UNIT 25

A MODEL MICROPLAN FOR JOINT FOREST MANAGEMENT

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ANNEXURES

This Microplan was prepared for the IAEP Scheme in Borduar Reserved Forest Area of Assam. It was prepared by the villagers of Aliha, Dhanipara and Khamar, Assam with the help of Regional Centre : NAEB, NEHU, Shillong and Social Forestry Wing of Assam Forest Department.

25.0 INTRODUCTION

The Borduar Reserved Forest is situated in Palasbari community development block of Guwahati subdivision in Kamrup district of Assam (Fig. 25.1). The original vegetation of the forest comprised sal, teak and many other broad-leaved tree species. Due to various human activities such as illegal tree felling, encroachment, excessive grazing and growing of agricultural crops within the RF, substantial portion of the RF is now either an open forest or degraded scrub land. During the 9th Plan period, a portion of this RF was proposed to be regenerated by the State Forest Department with funding support from the National Afforestation and Eco-development Board (NAEB), Ministry of Environment and Forests, Government of India. The project was sanctioned by NAEB as an Integrated Afforestation and Eco-development Projects (IAEP) Scheme in Kamrup district for an area of *ca* 350 ha to be implemented over a period of five years i.e. from 1997 to 2002. Different components of the scheme as sanctioned by the funding agency are : Assisted Natural Regeneration (ANR), Management Intervention (Artificial Regeneration), Soil and Water Conservation Measures, Awareness Raising and Entry Point Activities.

One of the essential components of the IAEP Scheme is to implement it through a sound microplan, to be prepared jointly by the concerned village communities and the project implementing agency. The microplanning process is aimed to ensure :

- decentralised down-top inter-sectoral planning process
- linkages of the programme with the beneficiaries
- adequate say and role of villagers in decision making process
- assessment of needs of participating communities by themselves
- planning, projecting and regulating the flow of benefits to the participants in a participatory way
- identifying the local resources and setting the priorities by the user group themselves
- preparing a local site-specific plan which is simple, transparent and easy to work.

25.1 OBJECTIVES

The specific objectives of the microplan were set as per the guidelines of the IAEP Scheme, which can be broadly grouped into two categories as follows :

25.1.1 Short Term Objectives

- To meet immediate need of fuelwood, fodder and small timber of the villagers (VFC) through sustained production.
- To generate employment for rural poor dependent on the forest and adjoining lands and for gainful production of wood and non-wood forest products.

- To inculcate an appreciation toward JFM among the village community by involving them in planning and regeneration efforts.
- To encourage farmers to grow multipurpose trees on their farm lands under agro-forestry.

25.1.2 Long Term Objectives

- To rehabilitate the vegetative cover of the degraded forests for ecological restoration, conservation and improvement of the biomass productivity in respect of NTFPs besides fuelwood and fodder.
- To conserve soil and moisture and to improve the overall water holding capacity of degraded lands, and of water resources for the agricultural land.
- To check forest degradation and promote conservation of biodiversity.
- To help in achieving the national objective of getting 33 per cent land area under tree and grass cover.

25.2 METHODS

25.2.1 Constitution of Microplan Working Group

For the preparation and implementation of microplan in the Borduar RF area, a Microplan Working Group was constituted in the meeting of the Executive Committee of Borduar Reserved Forest Protection and Regeneration Committee (BRFPRC) held on 13 October, 2000. The following persons were nominated as members of the Working Group.

1. Mr. Beli Ram Rabha
2. Mr. Kailash Rabha
3. Mr. Mukunda Chandra Rabha
4. Mr. Ananta Rabha
5. Mr. Kumar Rabha
6. Ms. Dipali Rabha
7. Mr. Singh Chandra Rabha
8. Mr. Majhi Ram Rabha
9. Mr. Aswini Rabha
10. Mr. Jaycharan Talukdar
11. Mr. C. R. Das
12. Mr. N. N. Das
13. Mr. A. Rahman
14. Mr. D. Das
15. Mr. K. Sarma

The members of the Working Group along with other villagers visited the project area several times. A questionnaire was designed by the working group for collection of data pertaining to socio-economic conditions of the villagers and resources available in the villages. They also intended to assess the needs and problems of the participating villagers.

Before beginning the microplan preparation, the members of the Working Group, particularly the outsiders i.e. the officials of the Forest Department and Regional Centre acquainted themselves with the villagers through informal discussions and ice-breaking exercises. The team built rapport with the villagers through sensitising themselves with their problems and giving due regard to their traditional values and lifestyles. The villagers were made clear about the objectives of the microplan preparation and need of their active involvement in the microplanning process. After understanding the objectives, the villagers volunteered to be the members of the Working Group.

25.2.2 PRA Exercise

PRA exercises were carried out during 13 October to 27 November, 2000. Group discussions, experience sharing, account of main events, general meetings and one-to-one discussion with the villagers in their own setting were the methods followed for PRA exercise. Informations were also collected through illustrations and maps, which were prepared by the villagers themselves or were prepared with their active participation (Annexure 1 to 7). One General Body meeting in each village was held to discuss the common problems faced by the villagers, and also to ascertain the extent of degraded forest areas that the villagers would like to protect, and the strategies they would like to adopt for solving the problem of grazing and fire etc. A common meeting was also held in which people from all the three villages were present. This was organised to appraise the objective of the project to all the committee members and to solicit their active participation at all the stages of project implementation including microplanning. In addition, face to face interviews were also held with the Executive Committee members of the Borduar RF Protection and Regeneration Committee. A number of PRA techniques such as resource mapping, drawing of venn diagram, time line, matrix ranking, seasonal calendar and wealth ranking including sorting of target groups were completed by the villagers themselves on chart papers. The members of the Working Group only facilitated the process.

25.2.3 Household Survey

In addition to PRA, household survey was carried out covering all the households in the three participating villages using a structured questionnaire (Annexure 8).

25.2.4 Transect Walk

Transect walks were also carried out with the villagers in the RF areas as well as in the village habitations. The route for transect walks was selected in such a way that the walk covered all the forest types and land use types in the project area (Fig 25.2). While carrying out the transect walk, five quadrats of 10 m × 10 m area were laid randomly in each forest type to determine the tree density and the existing growing stock. Different NTFP species found during the transect walk were recorded. Although no problem site was found in the project area, the villagers gave excellent suggestions for undertaking water and soil conservation measures during the transect walk. Even they identified the sites/locations for various water conservation measures.

25.3 PROFILE OF VILLAGES COVERED UNDER THE MICROPLAN

25.3.1 Location

The Borduar Reserved Forest area falls under the jurisdiction of Kamrup (West) Territorial Forest Division and plantations are carried out by the City Plantation Range, Guwahati. It is within the Palasbari Development Block of Guwahati Sub-Division in Kamrup District of Assam. The part of the Borduar Reserved Forest Area where the microplan is to be implemented, covers three villages. These are Aliha (including Chouthala), Dhanipara (including Dhangargaon) and Khamar village. These three villages lie along the periphery of the RF area.

25.3.2 Human Demography

25.3.2.1 Human Population

As per the primary data collected through questionnaires and PRA, population of the three villages is given in Table 25.1. There are 277 households with a total population of 1619. The average family size is 5·8 per household.

Table 25.1 : Human population in three villages

Villages	Male		Female		Total
	Adult	Child	Adult	Child	
Aliha	202	101	156	100	559
Dhanipara	215	108	165	104	592
Khamar	178	77	137	76	468
Total	595	286	458	280	1619

25.3.2.2 Literacy and Education

About 34% of the total population are literate. Of this, 25·5% completed primary level and 7% secondary level education and 1·5% are graduates. There are two L. P. Schools, one at Khamar and one at Dhanipara. There is no other educational institution in the project area. The students receive their secondary education from Kulsi, which is about 3 km. from the project area and college education from Mirza, which is about 18 km. from the project villages. The break-up of the population as per their education level is given in Table 25.2.

Table 25.2 : Educational level of the population					
Village	Primary	Secondary	Graduate	Illiterate	Total
Aliha	155	39	6	349	549
Dhanipara	157	41	11	429	638
Khamar	101	31	6	294	432
Total	413	111	23	1072	1619

25.3.2.3 Occupation

The villagers are mainly farmers (73·3% of the total households) and a few of them are either in government services (11·5%) or do private jobs (1·8%). About 13·4% of the total households are daily labourers. The number of households involved in different occupations is given in Table 25.3.

Table 25.3 : Number of households under different occupational categories					
Village	Govt. Service	Private Job	Daily Labourer	Self farm & H. H. Work	Total
Aliha	13	1	19	74	107
Dhanipara	10	1	4	85	100
Khamar	9	3	14	44	70
Total	32	5	37	203	277

25.3.2.4 Social Structure

A majority of the population of the three villages belongs to the Scheduled Tribes. About 84% fall under the ST category and only 16% under the OBC category (Table 25.4).

Table 25.4 : Number of households under different caste categories					
Village	General	SC	ST	OBC	Total
Aliha	–	–	107	–	107
Dhanipara	–	–	100	–	100
Khamar	–	–	26	44	70
Total	–	–	233	44	277

25.3.3 Livestock Population

The total livestock population of the three villages are about 1326. Of the total livestock population, 70% are cows and the remaining are goats and pigs. The village-wise details of the different livestock are given in Table 25.5.

Table 25.5 : Number of livestock population

Village	Cow	Goat	Pig
Aliha	313	111	19
Dhanipara	409	82	93
Khamar	208	84	7
Total	**930**	**277**	**119**

25.3.4 Land Use

Of the total area of the three villages, the maximum area (about 60%) is under paddy cultivation. Residential plots and home gardens cover about 35% of the total village area and the remaining portion includes playgrounds, schools and cremation grounds.

25.3.5 Agriculture

25.3.5.1 Land Holding Category

Most of the villagers (88·5% of the total number of households) are farmers with small land holdings (i.e. up to 3 ha). Some are landless (10·8%) and a few are large farmers (0·70%). The break-up of the number of households as per the land holding category is given in Table 25.6.

Table 25.6 : Number of households under different land holding categories

Village	Large Farmer (having land>3 ha)	Small Farmer (having land up to 3 ha)	Landless	Total
Aliha	1	92	14	**107**
Dhanipara	–	96	4	**100**
Khamar	1	57	12	**70**
Total	**2**	**245**	**30**	**277**

25.3.5.2 Cropping Pattern

Single cropping (i.e. cultivating only one crop in a year) is practised by most households. Only about 20% of the total households crop twice a year i.e. both during summer (April-July/September) and winter (July/August-November/December) (Table 25.7).

Table 25.7 : Number of households practicing different cropping pattern

Village	One crop/year	Two crops/year	Total
Aliha	69	22	91
Dhanipara	64	32	96
Khamar	58	2	60
Total	**191**	**56**	**247**

25.3.5.3 Home Garden Structure

Most of the households have home gardens adjacent to their houses. Of the total number of households, 0·36% raise only coconut, 24·2% only betel-nut and 58·8% raise both coconut and betel-nut (Table 25.8).

Table 25.8 : Number of households having different home garden structure

Village	Betel-nut only	Coconut only	Betel-nut & Coconut
Aliha	26	–	61
Dhanipara	28	–	62
Khamar	13	1	40
Total	**67**	**1**	**163**

25.3.6 Water Resources

In the three villages the water requirements are met either from man-made bore wells or from natural springs. But most of the people prefer natural springs for meeting their daily household water needs (Table 25.9).

Table 25.9 : Types of water sources

Village	Bore Well	Natural Spring
Aliha	2	2
Dhanipara	4	2
Khamar	2	1
Total	**8**	**5**

25.3.7 Energy Consumption Pattern

In the three villages fuel wood is the basic domestic fuel energy. Out of the total number of households, 95·3% are fully fuel wood-dependent. Though there are some households using only L.P.G. (3·2%) or both L.P.G. and fuel wood (1·4%), but they are negligible in number as compared to those using fuel wood only. The details of the number of households with their fuel consumption pattern are given in Table 25.10.

Table 25.10 : Number of households showing different energy consumption pattern

Village	Fuel wood	Only L.P.G.	Fuel wood & L.P.G.
Aliha	105	–	2
Dhanipara	93	7	–
Khamar	66	2	2
Total	**264**	**9**	**4**

25.3.7.1 Source of Fuel

Fuel wood is the basic fuel energy of which the forest is the main source. By-products from the field as such are not used for fuel.

25.3.8 Infrastructure and Communication

A black top road connecting Kulsi to NH 37 at Mirza passes through the villages in the project area. Everyday a bus plying between Mirza and Kulsi passes through the three villages. Dhanipara and Khamar villages have electrified and Aliha is yet to have electricity connection. Fifteen households in Dhanipara and ten in Khamar have electricity connection. Although there are 4 Lower Primary Schools, there is no Middle School and High School in the three villages. The nearest hospital is about 3 km away from the villages and a veterinary centre is located about 2 km away from the village area. One sub-post office is located at Dhanipara and a privately owned rice mill is also present in this village which caters to the needs of the entire area.

25.3.9 Identification of Problems and Problem Prioritisation

While conducting PRA exercise, various problems faced by the villagers were identified and prioritised. It was found that availability of drinking water was the most severe problem in all the three villages. The natural springs, which are the most important sources of drinking water for majority of the villagers are flowing at least 0·5 km away from the village. Hence, the villagers have to walk at least 1 km for collecting drinking water. During dry months, the water in these springs is also not adequate. The condition of the village roads is very bad and it causes much inconvenience in communication. Other basic needs such as hospital, sanitation, electricity and veterinary facilities are also lacking. The identified problems in order of priority are :

(a) Water connection (through pipeline) to the villages from the steam head or drinking well rings
(b) Village roads
(c) Hospital
(d) Electricity connection
(e) Sanitation facility

25.3.10 Social Target Groups

During the PRA, wealth-ranking exercise was done and all the villagers were ranked according to their wealth/economic status. The poorest forest-dependent families in each village were identified and the number of such families is listed in Table 25.11. During the plan implementation, these families would need special attention while providing employment in various project works and in granting assistance for undertaking alternate income generating activities so that their dependence on the forests is minimised. They may be given preference in the matter of involving villagers in the forest/plantation protection work.

Table 25.11 : Number of families identified as target group under the microplan

Name of the Village	No. of families
Aliha	12
Dhanipara	4
Khamar	11

25.4 THE VILLAGE FOREST PROTECTION AND REGENERATION COMMITTEE

25.4.1 Constitution of the Committee

The Borduar Reserved Forest Protection and Regeneration Committee (BRFPRC) was formed on the 10th April 1999 in a general meeting held at Dhanipara in which all the adult residents from the three villages were present along with the Forest Officials of Social Forestry Wing. All the households in the villages were the members of BRFPRC. The details pertaining to the IAEP scheme were discussed in the meeting and based on the discussion, the BRFPRC was formed. The main reason for forming the BRFPRC was to help and assist the Forest Department in every respect to ensure success of the scheme.

25.4.2 Executive Committee

In the above mentioned general meeting, an Executive Committee (EC) was formed. The function of the EC is to represent the general members of the BRFPRC and to look after the different activities undertaken in the scheme and to ensure its success. Besides the EC, three sub-committees were also formed for each of the three villages.

25.4.3 Meetings

Eleven meetings were held before the microplan exercise. Out of these, three were general meetings and the remaining were Executive Committee meetings.

25.5 DESCRIPTION OF THE PROJECT AREA

25.5.1 Location

The Borduar Reserved Forest area is within the Palasbari Development Block of Guwahati Sub-Division in Kamrup District of Assam. It is about 58 km west of Guwahati city and about 18 km. from Mirza on the National Highway 37.

25.5.2 Geology and Soil

The RF area is the extension of the Shillong Plateau. The soil in the area is mainly alluvial sandy loam.

25.5.3 Topography

The topography of the RF area is undulating and consists of hilly terrain with moderate slope. The forest area is mostly confined to the hills and the foothill and other surrounding areas are plain agricultural lands often interspaced with forest villages.

25.5.4 Climate

The annual average rainfall in the area is 1300 mm. June to mid-October may be termed as the rainy season. The monsoon starts towards the end of May. Maximum rainfall (550 mm) occurs during June/July. Minimum rainfall is during January which may be 20 mm. Temperature varies from 9°C in winter season to 30°C in May/June.

25.5.5 Water Resources

The RF area which comprises several hillocks has a number of natural springs and the water table in these hills is considerably high. Most natural springs in the RF are perennial. The RF area has no big stream or river.

25.5.6 Land use

The total area of the RF proposed under the project is about 350 ha. About 28·6% (100 ha) of the area is degraded forest dominated by fuel wood tree and shrub species. However, a few big trees of *Schima wallichii* and *Persea bombycina* are still there in this degraded area. This area is over-exploited due to free grazing and uncontrolled firewood collection. An area of about 150 ha (42·8%) has been planted by the Forest Department under teak and other miscellaneous species. About 100 ha (28·6%) of the project area has unexploited forest cover but consists of commercially unimportant tree species. This portion is situated at the top of the hill and remains inaccessible. The open forest area has been planted with teak and other miscellaneous species.

25.5.7 Forest Vegetation

25.5.7.1 Forest Type

The Borduar RF Project area harbours Tropical Moist Deciduous forest (Sub-group 3C according to the classification of forest types by Champion & Seth, 1968).

25.5.7.2 Forest Status

In the recent past there has been extensive loss of vegetal cover, especially since 1985 when vast forest tracts were cleared. Considering the status of forest, the area proposed under the project can be categorised into the following three types : (i) Degraded forest, (ii) Open forest, and (iii) Forest with miscellaneous species.

25.5.7.3 Species Composition

Shorea robusta (Sal) with its associates was found growing naturally in the area. In the degraded forest some old tree species of *Schima wallichii, Persea bombycina, Ficus bengalensis* etc. are found. The forest tract with miscellaneous species consists of *Schima wallichii, Ficus bengalensis, Shorea robusta, Terminalia chebula, Terminalia bellerica, Vitex penducularies, Michelia champaca, Persea bombycina, Gmelina arborea, Amoora wallichii, Mangifera indica, Toona ciliata, Bambusa* sp. etc.

25.5.7.4 History of Forest Management

The RF has been managed by the Forest Department through working plans since the time it was constituted as RF. However, with increasing population, illegal tree felling and timber theft increased and working plans are no more valid. The people living at the fringes of the forest were by and large ignored, and they had no role to play in the protection of the forest.

25.5.7.5 Enumeration

In the open forest which covers about 200 ha the total number of trees including the newly planted and regenerated ones was about 2,46,600 trees. *Tectona grandis, Schima wallichii, Shorea robusta* and *Samanea samen* are common tree species found in this area.

In the forest with miscellaneous species which covers an area of 70 ha, the total number of trees was about 48720. *Schima wallichii, Tectona grandis, Shorea robusta, Gmelina arborea, Vitex penducularis, Ficus bengalensis, Mangifera indica, Toona ciliata, Ficus* sp., *Artocarpus* sp., and *Amoora wallichii* are the trees common in this area. The number of trees in different girth classes for dominant species is given in Table 25.12.

Table 25.12 : Number of trees per ha in different girth classes in the open forest

	Girth Class (cm)			
Species	Planted/Regenerated seedlings (0-20)	20-35	35 and above	Total
Tectona grandis	0	0	800	800
Schima wallichii	0	0	133	133
Samanea samen	133	0	0	133
Shorea robusta	167	0	0	167
Total	300	0	933	1233

Table 25.13 : Number of trees per ha in different girth classes in the open forest with miscellaneous species

Species	Girth Class (cm)			
	Planted/Regenerated seedlings (0-20)	20-30	30-40	Total
Amoora wallichii	0	33	0	**33**
Artocarpus sp.	0	31	0	**31**
Ficus bengalensis	0	0	35	**35**
Ficus sp.	0	0	33	**33**
Gmelina arborea	0	68	0	**68**
Mangifera indica	0	29	0	**29**
Schima wallichii	0	0	133	**133**
Shorea robusta	98	0	0	**98**
Tectona grandis	0	0	114	**114**
Toona ciliata	0	37	0	**37**
Vitex penducularis	0	0	85	**85**
Total	**98**	**198**	**400**	**696**

The Similarity Index between Open forest and Forest with miscellaneous species was found to be 1·103. The Density in the Open forest was 1233 trees per hectare and that in the Forest with miscellaneous species was 700 trees per hectare. The frequency and abundance for both the Open forest and Forest with miscellaneous species are given in Table 25.14 and Table 25.15 respectively.

Table 25.14 : Frequency, density and abundance of tree species in the open forest patch

Species	Frequency (%)	Density/ha	Abundance
Tectona grandis	100	800	8
Schima wallichii	66	133	2
Samanea samen	66	133	2
Shorea robusta	66	167	2·5

Table 25.15 : Frequency, density and abundance of tree species in the forest with miscellaneous species

Species	Frequency (%)	Density/ha	Abundance
Schima wallichii	100	133	1·33
Shorea robusta	66	100	1·5
Gmelina arborea	66	67	1
Ficus bengalensis	33	33	1
Tectona grandis	100	133	1·33
Tenga bor	33	33	1
Mangifera indica	33	33	1
Sham kathal	33	33	1
Amoora wallichii	33	33	1
Toona ciliata	33	33	1
Vitex penducularis	66	67	1

25.5.7.6 Growing Stock

The portion of the Reserve Forest falling under the project area has relatively less growing stock because of unrestricted usage, over grazing, and illegal tree felling. In open forest, the total growing stock was estimated to be 23 cu m while that in the forest with miscellaneous species it was about 45 cu m.

Table 25.16 : Volume of trees in the open forest

Species	Girth (m)	Height (m)	Volume (m^3)	Volume (m^3/ha)
Tectona grandis	0·35	3·5	0·024	19·2
Schima wallichii	0·35	3	0·029	3·86
Samanea samen	0·02	0·6	0·000019	0·0025
Shorea robusta	0·02	0·75	0·000024	0·004
Total				23·0665

Table 25.17 : Volume of trees in the forest with miscellaneous species				
Species	Girth (m)	Height (m)	Volume (m^3)	Volume (m^3/ha)
Schima wallichii	0·35	10	0·097	12·90
Shorea robusta	0·15	1	0·0018	0·18
Gmelina arborea	0·25	4	0·0199	1·33
Ficus bengalensis	0·35	12	0·1169	3·86
Tectona grandis	0·35	10	0·097	12·90
Ficus sp.	0·35	9	0·088	2·9
Mangifera indica	0·25	5	0·025	0·825
Artocarpus sp.	0·25	6	0·029	0·96
Amoora wallichii	0·25	5	0·025	0·83
Toona ciliata	0·25	6	0·029	0·96
Vitex peducularis	0·35	11	0·107	7·17
Total				44·815

25.5.7.7 Factors causing Damage to Forest

The group discussions and interactions with the villagers revealed that illicit felling of trees for fuel wood and timber was the main cause of forest degradation. The villagers of the villages falling under the project as well as people from outside were responsible for the forest degradation. Free grazing of cattle has also been responsible for the loss of the young tree seedlings.

25.6 AVAILABILITY AND UTILISATION OF FOREST PRODUCE

25.6.1 Availability and Requirement of Fuel wood

A majority of the households (hh) are dependent on wood for domestic fuel, most of which are met from the RF. The daily fuel wood requirement for all the three villages is 1831 kg and the average consumption is 6·8 kg per household. The fuel wood collected from the RF per day was estimated to be 1898 kg, which was 67 kg more than the actual requirement. This excess collection remains in store for the consumption during next year (Table 25.18).

Table 25.18 : Daily fuel wood requirement			
Village	Fuel wood requirement per day (kg)	Average fuel wood requirement/hh (kg)	Fuel wood availability from the RF (kg)
Aliha	686	6·6	727
Dhanipara	651	7	661
Khamar	494	7	510
Total	**1831**	**20·6**	**1898**

However, fuel wood collection by different households is not uniform. In total, 91 households are responsible for 71 kg of excess collections, while 4 households buy 4 kg of fuel wood per day from outside the area (Table 25.19).

Table 25.19 : Number of fuel wood-deficienct and surplus households in three project villages				
Village	No. of fuel wood-deficient household	Quantity of fuel wood collected from outside (kg)	No. of fuel wood surplus household	Quantity of fuel wood collected excess of use (kg)
Aliha	0	0	52	**41**
Dhanipara	3	3	11	**13**
Khamar	1	4	28	**17**
Total	**4**	**7**	**91**	**71**

Table 25.20 : Annual fuel wood requirement in three project villages		
Village	Fuel wood Requirement	
	In kg	In cu m
Aliha	250390	426
Dhanipara	237615	404
Khamar	180310	307
Total	**668315**	**1137**

• 1 kg fuel wood = 0·0017 cu m

25.6.2 Availability and Requirement of Fodder

The per capita per annum fodder requirement for cow was estimated to be 2160 kg. Therefore the total fodder requirement for cows is about 2008800 kg per annum and for goats it is about 216060 kg per annum (780 kg per goat per annum). Fodder requirement is met both from the forest as well as agricultural field Free grazing in the RF is common throughout the year. Table 25.21 shows the annual fodder requirement of the three villages.

Table 25.21 : Annual fodder requirement (kg) in three project villages

Village	Cows	Goats	Total
Aliha	676080	86580	762660
Dhanipara	883440	63960	947400
Khamar	449280	65520	514800
Total	**2008800**	**216060**	**2224860**

25.6.3 Availability and Requirement of Timber

The total annual timber requirement of the three villages was estimated to be 47 cu m. On an average, each household requires about 0·17 cu m per annum. Most of the timber requirement is met from the RF. Village-wise requirement of timber is given in Table 25.22.

Table 25.22 : Annual timber requirement of three project villages

Village	Per capita timber requirement (cu. m)	Average timber required per household (cu. m)	Quantity of timber required (in cu. m)
Aliha	0·027	0·14	15
Dhanipara	0·034	0·20	20
Khamar	0·025	0·17	12
Total	**0·029**	**0·17**	**47**

25.6.4 Availability, Requirement and Uses of NTFPs

Thatch, soil, stones, fuel wood, fodder, fruits, vegetables, mushrooms and other edibles are important NTFPs which are regularly extracted by the villagers from the RF. Out of the total number of households, 46·2% regularly extract thatching material, 3·9% collect soil, 3·2% collect stones, 0·36% extract seeds and fruits and 0·72% extract medicinal herb (Table 25.23).

Table 25.23 : Number of households utilizing different NTFPs

Village	Thatch	Vegetables, Seed & Fruits	Medicine
Aliha	81	1	–
Dhanipara	4	–	2
Khamar	43	–	–
Total	**128**	**1**	**2**

25.6.4.1 NTFPs and their uses

The most commonly extracted NTFPs by the villagers have been listed in Table 25.24. The utilisation values of each NTFPs have been indicated.

Table 25.24 : Important NTFPs and their uses

Name	Fodder	Edible leaf/fruit/stem	Fuel wood	Other uses
Bambusa spp.	* * *			
Thysanalaena maxima	* * *			
Persea bombycina	* *			
Gmelina arborea	* * * *			
Ficus hispida	* *			
Artocarpus hetrophyllus	* * * *			
Shorea robusta	* *		* * * *	
Moti tenga		* * *		
Chama Kathal		* * *		
Bamboo shoots		* *		
Bahaka teeta		* *		
Moti tenga		* *		
Ranga aloo		* * * *		
Boga aloo (Tapioca)		* * * *		

Note : Degree of utilisation has been evaluated on a 1-4 scale; four stars show maximum utilisation and the one star shows minimum.

25.6.5 Choice of Species

25.6.5.1 Preferred Fuel wood Species

Most households (75·1%) use non-sal species for fuel wood. About 19·1% of the total households prefer sal species while 5·8% prefer makari sal as fuel wood. The number of households in three villages preferring different species are given in Table 25.25. Five fuel wood species have been ranked based on the preference of the villagers. *Michelia champaca was the most preferred species* (Table 25.26).

Table 25.25 : Number of households preferring different fuel wood species

Village	Non-Sal	Sal & others	Makari Sal	Total
Aliha	97	6	4	107
Dhanipara	66	32	2	100
Khamar	45	15	10	70
Total	**208**	**53**	**16**	277

Table 25.26 : Species preference for fuel wood		
Rank	Species	Number of households
1.	*Michelia chapmaca*	86
2.	*Gmelina arborea*	62
3.	*Terminalia bellerica*	60
4.	*Shorea robusta*	53
5.	*Schima wallichii*	16
Total		277

25.6.5.2 Preferred Timber Species

Sal and teak are the most preferred species for timber (47·3%). Among 7 timber species ranked, Sal was the most preferred timber species (Table 25.27).

Table 25.27 : Timber species preference of the project villages		
Rank	Species	Number of households
1.	*Shorea robusta*	122
2.	*Tectona grandis*	76
3.	*Gmelina arborea*	25
4.	*Michelia champaca*	19
5.	*Terminalia bellerica*	15
6.	*Vitex penducularies*	11
7.	*Schima wallichii*	9
Total		277

25.7 DEVELOPMENT AND MANAGEMENT PLAN

25.7.1 Plan Objectives

The specific objectives of the microplan were set as per the guidelines of the IAEP Scheme, which can be broadly grouped into two categories as follows :

Short Term Objectives

- To meet immediate requirement of fuel wood, fodder and small timber of the villagers (VFC) through sustained production.
- To generate employment for the rural poor who are dependent on the forest and adjoining lands along with gainful production of wood and non-wood forest products.
- To inculcate an appreciation toward JFM among the village community by involving them in planning and regeneration efforts.
- To encourage farmers to grow multi-purpose trees on their farm lands under agro-forestry.

Long-Term Objectives

- To rehabilitate the vegetative cover of the degraded forests for ecological restoration, conservation and improvement of the biomass productivity in respect of NTFPs besides fuel wood and fodder.
- To conserve soil and moisture and improvement of overall water holding capacity of degraded lands and water resources for the agricultural land.
- To check forest degradation and promote conservation of bio-diversity.
- To help in achieving the national objective of getting 33 per cent land area under tree and grass cover.

25.7.2 Strategies

- Planning and implementation jointly by Forest Department and Borduar Reserved Forest Protection and Regeneration Committee.
- Shared responsibility by both the stakeholders for various activities under the plan.
- Borduar Reserved Forest Protection and Regeneration Committee overall in-charge of the implementation of the microplan.
- Product extraction and equitable distribution of products to be regulated by the Borduar Reserved Forest Protection and Regeneration Committee.

25.7.3 Action Plan

25.7.3.1 Treatment Prescriptions

The Borduar RF project area can be broadly classified into degraded forest, open forest and forest with miscellaneous species. Treatment prescription for these land categories would vary depending upon the land capability class. Considering the land capability class and people's need management production activities have been prescribed (Table 25.28 and Fig. 25.3).

Table 25.28 : Area to be planted under different production activities

Management Production Activities	Area Category	Plantation Component	Area (ha)	Total Area (ha)
Natural Regeneration	Forest with miscellaneous species	i. Fuel wood ii. Fodder iii. Timber iv. NTFP	40 40 10 10	100
Management Intervention	Open forest	i. Fuel wood ii. Fodder iii. Timber iv. NTFP v. Som	60 60 15 10 5	150
	Degraded forest	i. Fuel wood ii. Fodder iii. Timber iv. NTFP	40 40 10 10	100
Total			**350**	**350**

Table 25.29 : Area to be planted under different production activities and expected output				
Components	Units	Area (ha)	Output per ha	Total output
i. Fuel wood	Cu m	140	3·61	505·4
ii. Fodder	Kg	140	2000	2,80,000
iii. Timber	Cu m	35	*12·4	434
iv. NTFP	–	30	–	–
v. Som	–	5	–	–
vi. Employment	MD	350	13	4550
vii. Cash Income	Rs.	–	520	1,82,000

* Based on output per ha of teak trees in Tripura

(i) Degraded forest :

All the areas under degraded forest will be planted through management intervention component of the project. Keeping in view the need of the villagers, plantations on an area of 40 ha each for fuel wood and fodder and 10 ha each for timber and NTFPs will be undertaken.

Planting Technique

The tree species which are to be planted in the site are to be raised from well established nursery seedlings. The seedlings are to be planted in well dug pits (0·30 m × 0·30 m × 0·45 m) along the contours at a spacing of 3 m × 3 m.

Species Proportions

The following species would be used for plantation.

1. Fuel wood Species :

Species	% of total fuel wood species	Total no. of plants to be planted
Michelia champaca	31	13,778
Gmelina arborea	22	9,778
Terminalia bellerica	22	9,778
Shorea robusta	19	8,444
Schima wallichii	6	2,667
Total	**100**	**44,444**

2. Fodder Species :

Species	% of total fuel wood species	Total no. of plants to be planted
Artocarpus hetrophyllus	20	8,889
Gmelina arborea	20	8,889
Thysanalaena maxima	15	6,667
Bambusa spp.	15	6,667
Persea bombycina	10	4,444
Ficus hispida	10	4,444
Shorea robusta	10	4,444
Total	**100**	**44,444**

3. Timber species :

Species	% of total timber species	Total no. of plants to be planted
Shorea robusta	44	4,889
Tectona grandis	28	3,111
Gmelina arborea	9	1,000
Michelia champaca	7	778
Terminalia bellerica	6	667
Vitex penducularies	4	444
Schima wallichii	2	222
Total	**100**	**11,111**

4. NTFP Species :

Species	% of total timber species	Total no. of plants to be planted
Artocarpus hetrophyllus	14	1,555
Tapioca	13	1,444
Gmelina arborea	13	1,444
Bambusa spp.	10	1,111
Thysanalaena maxima	10	1,111
Chama kathal	10	1,111
Moti tenga	6	667
Persea bombycina	6	667
Ficus hispida	6	667
Shorea robusta	6	667
Bahaka teeta	6	667
Total	**100**	**11,111**

(ii) Open Forest :

The total area to be planted in Open forest category is 150 ha. All the areas will be planted through management intervention component of the project. Considering the need of the villagers, 60 ha area each has been proposed for fuel wood and fodder plantations, 15 ha for timber plantation, 10 ha for NTFP plantation and 5 ha for Som plantation.

Planting Technique

The tree species which are to be planted in the site are to be raised from well established nursery seedlings. The seedlings are to be planted in well dug pits (0·30 m × 0·30 m × 0·45 m) along the contours at a spacing of 3 m × 3 m.

Species Proportions

The following species would be used for plantation :

1. Fuel wood Species :

Species	% of total fuel wood species	Total no. of plants to be planted
Michelia champaca	31	20,666
Gmelina arborea	22	14,667
Terminalia bellerica	22	14,667
Shorea robusta	19	12,666
Schima wallichii	6	4,000
Total	**100**	**66,666**

2. Fodder Species :

Species	% of total fodder species	Total no. of plants to be planted
Artocarpus heterophyllus	20	13,333
Gmelina arborea	20	13,332
Thysanalaena maxima	15	10,000
Bambusa spp.	15	10,000
Persea bombycina	10	6,667
Ficus hispida	10	6,667
Shorea robusta	10	6,667
Total	**100**	**66,666**

3. Timber species :

Species	% of total timber species	Total no. of plants to be planted
Shorea robusta	44	7,333
Tectona grandis	28	4,666
Gmelina arborea	9	1,500
Michelia champaca	7	1,167
Terminalia bellerica	6	1,000
Vitex penducularies	4	666
Schima wallichii	2	333
Total	**100**	**16,665**

4. NTFP Species :

Species	% of total timber species	Total no. of plants to be planted
Artocarpus hetrophyllus	14	1,555
Tapioca	13	1,444
Gmelina arborea	13	1,444
Bambusa spp.	10	1,111
Thysanalaena maxima	10	1,111
Chama kathal	10	1,111
Moti tenga	6	667
Persea bombycina	6	667
Ficus hispida	6	667
Shorea robusta	6	667
Bahaka teeta	6	667
Total	**100**	**11,111**

5. Som plantation :

The total area to be planted under som plantation is 5 ha. The total number of seedling is 5555 with a spacing of 3 m × 3 m.

(iii) Forests with miscellaneous species :

The total area to be covered under this land category i.e. forest with miscellaneous species is 100 ha. The area will be treated through natural regeneration component of the project. Out of this, 40 ha each has been proposed for fuel wood and fodder plantations and 10 ha each for timber and NTFP plantations.

Planting Technique

As the area will be covered under natural regeneration component, the seedling requirement will be about 400 seedlings per ha. The seedlings are to be planted in well dug pits (0·30 m × 0·30 m × 0·45 m).

Species Proportions

The following species would be used for plantation.

1. Fuel wood Species :

Species	% of total fuel wood species	Total no. of plants to be planted
Michelia chapmaca	31	4,960
Gmelina arborea	22	3,520
Terminalia bellerica	22	3,520
Shorea robusta	19	3,040
Schima wallichii	6	960
Total	**100**	**16,000**

2. Fodder Species :

Species	% of total fodder species	Total no. of plants to be planted
Artocarpus hetrophyllus	20	3,200
Gmelina arborea	20	3,200
Thysanalaena maxima	15	2,400
Bambusa spp.	15	2,400
Persea bombycina	10	1,600
Ficus hispida	10	1,600
Shorea robusta	10	1,600
Total	**100**	**16,000**

3. Timber species :

Species	% of total timber species	Total no. of plants to be planted
Shorea robusta	44	1,760
Tectona grandis	28	1,120
Gmelina arborea	9	360
Michelia champaca	7	280
Terminalia bellerica	6	240
Vitex penducularies	4	160
Schima wallichii	2	80
Total	**100**	**4,000**

4. NTFP Species :

Species	% of total timber species	Total no. of plants to be planted
Artocarpus hetrophyllus	14	560
Tapioca	13	520
Gmelina arborea	13	520
Bambusa spp.	10	400
Thysanalaena maxima	10	400
Chama kathal	10	400
Moti tenga	6	240
Persea bombycina	6	240
Ficus hispida	6	240
Shorea robusta	6	240
Bahaka teeta	6	240
Total	**100**	**4,000**

25.7.3.2 Yield Estimation and Optimisation

Table 25.30 : Demand and output for different items

Item	Output	Demand	Balance
1. Fodder	i. Quantity (kg) = 2,80,000 ii. Amount (Rs.) = 72,800 iii. Employment = 1,800	i. Quantity (kg) = 22,24,860 ii. Amount (Rs.) = iii. Employment =	−19,44,860
2. Fuel wood	i. Quantity (cu m) = 505·4 ii. Amount (Rs.) = 72,800 iii. Employment = 1,800	i. Quantity (cu m) = 1137 ii. Amount (Rs.) = iii. Employment =	−631·6
3. Timber	i. Quantity (cu m) = 434 ii. Amount (Rs.) = 18,200 iii. Employment = 455	i. Quantity (cu m) = 47 ii. Amount (Rs.) = iii. Employment =	+387
4. NTFP	i. Quantity (kg) ii. Amount (Rs.) iii. Employment	i. Quantity (kg) ii. Amount (Rs.) iii. Employment	–

25.7.3.3 Silvicultural Operation Schedules and Rotation

(i) Cleaning and Weeding

After having dug out the pits for planting the seedlings the surrounding area should be properly cleared of any weeds within a radius of about 2 ft. around the pit. Subsequent weeding operations should be carried out at least twice a year for the first two years of plantation. For the third and fourth year weeding can be carried out once in a year. Manual weeding in patches around the seedlings can be adopted.

(ii) Pruning and Thinning

Pruning of trees may be done from 3rd/4th year onwards, every year during winter by cutting the lower branches up to 50% of the height. Thinning of the trees can be carried out after the 6th year at intervals of every 2 years. The selection of trees to be thinned can be decided in consultation with the BRFPRC as per their requirements for fuel wood, fodder and timber.

(iii) Improvement Fellings

Improvement fellings may be carried out after the trees have attained the pole stage, removing the unsound and diseased trees.

(iv) NTFP Harvesting Schedule

Quite a number of NTFPs are utilised by the local people. These NTFPs are collected/harvested at different seasons of the year. Some of the main NTFPs used are listed below along with their harvesting periods.

Table 25.31 : NTFPs harvesting schedule

NTFPs	Initial Harvesting (month)	Final Harvesting (month)
(a) Fodder	April	July
(b) Edible NTFP	April/October	May/November
(c) Thatch Grass	December	February
(d) Stone and soil	November	February

25.7.3.4 Plantation Management

25.7.3.4.1 Fire Control

Though the Project Site is not highly prone to forest fires, precautionary measures can be taken by cutting fire lines (1 m wide) along the contours at intervals of 50 m especially before the start of the dry season.

25.7.3.4.2 Grazing Control

For controlling of grazing in the RF Project Site the BRFPRC has to take up measures such as implementation of fines on any offender especially before the seedlings reach the pole stage. Fencing with locally available materials may also be recommended keeping in view the fund availability.

25.7.3.4.3 Control on Illicit Felling

Regular patrolling in the site can prove to be beneficial in curbing illicit felling activities. The patrols can be organised on a rotational basis in which three persons one from each village can be selected for each day. In addition to the patrol the BRFPRC could impose a heavy penalty on any offender.

25.7.3.4.4 Control on Encroachment

To prevent any form of encroachment the BRFPRC has to keep a strict and regular vigilance of the project site. Necessary action should also be taken as it deems fit to prevent encroachments either by the local villagers or by outsiders.

25.7.4 Village Resources Development Plan

25.7.4.1 Water Resources Development Plan

The RF which comprises of hills surrounding the three villages has a high water level and a number of natural springs can be found here. In spite of this the villagers face problem in meeting water requirements especially for drinking purposes. The reason being that the accessible natural water sources are found on the periphery of the RF and are quite far from most of the human settlements. From the discussions with the villagers it emerged that construction of storage water tanks at the mouth of the springs which is to be connected with pipe lines for supplying water to different parts of the villages could solve their drinking water problem.

25.7.4.2 Human Resource Development

The three villages consist of a population with complete religious homogeneity and a more or less uniform caste/community structure. This can be an added advantage towards a combined effort by the villagers for achieving the targets of the BRFPRC. Since most of the farmers in these villages belong to small land holding (88%) groups, facilitation work can be carried out uniformly to improve crop production, irrigation canals, marketing etc. Vocational training can also be given to the villagers for skill development. This would provide them employment especially during the off season since most of them are engaged in cultivation for only one season (69%).

25.7.4.3 Infrastructure Development

There is a need for developing the village roads to improve communication, especially for Aliha village which is connected with a *kacha* road. Special attention in maintaining the roads during the rainy season is necessary. The villages are having a very few electricity connection. Aliha village especially does not have any connection at all. There is an urgent requirement of a hospital or at least a Primary Health Centre since the villagers have to travel a long distance even for getting first aid. Moreover this area is prone to malarial infection. The livestock population in these villages is quite high and there is no veterinary facility in this area. So, a veterinary centre needs to be set up for providing basic help to the livestock owners.

25.7.5 Soil and Water Conservation Plan

The soil and water conservation works ought to be given proper emphasis to improve the site quality and get better survival and growth in the plantations. The following techniques may be adopted for the Project Site.

(i) Contour Bunds

In gently sloping area contour bunding may be carried out at about 30 m interval along the slopes. These bunds may be 0·5 m wide and 0·5 m high.

(ii) Contour Trenches

In the higher slopes staggered contour trenches and pits be dug out to trap maximum water coming from the up hill side. The size of the pit may be 0·3 m × 0·3 m × 0·45 m and the spacing 4 m × 3 m.

25.7.6 Budgeting

Table 25.32 : Budgeting for different work components

Work component	Area (ha)	Amount (lakh)
1. Natural Regeneration		
(a) Advance Work	100	3·20
(b) Creation	100	1·30
(c) Maintenance	75	0·525
2. Management Intervention		
(a) Advance Work	250	6·625
(b) Creation	250	11·30
(c) Maintenance	350	3·425
3. Extension/Awareness/JFM/Training etc.		2·155
Entry Point Activities		1·80
Fencing		1·32
Microplanning		0·79
Monitoring and Evaluation		0·47
4. Soil and Moisture Conservation		3·955
5. Overheads		2·64

25.8 EXECUTION OF PLAN

25.8.1 Role of Forest Department

The role of the Forest Department in implementing the microplan in the field would be basically advisory and facilitating. Provision of funds for raising or procuring the required seedlings to be planted in the plantations and for undertaking the plantation areas will be arranged by the Forest Department. Technical support will also be provided by the Forest Department. Besides, training programmes for VFPC members will also be arranged by the Forest Department.

25.8.2 Role of Borduar Reserve Forest Protection and Regeneration Committee

The Borduar Reserved Forest Protection and Regeneration Committee (BRFPRC) would be responsible for ensuring the successful implementation of the plan in the field. It has to ensure that smooth coordination exists amongst all its members so as to effectively carry out the necessary silvicultural operations, control of grazing, illicit felling and encroachment and other protection and management related works.

25.8.3 Works of other Departments

In order to develop the basic infrastructure of these villages the direct involvement of various departments is necessary. Departments such as the PWD, Health Services, PHE, Veterinary and the Power Department has to take up programmes for developing roads, hospitals, water supply, veterinary centres and electricity connection respectively.

25.8.4 Regulation of Fuel wood, Fodder and other NTFP Extraction

Fuel wood extraction can commence from the 4th/5th year for the fast growing species and from the 6th year for the other species. Extraction of fodder from species like *Thysanaelaena maxima* may be allowed after the first year, but from the fodder trees fodder collection may start after the 4th year. NTFPs can be extracted right from the first year provided no harm is done to the young regeneration. The BRFPRC has to evolve a mechanism for regulating the production, extraction and its equitable distribution.

25.8.5 Benefit Sharing Mechanism

For the sharing of benefits (final felling) between the Forest Department and the BRFPRC, it is agreed 75% of the total harvest will go to the Forest Department and the remaining 25% to the BRFPRC. The villagers can extract fuel wood, fodder and other NTFPs as per the regulations made by BRFPRC. For the sharing of benefits amongst the villagers, the BRFPRC will take the necessary decisions.

25.8.6 NTFP Marketing

The Non-Timber Forest Produce can be a viable source of sustained income provided that there is proper marketing of the products. Marketing avenues for the NTFPs could be opened by setting up marketing cooperatives and also through value addition of the products. Marketing of the NTFPs is an important aspect as these can provide early returns for the villagers as compared to timber.

25.8.7 Monitoring and Evaluation

For proper execution of the project work, an internal monitoring committee called "Monitoring and Evaluation Committee" will be constituted in the office of the Chief Conservator of Forests, Social Forestry, Assam with following members :

1. Planning Officer (Social Forestry) – Chairman
2. Dy. Conservator of Forests (Monitoring) – Member
3. Dy. Conservator of Forests, o/o CF, C & S Circle – Member
4. Dy. Conservator of Forests (Publicity), o/o CC (SF), Assam – Member

The Committee will be entrusted with the job of inspection, monitoring and evaluation works under the project. The Committee will have the liberty to inspect the works at any point of time and report to Circle conservators and Chief Conservator of Forests, social Forestry, Assam. The Committee will invariably submit their report on quarterly basis.

The Divisional Forest Officer executing the project work shall submit the progress reports on monthly and quarterly basis.

25.8.7.1 Record Keeping

The BRFPRC will maintain the following records for proper control :

(i) Registration Certificate and Membership Register

(ii) Plantation Journal

(iii) Minutes of the Meeting of BRFPRC

(iv) Policy Decision of the BRFPRC and Forest Department

(v) Harvesting yields from the plantations, leaf fodder, fuel wood, small timber, etc.

(vi) Revenue and Expenditure

(vii) Bank Account records

(viii) Audit and Annual Report, Evaluation Report etc.

25.8.7.2 Monitoring and Evaluating Agencies

The Planning and Development Department of Government of Assam carries out monitoring of various plan works under forest Department. In addition to the internal monitoring by the forest department, various project activities will also be open to monitoring by Planning and Development Department of Government of Assam and any other agency appointed by Government of India for the purpose.

25.8.8 Schedule of Works

Table 25.33 Schedule of work under different work components

Work Component	Work Items	Period of Work	Responsibility
1. Nursery	i. Collection of seeds	Oct-Dec (or seeding time)	Forest Department
	ii. Seed treatment	-do-	Forest Department
	iii. Raising polypot seedlings including cost of mother beds, sowing of seeds and filling of polybags.	Dec-Jan	Forest Department
	iv. Raising bare rooted seedlings including mother bed preparation and pricking out.	-do-	Forest Department & BRFPRC members
2. ANR	i. Survey and demarcation	Oct-Mar	Forest Department
	ii. Jungle and brush wood cutting all over the area	Dec-Feb	Forest Department & BRFPRC members
	iii. Ranging and clearance of lines including staking	April-May	Forest Department & BRFPRC members
	iv. Making of pits	May-June	Forest Department & BRFPRC members
	v. Planting including transportation	May-Sept	Forest Department & BRFPRC members
	vi. Making of inspection path	Aug-Sept	Forest Department
3. Management Intervention	i. Survey and demarcation	Oct-Mar	Forest Department
	ii. Jungle cutting	Dec-Feb	Forest Department & BRFPRC members
	iii. Tree felling (Only undesired species)	-do-	Forest Department & BRFPRC members
	iv. Burning and reburning	Jan-Mar	Forest Department & BRFPRC members
	v. Ranging and clearance of lines	April-May	Forest Department & BRFPRC members
	vi. Staking and collection of stakes	-do-	Forest Department & BRFPRC members
	vii. Making of pits	May-June	Forest Department & BRFPRC members
	viii. Planting including plantation	May-Sept	Forest Department & BRFPRC members
	ix. Fireline cutting	Nov-Dec	Forest Department & BRFPRC members
	x. Making of inspection path	Aug-Sept	Forest Department

4. Soil Conservation	i. Contour bunding in the steep slope areas	May-Sept	Forest Department & BRFPRC members
	ii. Water harvesting cum storage tank-1 no.	Dec-April	Forest Department & BRFPRC members
5. Entry Point Activities	i. Water storage tanks-2 nos.	Dec-April	Forest Department & BRFPRC members
	ii. G.I. pipelines for water supply to 3 villages	-do-	Forest Department & BRFPRC members

25.8.9. Plan Flexibility

This microplan will be valid for 5 years period i.e., till the project is completed. However, the changes/modifications in the plan, if required may be made by the BRFPRC and submitted to the CF (Social Forestry) for approval. •

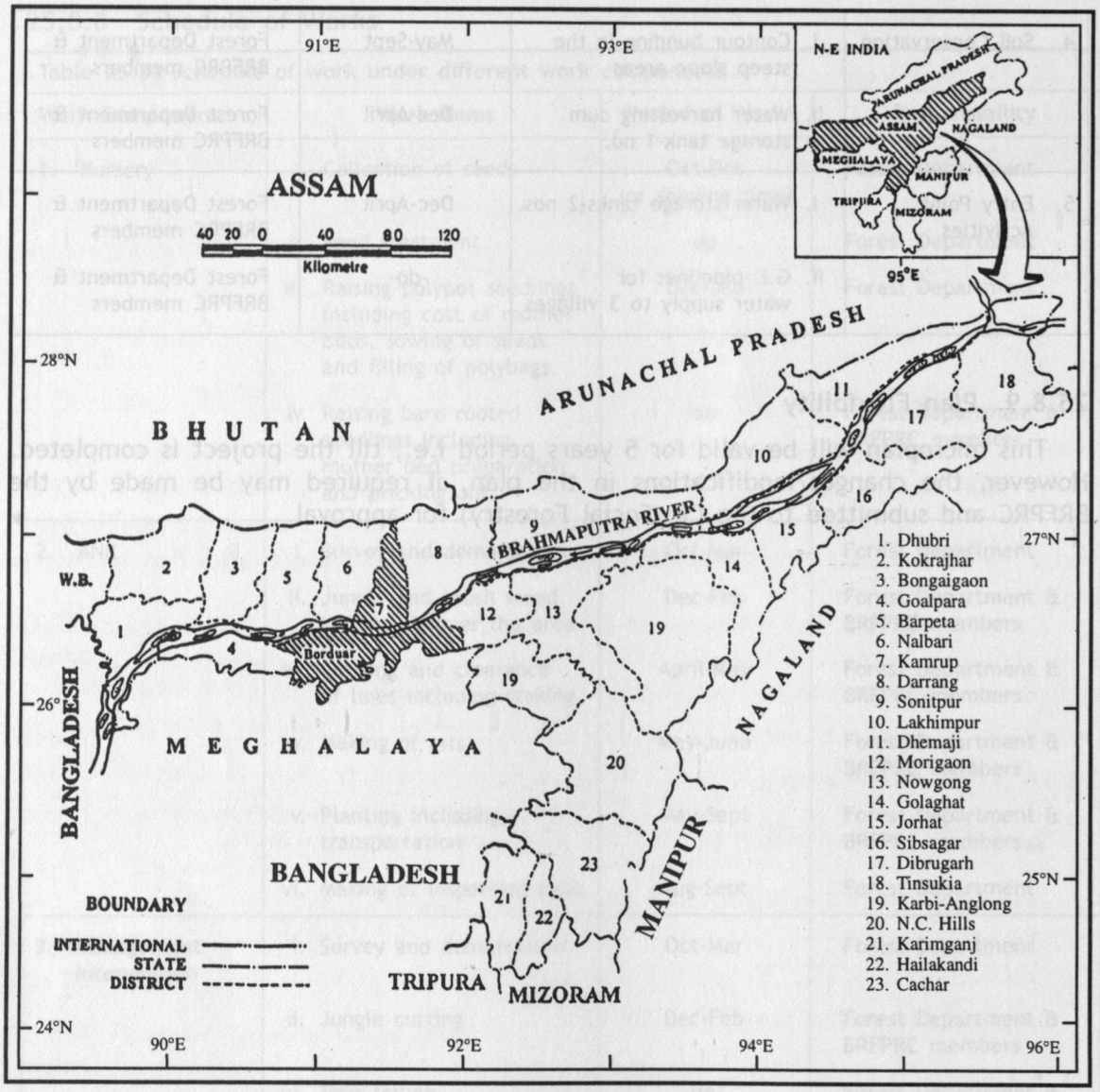
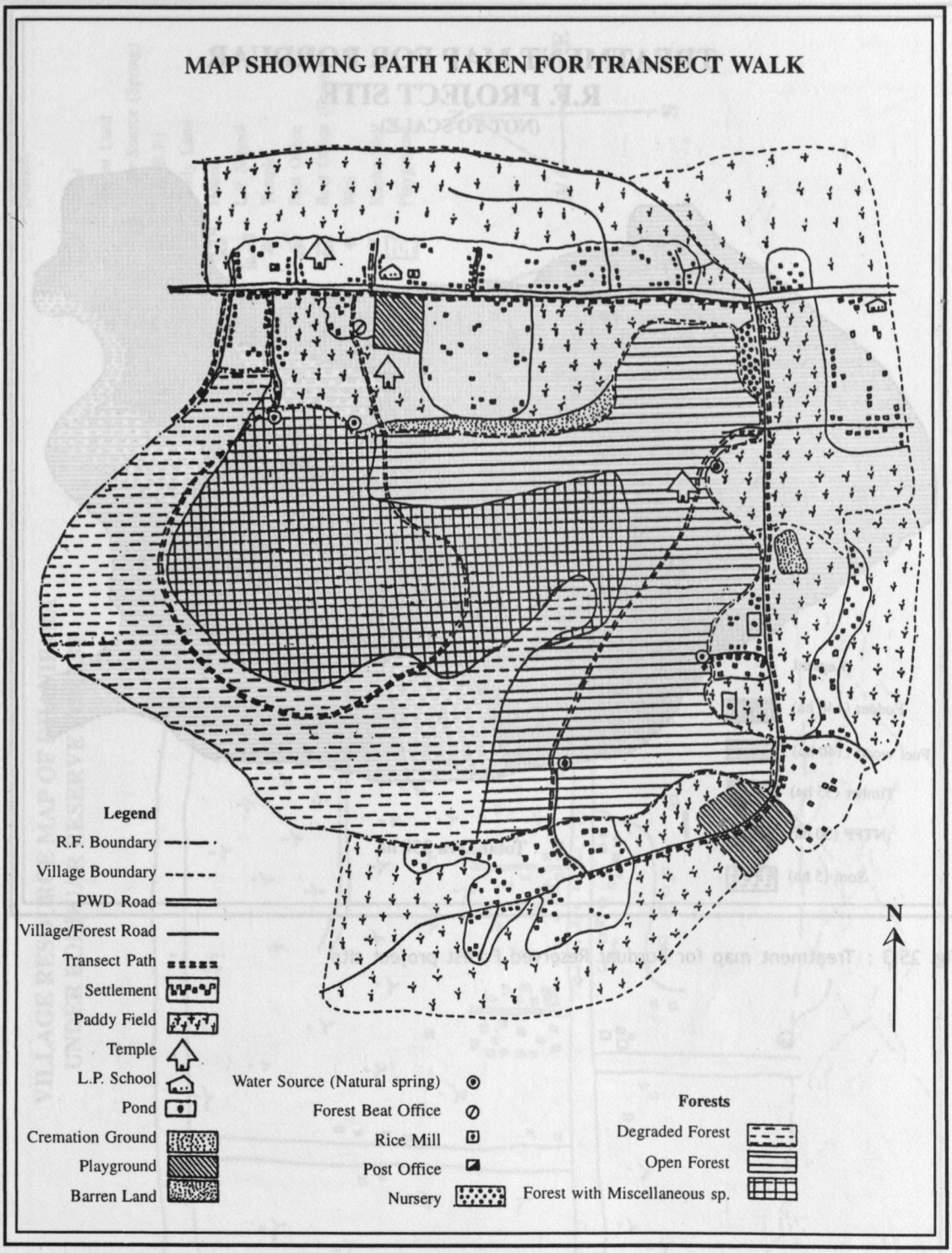


Fig. 25.1 : Location of Borduar in Guwahati subdivision of Assam



25.2 Map showing the path taken for transect walk

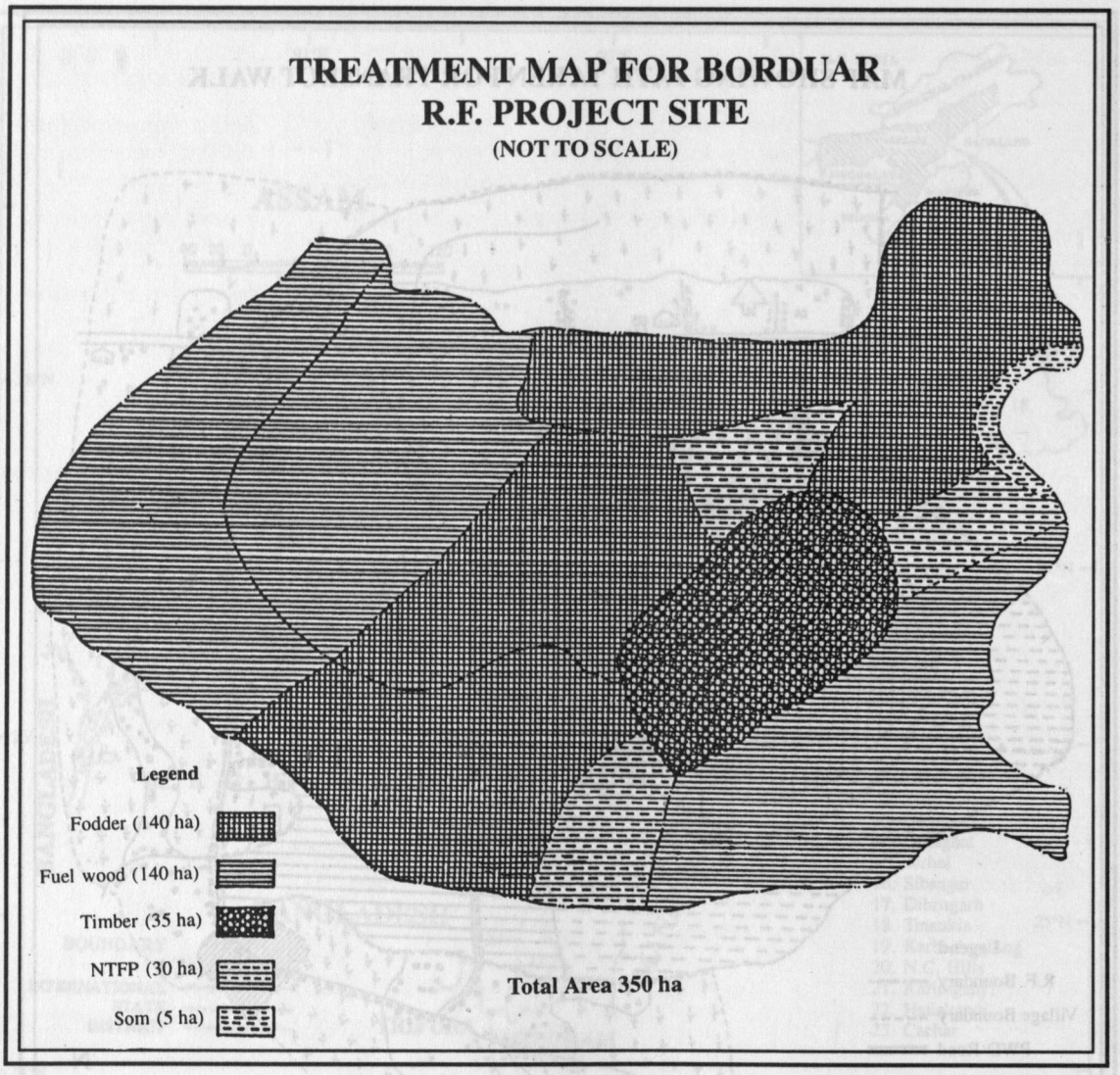
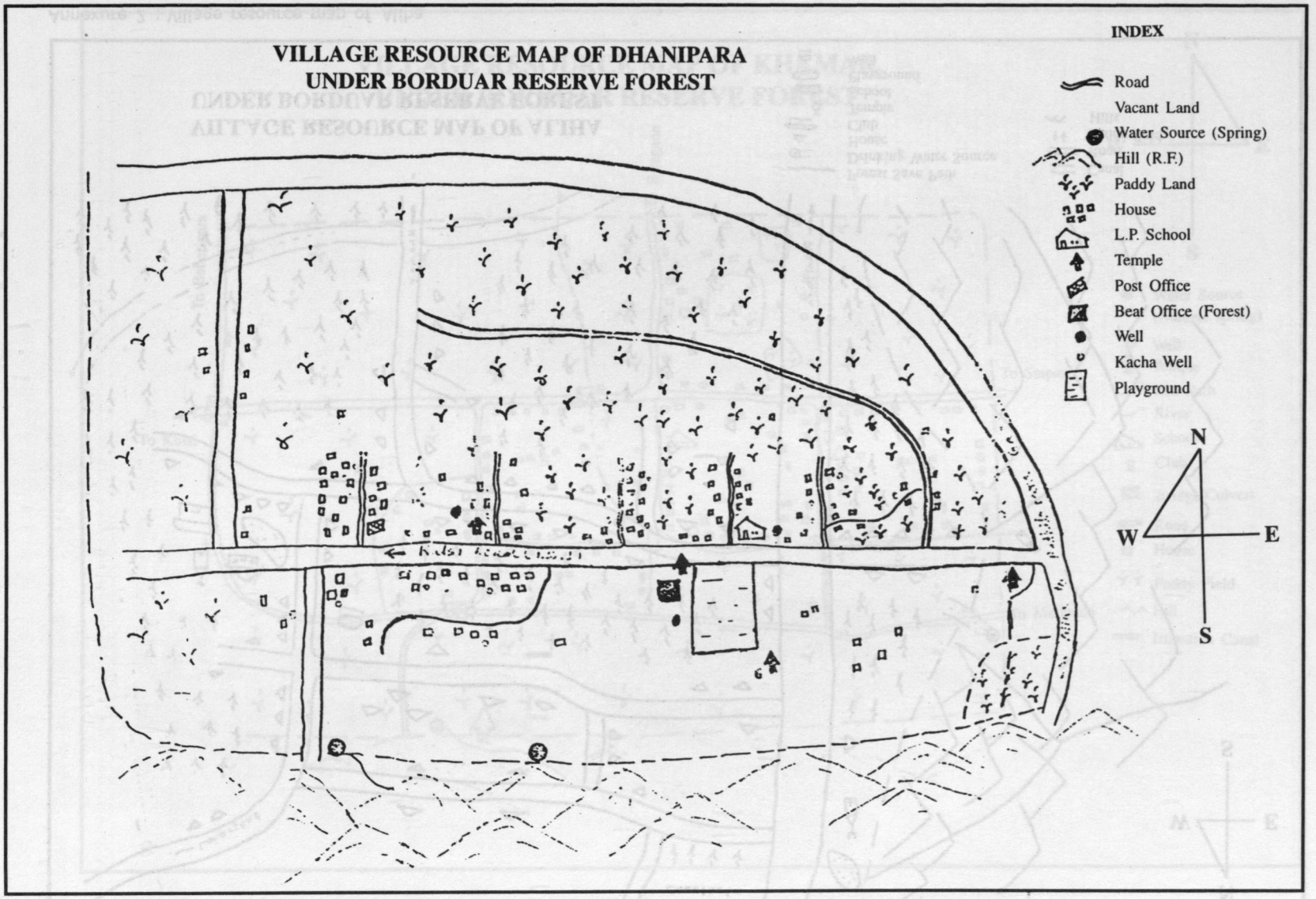
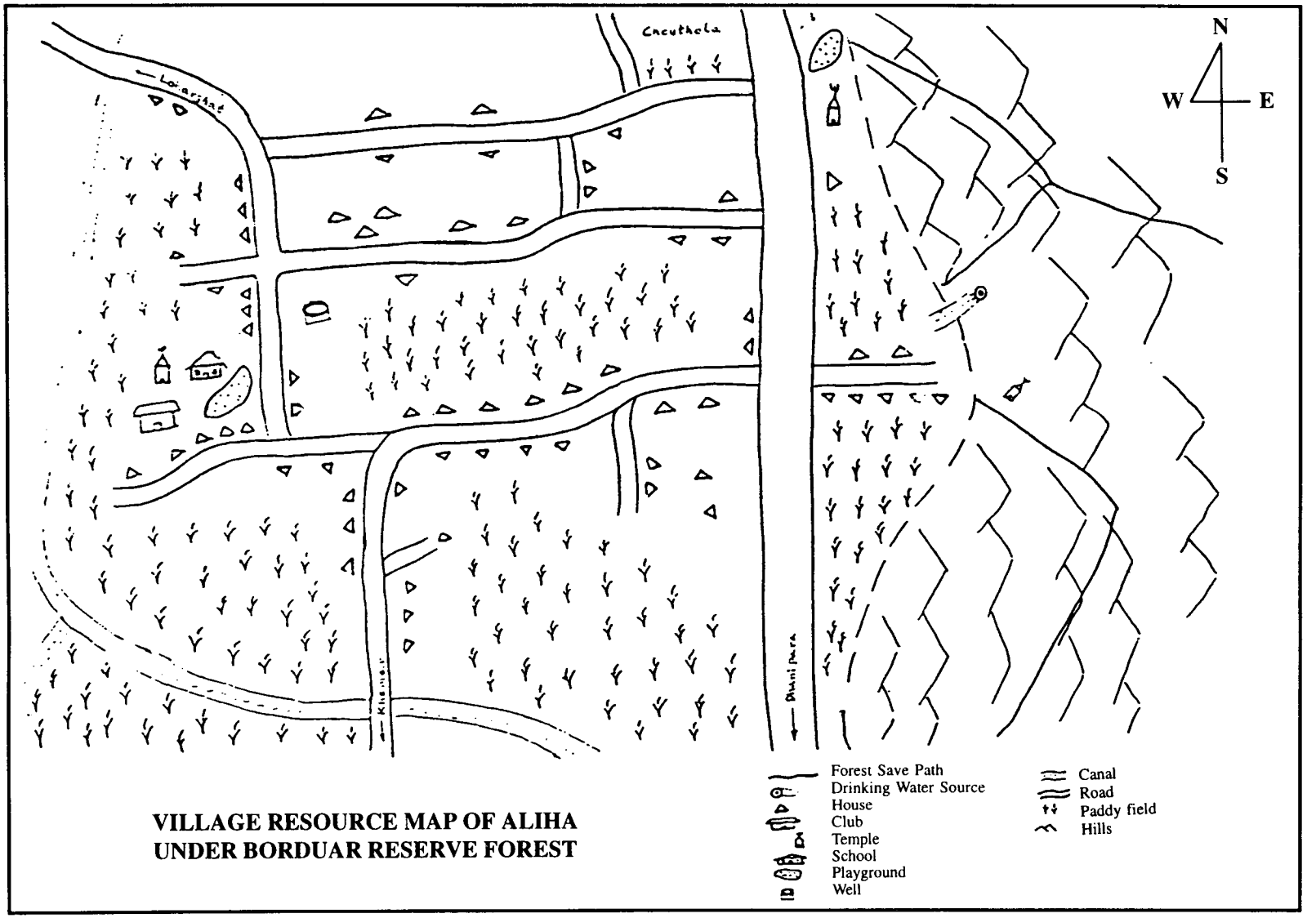


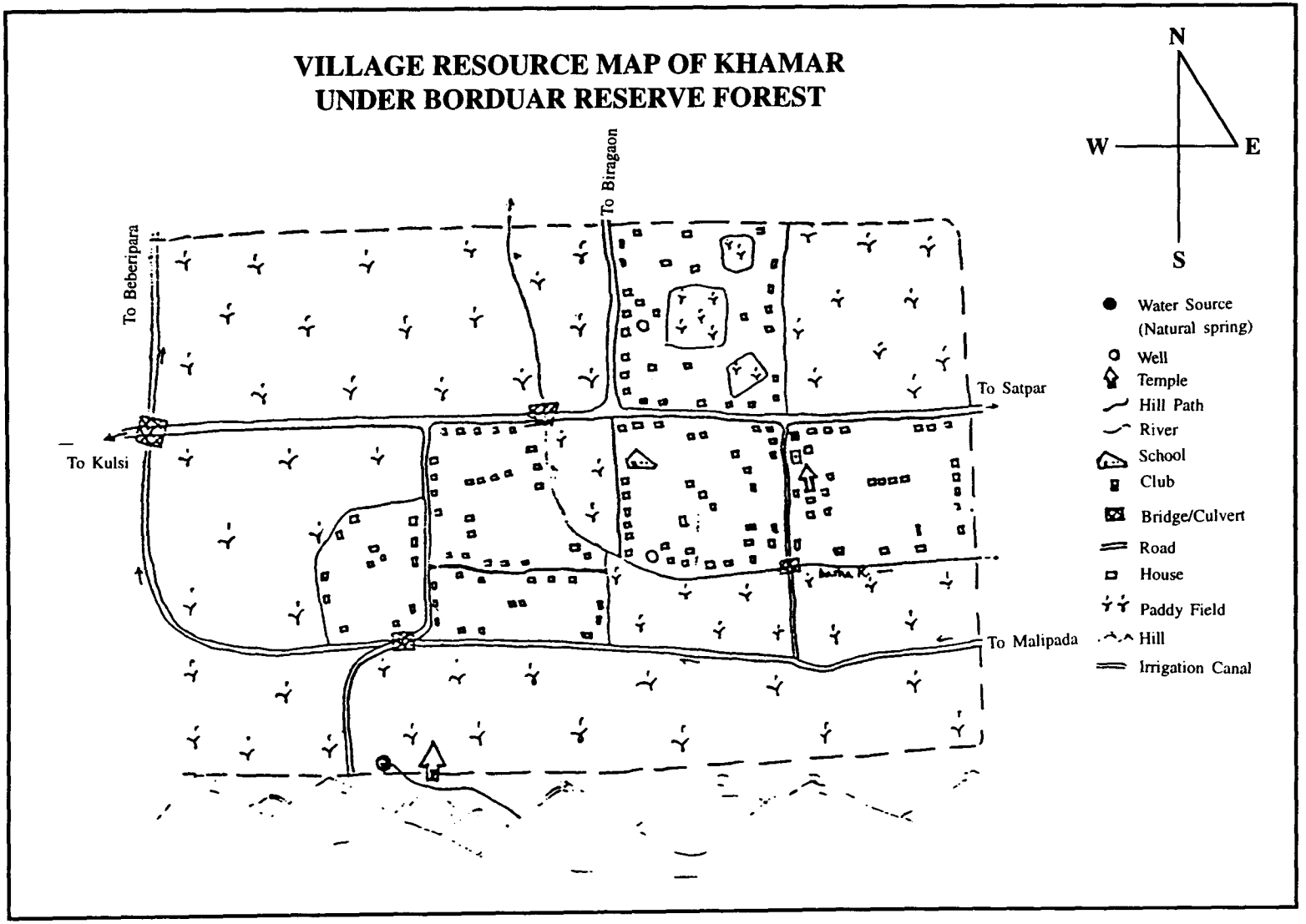
Fig. 25.3 : Treatment map for Borduar Reserved Forest project site



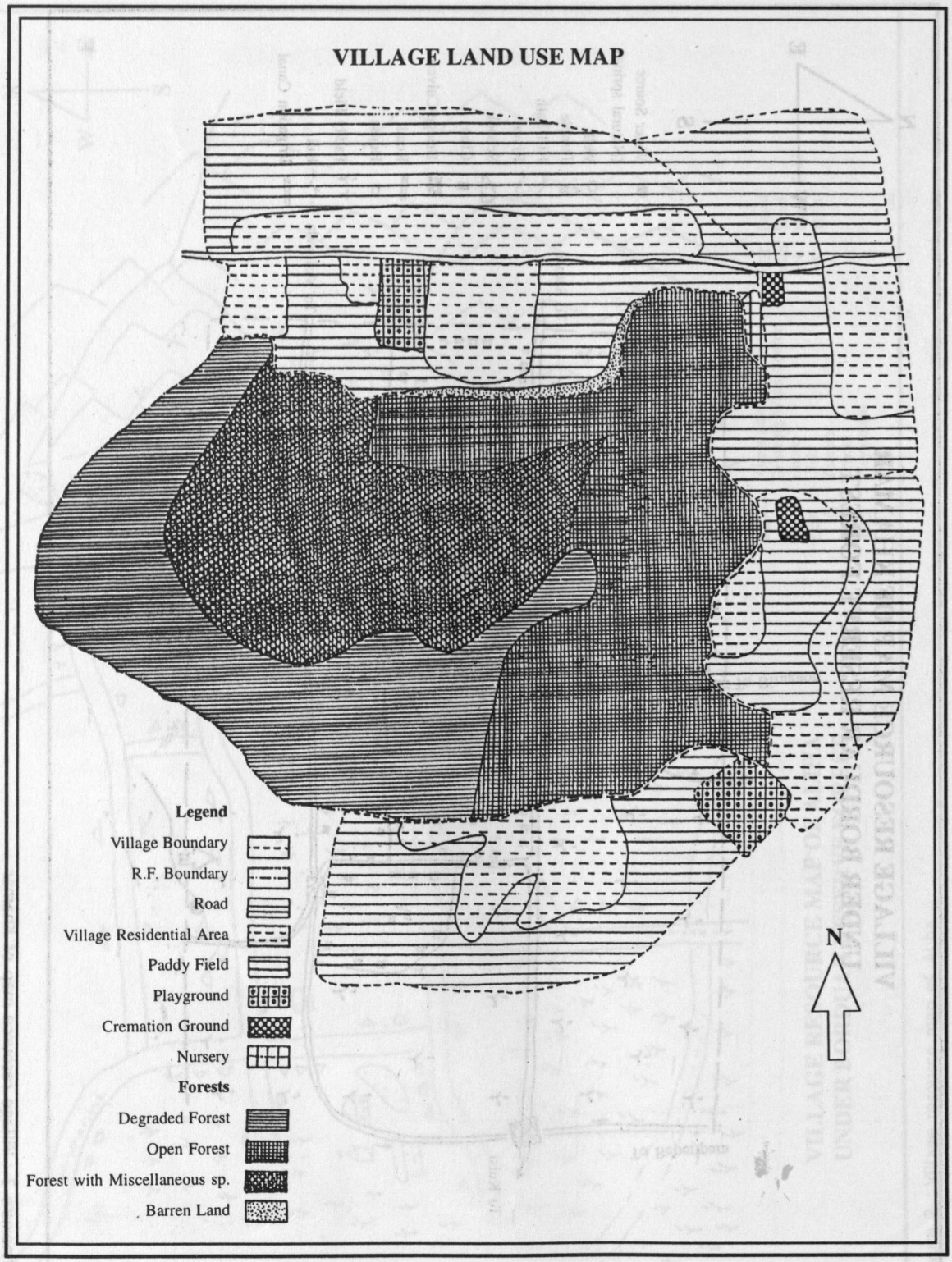
Annexure 1 : Village resource map of Dhanipara



Annexure 2 : Village resource map of Aliha

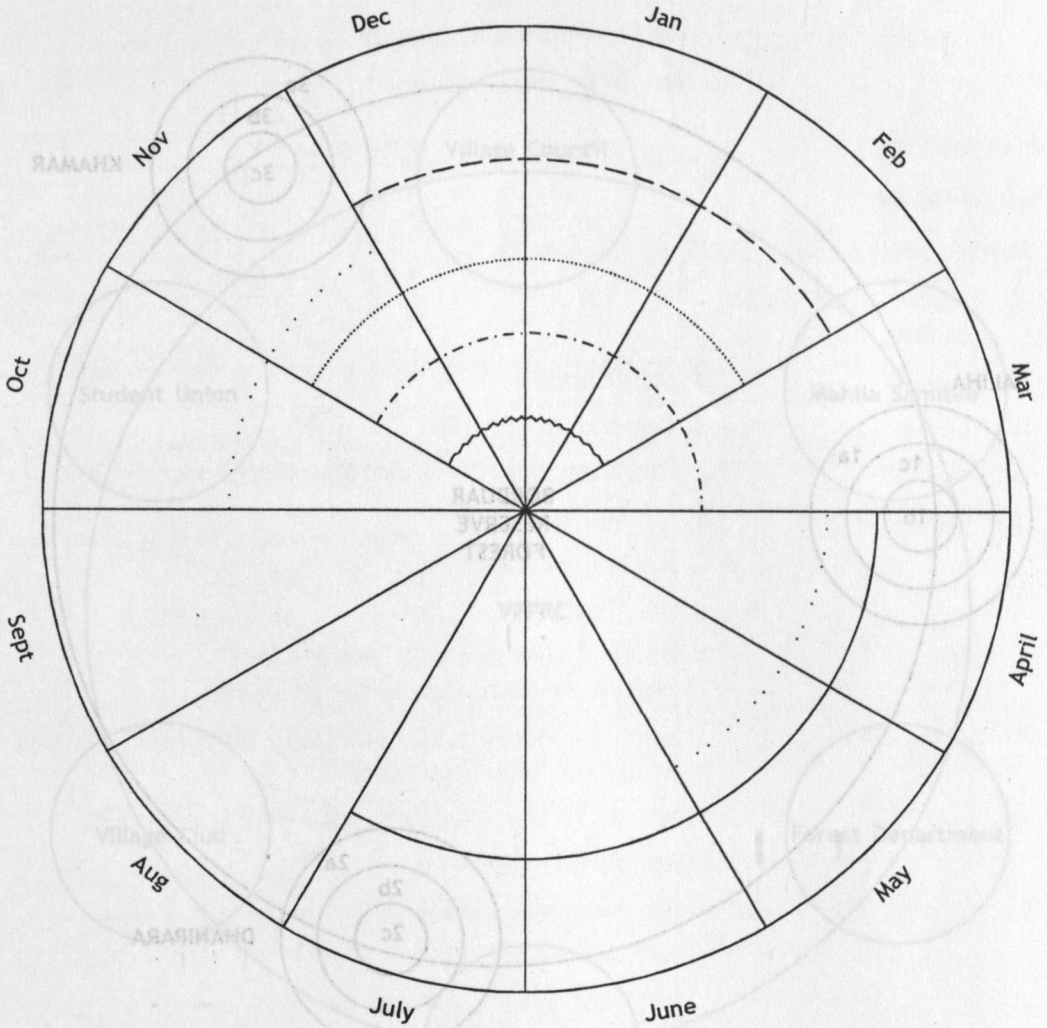


Annexure 3 : Village resource map of Khamar



Annexure 4 : Village land use map

SEASONAL CALENDAR OF FOREST PRODUCE EXTRACTION



Legend

Timber Collection

Firewood Collection

Fodder Collection

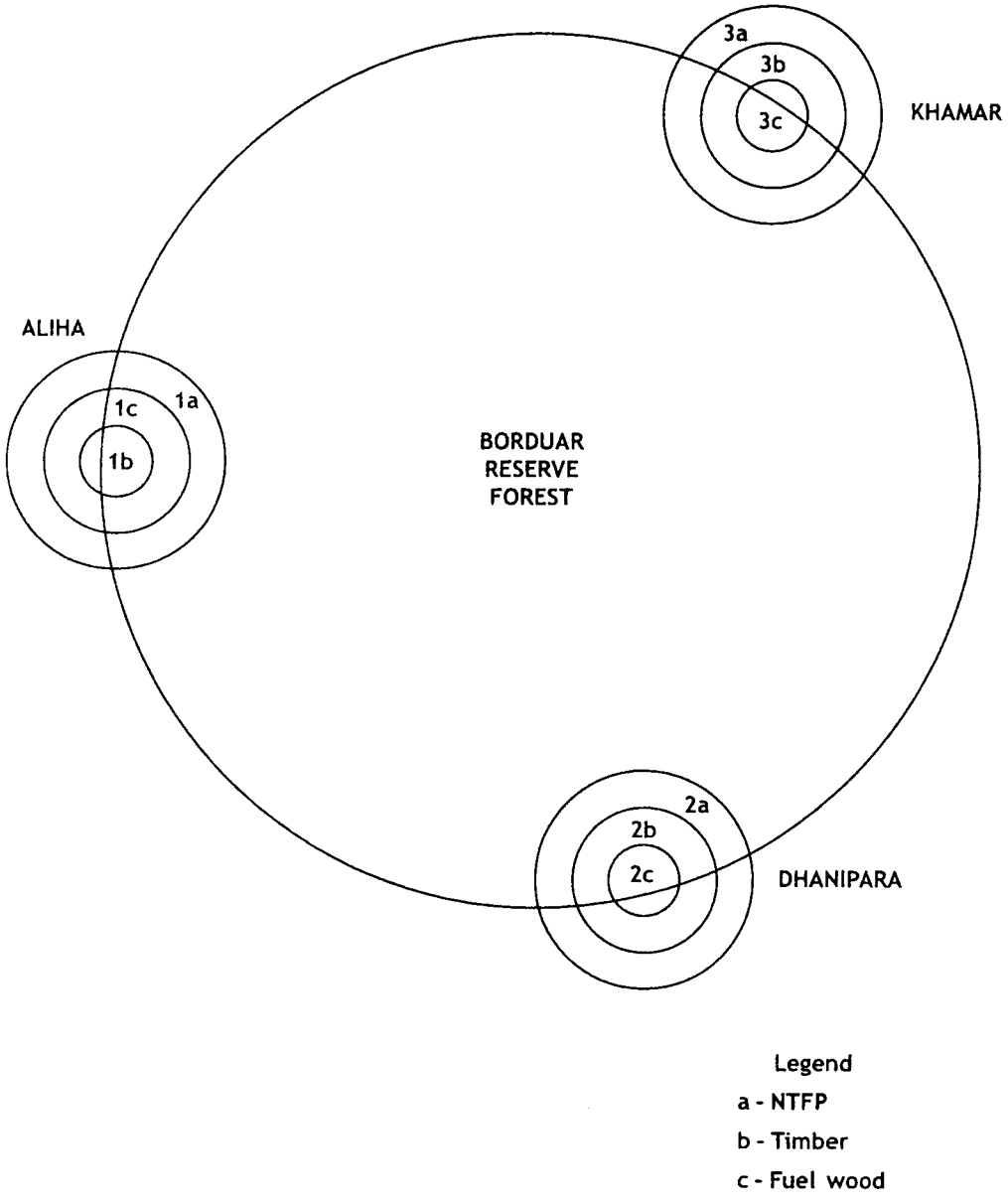
Edible NTFP Collection

Thatch Grass Collection

Stone & Soil Collection

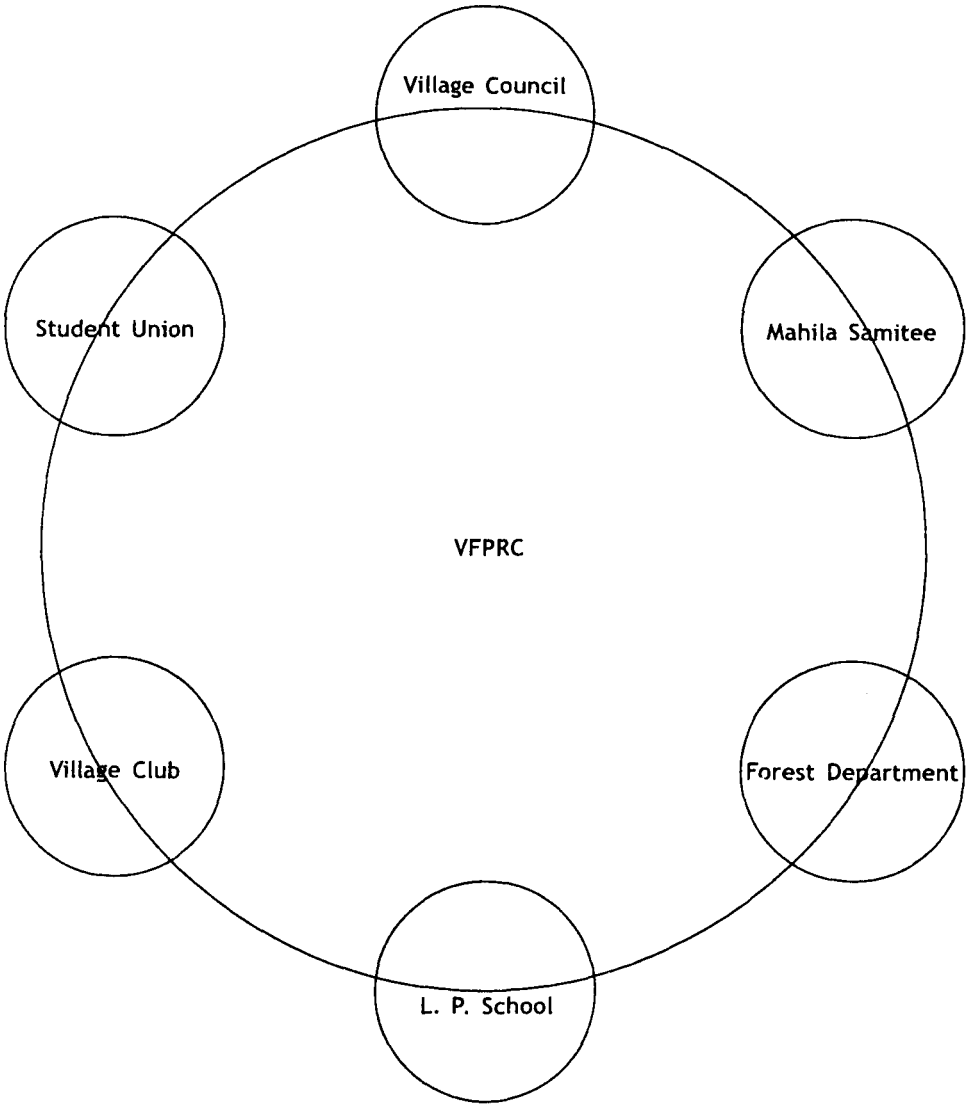
Annexure 5 : Seasonal calendar of forest produce extraction

VENN DIAGRAM SHOWING DEPENDENCY OF VILLAGES ON FOREST



Annexure 6 : Venn diagram showing dependency of villages in forest

VENN DIAGRAM SHOWING INTER-RELATIONSHIP OF VARIOUS ORGANISATIONS WITH THE VFPRC



Annexure 7 : Venn diagram showing inter-relationship of various organisations with the VFPRC