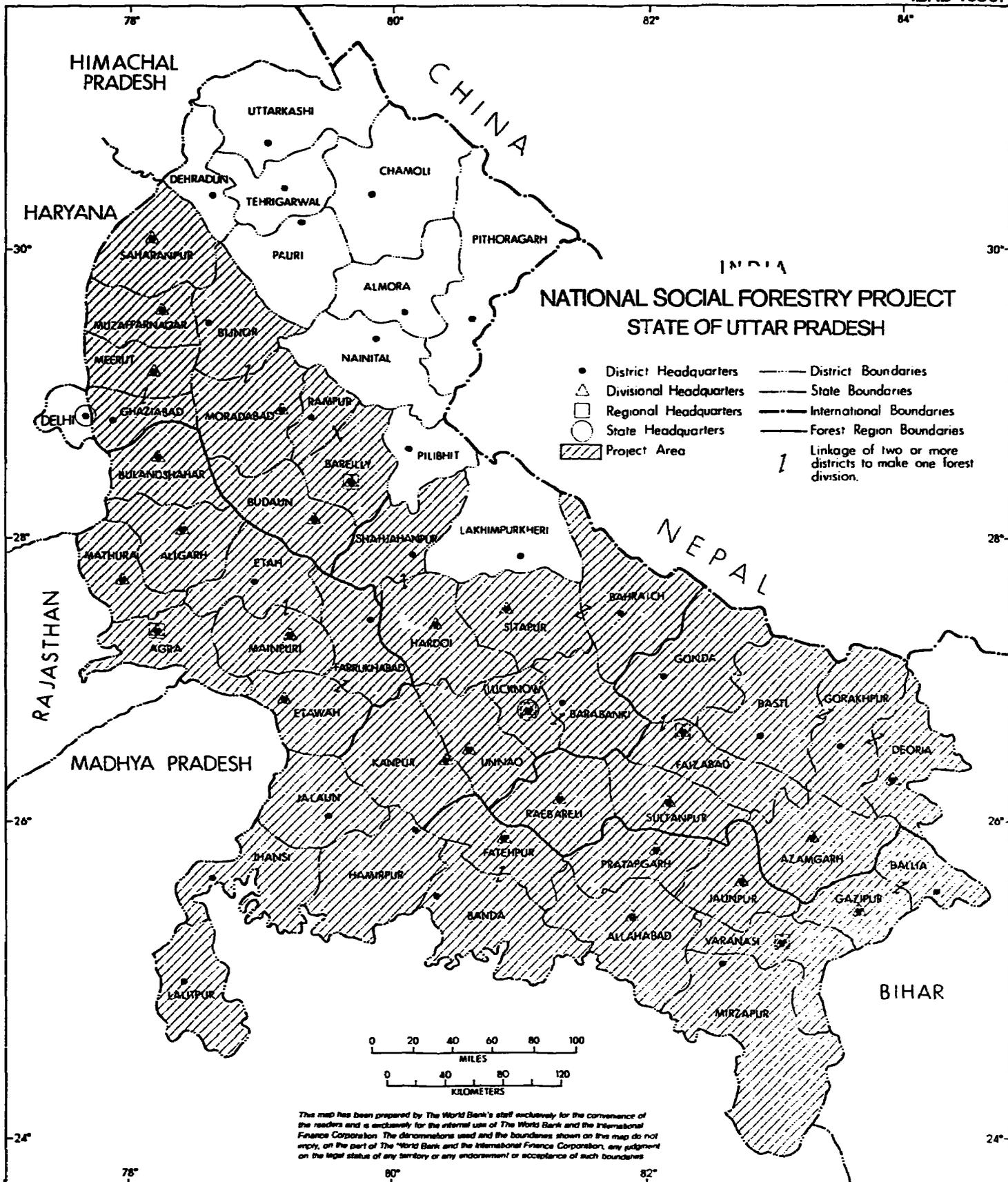


INDIA  
**NATIONAL SOCIAL FORESTRY PROJECT**  
**STATE OF GUJARAT**

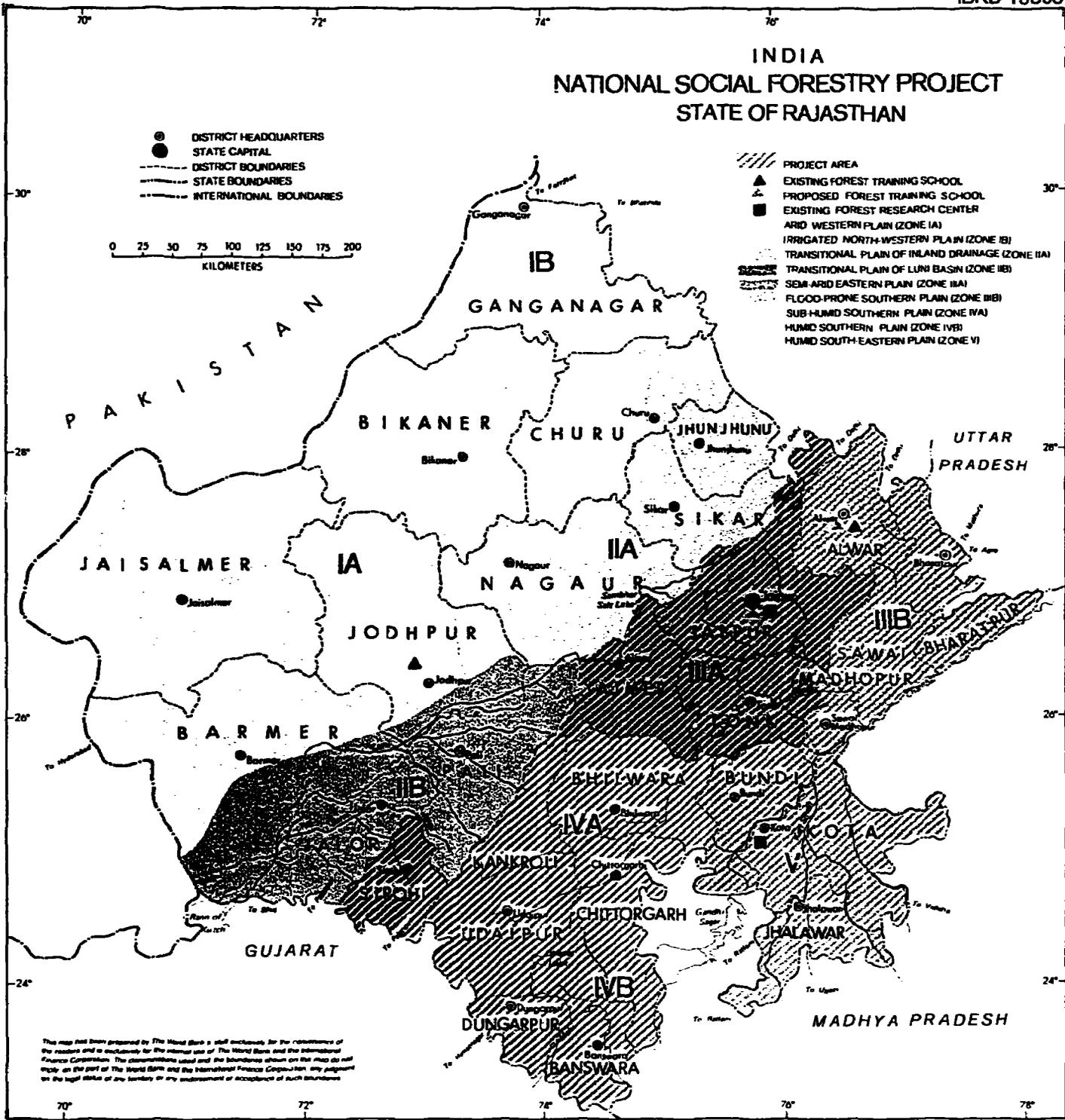
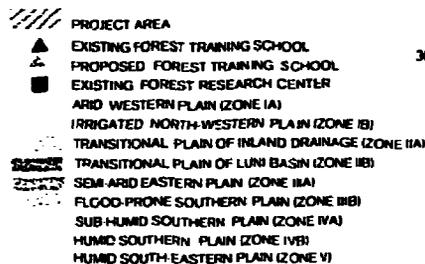
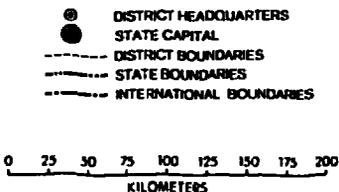
- PROJECT AREA
- FOREST RESEARCH AND SEED CENTERS
- COMMUNITY FOREST DIVISION BOUNDARIES
- FOREST CIRCLE BOUNDARIES
- COMMUNITY FOREST DIVISION HEADQUARTERS
- COMMUNITY FOREST CIRCLE HEADQUARTERS
- COMMUNITY FOREST STATE HEADQUARTERS
- COMMUNITY FOREST TRAINING CENTERS
- RIVERS
- RANN OF KUTCH
- STATE BOUNDARIES
- INTERNATIONAL BOUNDARIES



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# INDIA NATIONAL SOCIAL FORESTRY PROJECT STATE OF RAJASTHAN



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JAMMU and KASHMIR

INDIA  
NATIONAL SOCIAL FORESTRY PROJECT  
STATE OF HIMACHAL PRADESH

CHAMBA

LAHUL and SPITI

KANGRA

KULU

KINNAUR

CHINA

PUNJAB

UNA

MANDI

HAMIRPUR

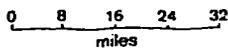
SHIMLA

SOLAN

UTTAR PRADESH

SIRMAUR

HARYANA



- ▲ PROJECT AREA
- ▲ FOREST CIRCLE HEADQUARTERS
- ▩ FOREST TRAINING SCHOOL
- AGRICULTURAL UNIVERSITIES
- TOWNS AND VILLAGES
- ⊙ DISTRICT HEADQUARTERS
- RIVERS

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