

**PART I**  
**SUMMARY OF FACTS UPON WHICH THE PROPOSALS ARE BASED**

**CHAPTER 1**

**1. DESCRIPTION OF TRACT DEALT WITH**

- 1.1. NAME AND SITUATION:** This working plan deals with the forest tracts of the Aie Valley Forest Division under the Western Assam Circle Conservancy. The territorial division is spread over parts of present Kokrajhar and Bongaigaon districts, on the northern bank of river Brahmaputra. The area dealt with falls between  $26^{\circ} 06' 45.05''$  N to  $26^{\circ} 54' 03.08''$  N latitude and  $90^{\circ} 21' 23.17''$  E to  $90^{\circ} 52' 20.85''$  E longitude. The total geographical area of the division is 2786.90 sq km. The division is bounded on the west by the Bhur River which drains subsequently into Champamati river, on the north by an international boundary with Bhutan, on the east by the rivulet Sukhanjani on its downstream till it meets the southern boundary of Panbari RF, and then along the said boundary till it meets the western boundary of Barpeta district. On the south it is bounded by the river Brahmaputra. Plate No. 1 depicts the broad geographical, administrative and political outline of the division. Table No.1 shows the key statistics of Kokrajhar & Bongaigaon districts.

The HQ of the division is at Bongaigaon. This is an important industrial township of Assam, housing the Bongaigaon Refinery & Petrochemicals Ltd. (BRPL). It also holds importance as a major railways township. In the days (till 1984 or so) when BG line did not extend to rest of Assam, from here, all trans-shipment from MG to BG took place.

The other important places are Basugaon, Bijni, Manikpur, North Salamara, Abhyapuri and Jogighopa. Bijni and Abhyapuri were earlier Zamindari estates. The palace of ex Zamindars still commands the center place in this sleepy township of Abhyapuri. Jogighopa is an industrial township housing the Ashok Paper Mill. The importance of this small industrial township has increased after the 3<sup>rd</sup> bridge (rail-cum-road), named Nar Narayan Setu, over the river Brahmaputra was made operation in 1996. Basugaon and Bijni are both railway stations. Manikpur is the HQ of the Western Assam Afforestation Division.

The division is well connected by rail as well road. The National Highway 31 passes through the division, and bifurcates in two sub branches at Rakhaldubi.

- 1.2. CONFIGURATION OF THE GROUND:** The land, in general, has southward slope. It can be considered a plateau rising gently towards north where it meets the Bhutan Hills. The elevation is as high as 500 m in the north. The plateau merges with the cultivation lands in the south and drains into the river Brahmaputra. From the north, for a few kilometers to the south, the tract is composed of rocks and pebbles, and remains waterless most part of the year, representing a typical *Bhabar* characteristic. Further down, the streams are perennial, ground water is high and the soil is more productive, thus, representing a *Terai* characteristic.

The topography in the southern part of the division is broken by several hillocks of varying altitudes. Some of the important hills are Kakoijana, Bamungaon, and Nakkati. The highest point is at 498m elevation on the Bhairab hill. Number of *beels* and water bodies also abound in this part. Most of the beels are linked to the dead channels of the Manas river near its confluence with the Brahmaputra. The major rivers and streams are Bhur, Champamati, Aie, Kanamakra, Teklai, Kujia and Manas. The rivers emerge from the Bhutan hills. Plate No. 2 depicts the drainage pattern of the division.

- 1.3. GEOLOGY, ROCK & SOIL:** The formation is distinctly alluvial. One can observe all shades of alluvium formation starting from conglomerates to finest micaceous sand and clay along the north south. The bhabar tract consists of coarse water borne pebbles of chiefly quartzose and schistose origin, upon which lies a thin layer of sandy loam and humus. Stones crop out near the foothills, but lie little lower in the south. The soil is very porous. Despite heavy rainfall in the area, it remains dry for most part of the year. As one approaches terai areas, water level gets higher. Amount of silt and clay is also much higher compared to bhabar tract. The presence of silt and clay directly enhances moisture retention, in addition to high ground water. The soil is sandy loam and rich in humus. The hillocks in the south are mostly composed of gneisses and schists.
- 1.3. CLIMATE:** Three distinct seasons can be recognized, namely winter, summer and monsoon. Winter sets in middle of October and lasts till end of February. This is followed by warmer months of March, April and middle of May. At the end of it, monsoon sets in and continues till end of September. During dry spells, dust is common. Monsoon is preceded by storms. During winter, especially in January and February, there is heavy dewfall. Hailstorms occur in April.
- 1.4. DISTRIBUTION & AREA:** The area dealt with in the plan comprises of the reserved forests and proposed RFs areas falling within the Aie Valley Forest Division. The name of the reserves along with other details is given in Table No. 2.
- 1.5. MAPS:** The Bengtol RF was found to be the only forest area with maps on 4" = 1 Mile. Old maps of Manas RF were not available. Rest of the areas that were constituted much later, do not have any reliable map. However, Survey of India topographic sheets (No. 78J/5,6, 7,8,10,11,12,13,14) on 1:50,000 scale are available for the entire division. Digital map has been created in .dwg format for the entire division. Boundaries of all the areas shown as RF have been lifted from these maps. Some of the areas have been represented in the digital map with modified boundaries, but most of the areas brought under reservation process in post 1960 period do not have appropriate boundary descriptions (including a well defined reference point) and map.
- 1.6. STATE OF BOUNDARIES:** The international boundary with Bhutan is well marked at places. The natural boundaries marked with river banks are dynamic and keep migrating year after year, providing a challenge to modern cartography. Boundaries at other places are non-existent. No internal boundary pillars were seen during the survey.
- 1.7. LEGAL POSITION:** The Bengtol RF, the oldest reserve in the division, was constituted vide notification No. 32 of 25<sup>th</sup> July, 1883 under Act VII of 1865. Rest of the forest areas were notified under the Assam Forest Regulation of 1891. The Bijni, Aie and Manas RFs were created in 1894,1915,1909 and 1927. The Aie and Bijni RFs were merged with Manas RF subsequently. The proposed RFs have had only the preliminary notification under the Act. Final notification is yet to be issued for various reasons. However, the attitude of the concerned forest officials is as if PRFs were some kind of a permanent state of affairs.
- 1.8. RIGHTS & CONCESSIONS:** The rights and concessions are as described in the notifications.

## CHAPTER 2

### 2. DESCRIPTION OF THE FORESTS

- 2.1. **TYPES OF FORESTS:** This chapter has lost much of its relevance due to massive deforestation in the division in the last decade. The glorious Sal forests of Bengtol are nowhere to be seen today. Much of the description given in subsequent paragraphs in this chapter is for sake of continuity and update (wherever possible).

The division has traditionally been classified as bearing the following forest types:-

- 🌲 Sal Forest
  - 🌲 Bhabar Sal Forest
  - 🌲 Terai Sal Forest
  - 🌲 Eastern Heavy Alluvial Plain Sal Forest
  - 🌲 Eastern Hill Sal Forest
- 🌲 Mixed Deciduous Forest
- 🌲 Evergreen Forest
- 🌲 Savannah
  - 🌲 Dry savannah
  - 🌲 Wet Savannah
- 🌲 Riverain Forest

A brief description of each type is given below: -

- 2.1.1. **Bhabar Sal Forest:** This type has been sub classified by Champion & Seth into two classes, namely East Himalayan Upper Bhabar Sal (E3 C/C b(i)) and East Himalayan Lower Bhabar Sal (E3 C/C b(ii)).

The Upper Bhabar Sal represented I/II quality on alluvial and well drained sites with boulder deposits. It was found in parts of the Manas RF falling west of Gorubhasa Deosri Road and approximately north of the ride 9 (of Chirang RF), and Bengtol RF. The top canopy is occupied by Sal, *Schima wallichii*, *Lageretroemia parviflora*, *Terminalia bellerica*, *Sterculia villosa*, *Vitex peduncularis*, with occasional *Bonsum*, *Amora* and *Chopa*. The second canopy is occupied by *Dillenia pentagyna*, *Premna benghalensis*, *Caryea arborea*, *Bridellia retusa*, *Wrightia tomentosa* to mention a few. Bamboos were also reported in the previous plan, however, their incidence is insignificant, as during the current survey, no bamboos were recorded in the areas visited by the field parties. Among the shrubs, notable are *Clerodendrum infortunatum* in drier tract and *Moringa angustifolia* in moister tracts. Open canopies areas are occupied with *Imperata arundinacea*. *Pollinea ciliotem* (San grass) also occurs.

The Lower Bhabar Sal occurs in damper areas with less incidence of grasses, but more evergreen undergrowth conditions. The Sal quality varied from I/II to II on well drained alluvial soils. On burning of these tracts, incidence of *Imperata* has been found to increase.

- 2.1.2. **Terai Sal Forest:** This type has been classified as 3C/C1c. It was found to occur in parts of Bengtol RF. The quality class seemed to vary from I to III/IV. The average quality was II/III to III. It is worth mentioning that none of these blocks bear any forest cover today, what to speak of Terai Sal of a particular type defined by Champion & Seth. In fact, Bengtol RF is devoid of any forest cover worth the name, what to speak of terai sal. It is

sad to note that such virgin tracts now lie occupied by encroachers and are dotted with numerous relief camps housing thousands of victims of ethnic clashes.

The principal associates of Sal were *Artocarpus chaplasi*, *Michaelia champaka*, *Amoora wallichii* etc. The middle canopy was occupied by *Garuga pinnata*, *Schima wallichii*, *Dillenia pentagyna*, *Castanopsis indica*. The undergrowth consisted of *Morinda angustifolia*, *Alpinia* spp, *Leea sambucina* and ferns. In openings, *Imperata* sprang up. In broadly open areas, *Eupatorium odoratum* colonized greatly.

2.1.3. **Natural Regeneration of Bhabar & Terai Sal Forests:** Largely credit goes to Perree for taking the problem of natural regeneration of Sal seriously. Natural regeneration of Sal has been always very poor to nil in these tracts. There also had been incidence of dying back of Sal in certain areas. Very little is available in records to show any concerted long term effort was made to go to the roots of the problem. The extent of fire protection could never be determined so as to enable Sal to regenerate itself naturally, and at the same time prevent rampant damage to the forests by fire. The details of the prescriptions of Perree along with other details would be described in a subsequent chapter on past systems of management.

2.1.4. **Eastern Heavy Alluvial Plain Sal Forest:** This type has been classified as 3C/C2d(ii) by Champion & Seth. The crop as per earlier description appeared to be varying from 60-90% in Sal. The rest occupied by its associates Oxi, Jia, Bohera, Kum, Gamari, Panikadam, Sida etc. At present, the crop is almost entirely coppice Sal of fairly low quality. Due to repeated damages, the crop has not been able to cross beyond pole stage.

All the plains forests in older alluvium of tropical red soil are covered by this type. Sal forms 60% to 95% of the trees in the crop, but large-sized trees of the species is rather rare due to past heavy exploitations. Both the sub-types. (Guma & Kamrup) are represented in these forests. Broadly speaking, the plains' forests lying to the North of the Brahmaputra river approximates to the Guma subtype and the associates of Sal (in approx. order of frequency of occurrence) are Oxi, Jia, Bahera, Kum, Gamari, Panikadam, Sida, Kanchan, Parali, Amara, Udal, Ahoi etc. There is practically no middle-canopy, and where-ever it occurs it is composed of mostly young saplings of Sal, Bahera Sida, Dudhi, *Cycas* spp etc. The ground cover is composed mostly of *Curcuma* sp. (Katuri).

The forests of this type lying to the south-bank is more akin to the Kamrup Sub-type and the associates of Sal here occur in the following approximate order of frequency :-

Behera , Jia, Neoli, Oxi, Kum, Gogra, Jam, Paroli, Sida, Ahoi, Kuhir etc. The middle canopy, when present is made up of young saplings of Sal in association with Kum, Gamari, Ahoi, Behera etc. The undergrowth and ground cover is same as given above and *Coffea bengalensis* is also found in places. Thatch (*Imperata cylindrica*) also occurs as ground cover in open locations.

Regeneration of Sal is not a problem in these forests. In fact, wherever there are slight openings in the canopy there are profuse occurrence of whip seedlings of Sal, and establishment of these are also rather easy . Along the edges of all areas under this type, the existence of such rank growth of whippy Sal is readily noticeable.

According to Kanjilal (in his report of 1920 of Bijni Raj Estate), the gregarious pure type of the plains Sal forests were created, by waterborne or windblown Sal seeds brought down from the hills and elsewhere, and Sal behaved as a coloniser in open grass-lands, river-flats and islands etc. He reckoned that the associates of Sal came in later in such areas.

- 2.1.5. **Eastern Hill Sal Forest:** This type has been classified as 3C/C La(II) by Champion & Seth. This occurs on hill slopes and ridges in patches. This type has also been subjected to damages, and the present crop is entirely coppice.

On the hills of the older alluvium, 'Sal' occurs in patches on the ridges & spurs, the valleys and the middle slopes being usually occupied by miscellaneous species & bamboos. The quality of the Sal crop is rather poor, and the occurrence is in the form of pure patches. The associates of Sal forming more than 3% of trees above 6m in girth are-Bahera, Jia, Ghogra, Kum, Oxi, Sida & Udal. There are also some Ahoi, Koroi, Jam, Parali, Panikadam, Haldu etc. in association with Sal. Middle-storey is rather scanty and is usually made up of species like Caroya aroborea, Aporosa oblique, Emblica officianalis, Dillenia pentagyna, Sterculia sp. Etc. The usual ground cover is Microstogium sp. Under the closed Sal canopy. Eupatorium and thatch occur in open patches.

"Whips" of Sal are found on the ridges in the openings, but established saplings and larger poles are rather scarce. The areas where this type occur are generally subject to fierce annual fires.

- 2.1.6. **Moist Deciduous Forest:** This is Northern secondary moist deciduous forest typified as 3C/C3 2 Sl. The top canopy is occupied by Talauma hodgsonii, Terminalia bellerica, Pterospermum chelonoids, Amora wallichii. The second canopy consists of the pole crops of the above species as well as Dillenia pentagyna, Bombax ceiba, Schima wallichii, Michelia spp, Wrightia etc.

The ground flora is composed of Coffea bengalensis, Clerodendron infortunatum and Pollinia ciliata in closed conditions of canopy. In open conditions, grasses such as Imperata arundinacea, Andropogon nardus, Anthistria gigantean, Saccharum spp are found.

- 2.1.7. **Evergreen Forest:** This is the Wet Evergreen formation of the type 1B/C. The top canopy is occupied by Chikrasia tabularis, Tetrameles nudiflora, Cinnamomum cecicodaphna, Mansonia Dipikae. The second story is consists of Stereospermum personatum, Dillenia pentagyna, Mesua ferrae, Wrightia tomentosa, Holarrhena antidysentrica, Talauma hodgsonii. Some of the shrubs are Morinda angustifolia, Laas spp, Laportia crenulata, Clerodendron spp. Phragmites karka and Saccharum procerum are the prominent grasses. The forest is prominent in climbers and epiphytes. The most common species in this category are Entada scandens, Vitex spp, Fintex microphylla etc.

- 2.1.8. **Cane Brakes:** At present, with the expansion of cultivations and the large inroads made into the forest areas due to this factor, this type of forests is on the verge of extinction. There are rare occurrence of this type in the wet depressions with clayey soils. The species of cane found being Jati and Raidang.

- 2.1.9. **Secondary Moist Bamboo Brakes:** This type occurs in the hilly areas and bamboos usually occupy the valleys and the middle-slopes of the hills along with patches of moist mixed deciduous forests. Nakkati Hill on the north-bank has large areas under such bamboo-brakes. The brakes are composed of clumps of Kako-bamboo (Dendrocalanus hamiltonii), and other is practically no middle-canopy or ground-cover. Occasional whips of Sal are found struggling under the bamboos.

- 2.1.10 **Savannah:** This type occurs in Manas extensively. Broadly it can be divided in two categories- namely Dry and wet. These are described briefly below: -

**Dry Savannah:** This type occupies extensive areas in the Bhabar terraces, and the locations are subject to fierce annual fires. Very scattered & stunted Sida, Simul, Udal Oxi, Kum & and occasional Gamari/Gohora are the main tree species found in such areas growing in a sea of grass. Due to the absolutely open conditions, no differentiation into Top-story & Middle Story spp. is possible. However smaller saplings of the above spp. along with Amalkhi, Khoir, Maskoitsa, Gunderi etc. are also observed in such formation. Rare and solitary Sal trees as well as groups are found in a few locations in the Manas RF.

Some of the grasses occurring in this type are – Imperata cylindrica, Narenga porphyrocoma, Saccharum arundinaceum. Themeda arundinacea, Tragus biflorus etc. Grawia sapida and Premna herbacca are the characteristic associates in the grass lands. Amongst climbers Accacia pinnata are frequently met with. Other climbers observed are Butea sp., Dalbergia sp., Mikania sp. etc.

**Wet Savannah:** On badly drained and low-lying locations there is a change in the composition of the crop, and in such locations an occasional Koroi, Uriam, Owtenga, Bheikor & Simul comes up. Some of the grasses found in such areas are Saccharum procerum, Saccharum spontaneum, Apluda aristata, Phragmites karka, Neyraudia reynsudiana, Erianthus spp. etc. In the extreme form of this type, in locations containing perennial water (swamps), there are practically no trees and the vegetation consists of Eichhora crassipes, Nyupnoides spp. Leersia hexandra, Vossia cuspidata, Polygonum spp., Phragmites karka, Thysanolenia arostis, Trapa spp. Ludmisia spp. etc.

**2.1.11 Riverine:** This type, characteristic colonizer species, occurs on riverine accretion both along banks as well as on islands. The type is also found in abandoned & silted up courses of rivers & streams, away from the present channels. Mixed stands of both the species occurring together are rather rare and in such patches Sissoo invariably predominates. Pure patches of Sissoo are more commonly met with than pure patches of Khoir. Towards the eastern part of the Manas RF, there are a few patches of pure Khoir. Further away from these pure patches, large Sissoo trees are met with occasionally in the next stage of succession. Khoir stems persist as isolated groups or as individuals in all stages of the succeeding moist mixed deciduous formation.

Simul & Kuhir form an occasional associate in pure stands of Sissoo & Khoir. In the eastern part an occasional Koroi also comes up as an associate in Khoir patches. There is practically no middle story in this type.

The ground cover is exclusively made up of grasses e.g. Saccharum spontaneum, Eragrostis tennella, E. diarrhena, Aristida adscensionis, Tragus biflorus, Imperata cylindrical etc. In some locations Clerodendron viscosum, Solanum spp., Eupatorium Odoratum, Flemingia spp., Leea spp. Are also met with as ground cover, in association with the grasses.

**2.2. INJURIES TO WHICH CROP IS LIABLE:** T.K. Das in his plan of the Haltugaon division wrote, "Working Plan would soon enough be an elegy", while describing the injuries caused by encroachers. Nothing could be more true today, as this particular agency of destruction, which acts probably in most organized fashion contrary to common belief, has, within a very short span of time, brought the verdant forests of the division to naught by clearing as much as 21,000 ha. One may ask naturally, what the foresters were doing? Though there is no straight answer to that question, some of us including the Assam Forest Protection Force fought valiantly, many had to sacrifice their lives, forest buildings were set ablaze, staff killed, kidnapped, tortured... all in the name of, God alone knows, what. The irony is that all those that were incited to loot and plunder have remained as poor as ever, even

became poorer, though timber/trees worth crores of rupees were destroyed/removed/felled/cut. Today majority of rural population of Kokrajhar/North of Bongaigaon has become ecological refugees, but, sadly, foresters have always to bear the brunt.

## CHAPTER 3

### 3. UTILIZATION OF PRODUCE

- 3.1. AGRICULTURAL CUSTOMS & WANTS OF POPULATION:** The population inhabiting the forest villages and the fringe villages are agricultural economies, comprising of various ethnic identities. The inputs to their system of agriculture is chiefly traditional, the highlight of the system being indigenous irrigation system through a network of canals called *Dongs*. The population is dependant on the forests for firewood, fodder, small-wood, timber, Non-wood forest produce (NWFP) and fruits. Almost all the requirement of house building, fencing, agricultural implements and energy are met from the forests. All such goods and services are being availed by the public for free, without paying even a farthing to the exchequer. Of all, the fire-wood and small timber is removed from the forest areas and supplied to the neighbouring towns fetching handsome return to the exploiters. Extraction of NWFP is also largely in the unorganized sector.

However, the largest demand is of land itself, for which the communities have incessantly toiled to clear every patch of nearest forest. As a result, today, the prime Sal forest areas have been replaced by agricultural fields. Please see an inserted photograph in one of the title pages of the plan for a typical sight.

- 3.2. MARKETS & MARKETABLE PRODUCE:** The principal timber markets are Kokrajhar, Basugaon, Bongaigaon, Kochugaon, Barpeta and Goalpara. If the transport network is utilized, markets outside the state can very well be explored for export of forest produce. An exhaustive list was prepared by TK Das in his plan for Haltugaon division, which is presented here as Table No. 3 for benefit of readers, policy makers and managers alike. Table No. 4 gives the name of all the saw mills located in the division.

The harsh reality is that the timber/small timber/fire-wood market is by no means under any direct regulation by the Department. Under the prevailing circumstances of fear and apprehension, where the control mechanism has collapsed, supply is mostly from spurious sources.

NWFP or Non timber forest produce (NTFP) is the potential revenue earner. The Department should give a serious thought to bring its management by way of production, collection, value addition and export.

- 3.3. LINES OF EXPORT:** The division has a very good transport/communication network. The NF Railway line passes through the division. The main stations are Bongaigaon, Bijni, Jogighopa, Chapar . The rail cum road bridge at Jogighopa (in Bongaigaon district/division) has linked the entire district to Goalpara and Meghalaya on the southern bank of the Brahmaputra river. There are several roads, including the NH 31 criss-crossing the division. The NH37 can be accessed via the Nar Narayan setu at Jogighopa.

From the forests on the north, there are two major roads i.e. Kuklung-Bijni road, and Gelengphu-Deosri-Gorubhasa road, both of which join the NH 31. The forest areas in the south of the division are also well connected to various roads, some of which require maintenance/bridges/culverts, especially near the forest areas. The communication map of the Division is shown in Plate No. 3.

Another road which requires mention is the Ultapani-Hatisar Road which links Ultapani with Hatisar/Deosri and passes through the Manas RF and Dholpani block A of the Chirang RF. This road was partly cleared by the field parties during the current plan survey, from the Hatisar end upto Bhur river, and from Ultapani end upto a distance of about 4 km.

Thereafter the vegetation had become too thick to clear for the working plan parties to move ahead.

- 3.4. **METHODS OF EXPLOITATION:** The earlier practice of disposal of timber and other produce through annual coupes have been done away with. However, the system of Mahals for disposal of minor minerals and NWFP still continues.
- 3.5. **CURRENT PRICES:** Though the Division was asked to submit local/current prices, the same were never received. Hence, no light could be thrown on the matter here.

## CHAPTER 4

### 4. ADMINISTRATIVE HISTORY

- 4.1. INTRODUCTION:** The forests described in this working plan share a very long, i.e. more than a century and a quarter of checkered forest management. Though the author put best efforts to trace down the history of each forest reserve, especially in relevance to frequent administrative changes that were necessitated in course of time, yet the effort can hardly be called a success. Most of the records, gazettes and Forest Administration reports of the early times could not be traced. Passing mention of administrative changes in the previous working plans was found often conflicting. The brief history presented here is, therefore, not free from errors. At places, author had to contrive the possible transition based on pure logic.
- 4.2. BRIEF HISTORY OF REORGANIZATION:** Goalpara Forest Division was first created in 1857 (and it probably included Garo Hills as well). The Garo Hills was created as a separate district in 1869, but it was not until 1875 that the demarcation between the two districts was defined and declared. W.R. Fisher was the first Divisional Forest Officer of the undivided Goalpara Division. The HQ of the Division was at Dhubri. In 1881-82, Garo Hills Division was created with HQ at Tura.

The then Inspector General of Forests, Government of India, Sir F. Beadon Bryant IFS, visited the Division in 1911, and recommended its division in two parts. In 1934, the Division was bifurcated into Haltugaon and Kochugaon Divisions. The HQ of the former was made at Haltugaon, a sleepy hamlet of little consequence (even today), whereas Dhubri continued to be the HQ of the other part i.e. Kochugaon division. This division was effected by Milroy.

It appears that the names of Haltugaon and Kochugaon Divisions were changed to Goalpara East and West respectively sometime between 1946 to 1948, probably as a post war reconstruction drive.

In 1956, another major re-organization was effected by transfer of Manas RF by creating North Kamrup Division vide notification No. FOR.223/52/227 Dt. 18.9.56. All the forests falling east of the Kanamakra river (and going eastward upto Dhansiri river) and north of the railway line were transferred to the North Kamrup Division with HQ at Barpeta Road. The HQ of Garo Hills Division was shifted to Goalpara from Tura.

1968 saw yet another reorganization on a bigger scale, wherein Dhubri division was created with HQ at Dhubri, by bifurcating Goalpara West Division into two. The other division was Kochugaon Division with HQ at Kokrajhar, subsequently changed to Gosaigaon. Goalpara Division was created by bifurcating Haltugaon from the Goalpara East Division. The HQ of Garo Hills Division was shifted back to Tura.

In an effort to intensify forest management further, the areas were reorganized in 1980. Aie Valley Division was carved out by separating Abhayapuri range from Goalpara, and parts of the forest reserve east of the Champamati river from Haltugaon division. A small reorganization was effected in 1992 by including Kuklung Range and Bijni Depot from North Kamrup division to Aie Valley Division.

**4.3. ADMINISTRATIVE SETUP:** The Division is headed by a Divisional Forest Officer. There are 4 territorial ranges, 3 Depots and 1 independent account beat. The ranges are Amteka Range, Sidli Range, Abhyapuri Range, and Kuklung Range. The depots are Bongaigaon Forest Depot, Basugaon Forest Depot and Bijni Forest Depot. All the seven units have independent territorial jurisdiction. The division maintains one central check-gate cum independent accounts beat at Rakhdubi, which is a crucial point of communication for the entire division.

The Amteka range looks after part of Manas RF Part I, Sissoobari and Teklai RFs. Sidli Range looks after part of Manas Rf Part I, Bengtol RF, Katribari RF and Ranisundari RF. Manas range (Kuklung) looks after Manas Part II and Kuklung RF. The Abhyapuri range looks after Nakkati, Kakoijana, Bamungaon, Khoragaon and Rakhalthakur RFs. The Basugaon Depot looks after Digdari RF.

In addition, there is Protection Squad Range at Bongaigaon.

The Beats and Sub beats are given below:-

Sl. No	Range	Beat	Sub-Beat	Camp	Check-gate
1	Abhayapuri	North Salmara	Kakoijana	Jiaguri	North Salmara
		Kabaitari	Kherbari	Jitkibari	
		Baitamari	Malegarh	Bowalimari	
			Kochudola	Rakhalthakur	
			Bistupur	Hapachera	
			Sidalsati	Sonakuchi	
2	Sidli	Deosri	Hatar*	Champa*	
		Bordangi*	Gorubasa*		
		Bengtol*			
		Kasikotra			
		Morabhur*			
		Dattapur*			
		Bamungaon			
3	Amteka	Lalai*			
		Parboti*			
4	Manas	Batabari*			
		Rangijhora*			
		Agrang*			
		Daranga*			
5	Basugaon Depot		Bidyapur	Champa	
			Digdari		
6	Bongaigaon Depot		Mulagaon		
7	Bijni Depot	Manikpur			
8	Division				Central Forest C/G, Rakhdubi

\* Destroyed during the disturbance in '90s & hence, not in existence.

- 4.4. STAFF STRENGTH:** The sanctioned staff strength is 196 under the Non Plan & Plan Head of expenditure. Total number of personnel under harness is 166. A brief summary is given below:-

Sl No.	Category of Post	Existing Strength
1	DFO	1
2	ACF	2
3	FR	5
4	Deputy Ranger	7
5	Fr I	28
6	Fr II	6
7	Forest Guard	78
8	HA	1
9	UDA/LDA	7
10	Driver/Handyman	4
11	Draftsman	1
12	Mali	1
13	Depot Chowkidar	7
14	Peon/Chowkidar	16
15	Sweeper	1

Out of these, 30 posts are vacant, 14 being in the forest guard cadre.

The Staff position, the annual statement of Salary under the Non Plan & Plan head, and statement of revenue and expenditure is given under Table No. 5 – 7.

There are 10 Frl and 28 Fgd trained at the Forest schools located at Jalukbari & Makum respectively.

- 4.5. AMENITIES TO STAFF:** Drinking water supply is mostly met from ring wells. Though there appear to be a large number of ring wells sunk at various places, some of them are not functional. Few are damaged as well.

Electricity is available at divisional HQ, Abhyapuri, Runikhata, Basugaon, and Bijni. Rest of the places, there is no electricity. The department can think about solar lighting option. There is only one phone in the Division. Staff have not received uniform for a very long time.

There is only one Gypsy in running condition. Though two jeeps and two trucks physically exist, they are not in running condition.

Occupancy of government residence is high in Bongaigaon, Abhyapuri and Basugaon. At Runikhata, few of the staff stay. Due to disturbance, residential quarters at other places are mostly abandoned.

- 4.6. PLANTATION WORKS:** The various schemes are RDF, Matchwood, Sal artificial regeneration, under planting and other hardwood spp. Species planted are Bonsum, Lali, Velkur, Ajhar, Gamari, Sal, Sissoo, Teak, Kadam, Siris etc. A detailed list of plantations is provided in Part III of the Plan at Table No. 8.

## CHAPTER 5

### 5. SOCIAL FORESTRY

- 5.1. INTRODUCTION:** The Social Forestry Division, Bongaigaon came into existence on 14<sup>th</sup> June, 1993 vide Govt. notification No. FRM.203/92/21 Dt. 20-2-93. It has functional jurisdiction over the civil district of Bongaigaon. The division is headed by a Divisional Forest Officer, under the overall administrative control of the Conservator, Western Assam SF Circle.
- 5.2. ADMINISTRATIVE SETUP:** The division has 3 ranges, namely Bongaigaon, north Salamara, and Bijni. There are three independent Account Beats namely Nakkati 9with HQ at Bongaigaon), Kabaitary 9with HQ at Chalanpara), and Manikpur.
- 5.3. MAJOR ACTIVITIES:** The major schemes implemented by the Division are AOFFP (Area Oriented Fodder & Fuelwood Programme), SCCP (Schdeled Caste Component Plan), TSP (Tribal Sub Plan) and SFG (Social Forestry General). The Divison undertakes block plantation, roadside strip plantation, and beautification activities.

The Division maintains several parks. These are Bijni park cum mini Zoo, National Highway Park at Goroimari, Sankardev Sisoo Udyan at Bijni, Abhyapuri Recreation Park and Bongaigaon Children Park at Gandhi Maidan, Bongaigaon.

The division, under the provision of the Assam Joint (Peoples participation) Forestry Management Rule, 1998, has formed several committees in the name and style of Forest Protection & Regeneration Committees. In total 16 such committees were formed. Details of the committees can be seen in Part III of the Plan. *Since writing of the Plan, the scenario in the JFM Sector in the state has improved considerably. As per guidelines of the Government of India, FDA has already been formed with a designated CEO. The JFM rules are under modification. So, the details included in the draft plan have been dropped. Instead, the JFMCs participating in the FDA are listed in Part III).*

- 5.4. STAFF STRENGTH:** The total sanctioned staff strength is 73. Directly under the control of the Divisional Forest Officer, there are 5 Forest Range officers. At present, there are 5 Deputy Rangers. There are 16 Forester I, 2 FrII, 21 forest guards and 13 malis.
- 5.5. AMENITIES TO STAFF:** The divisional HQ functions from a rented premises. There are few quarters in the ranges and beats. Most of them are damaged. Electricity is also not available in most of the places. There is only one petrol jeep and another minitruck. Both the vehicles are unserviceable.
- 5.6. TABULAR DETAILS:** Various details on manpower, revenue & expenditure, plantations can be had from Part III of the Plan. See Table No. 12 to 18.

## CHAPTER 5A

### 5A. SOCIAL FORESTRY (TWO)

**5A.1. INTRODUCTION:** The Social Forestry Division, Kokrajhar was started in 1983. It has functional jurisdiction over the civil district of Kokrajhar. The division is headed by a Divisional Forest Officer, under the overall administrative control of the Conservator, Western Assam SF Circle.

**5A.2. ADMINISTRATIVE SETUP:** The division has 3 ranges, namely Gosaigaon, Fakiragram, and Basugaon. There are two Account Beats namely Kokrajhar and Sapkata.

**5A.3. MAJOR ACTIVITIES:** The major schemes implemented by the Division are AOFFP (Area Oriented Fodder & Fuelwood Programme), SCCP (Scheduled Caste Component Plan), TSP (Tribal Sub Plan) and SFG (Social Forestry General). The Division undertakes block plantation, roadside strip plantation, and beautification activities. The Division maintains the Habrubil Park in Gosaigaon. So far the Division has raised about 52 sq km of plantations.

Plantations are taken up in Sal regeneration areas of Bahalpur-Charaikhola. In riverine areas Khoir, Sissoo and Simul are raised. In evergreen and highland areas, Gamari, Tita Chopra, and Ghora neem are generally raised. In low-lying areas, Velkar, Uriam and Azhar are raised.

Teak plantations have been stopped. The division was successful in raising khoir plantations from stump cutting. It was observed that the growth was vigorous, and seedling height attained in one year in a plantation raised from cutting, was thrice that of the one raised from seeds.

The Division has 8 nurseries. They are located at Kokrajhar, Fakiragram (Borsijhora), Dotoma, Basugaon, Nizlaguri, Gossaigaon (Habrubil), Bajugaon and Simaltapu (Sapkata). Only the nurseries under the TSP scheme has been maintained, but due to lack of funds the nurseries maintained under SFG have been discontinued. Each nursery has a capacity of 1 lakh seedlings. The Division has an annual target of distribution of 2 lakh seedlings annually to the public, NGOs, other Government departments.

**5A. 4. STAFF STRENGTH:** The total staff strength is about 70. Directly under the control of the Divisional Forest Officer, there are 3 Forest Range officers. At present, there is one Deputy Ranger. There a number of Foresters, forest guards and malis. The actual incumbency position is not available, as no report was submitted by the concerned DFO, despite several reminders.

**5A. 5. AMENITIES TO STAFF:** There are no quarters. All the offices function from rented premises, except those in Gosaigaon range. The Fakiragram office is functioning from territorial quarters. There are few or no staff quarters.

**5A. 6. TABULAR DETAILS:** No tables were made available by the SF division for incorporation in the Plan, despite reminders.

## CHAPTER 6

### 6. WILDLIFE

- 6.1. INTRODUCTION:** The Wildlife Division Kokrajhar was set up in 1992, without any express and speaking provisions. In 2001, the Chakrasila wildlife sanctuary was brought under control of this Division. *(This Division has no jurisdiction over the areas of the Aie Valley Division, but has been mentioned here for sake of continuity, and/or to provoke planners to rethink about strengthening the wildlife wing in the western Assam. )*
- 6.2. ADMINISTRATIVE SETUP:** The Division is headed by a DFO. Most of the time, it has been observed that it is under dual charge. The Division has not been allowed to grow, and appears to be on the least priority of the Department. There is one HQ beat.
- 6.3. DESCRIPTION OF FAUNA:** The last census, which was a tiger census, was conducted in 2001. The faunal diversity of the area is rich. There are Golden langurs, Royal Bengal tigers, Leopards, Bison. In addition, there are Hog deer, Barking deer, Binturang, Flying squirrel, Chinese pangolin and a variety of avifauna.

In the Chirang RF (mentioned here for sake of continuity), there is an estimated population of 180 elephants, 20 Royal Bengal tiger, a large number of Leopards, Bison, Hog deer, Barking deer, Sambar, Spotted deer, Dhol etc. A large number of Golden langur population also occurs in the RF. There are several colonies of Hornbills.

Division wise presence of elephants and big cats is given in the following table, based on the Elephant Census of 2002 and Tiger Census of 2000:-

Division	Elephant	Tiger	Leopard
Aie Valley	96	8	-
Haltugaon	93	3	5
Kachugaon	122	10	4

The details of the census and other wildlife related information are provided in the Tables separately in the Plan in Part III. See Table No. 32.

- 6.4. MAJOR CONSERVATION ACTIVITIES:** The division has started “Daimalu Eco- Centre” at Karigaon for conservation of Golden langur. The 42 different species upon which the Golden langur feeds, have been planted in the park. Some of the species are Gamari, Arjun, Hilikha, Bahera, Bauhinia spp, Dillenia spp. etc.

*In relation to Aie Valley Division, it would be pertinent to mention here that the Kakoijana RF has considerable population of the Golden langurs. The NGOs have been demanding declaration of this RF into a wildlife sanctuary. Similarly, the Manas RF, most of which is grass-land interspersed with evergreen islands is also a very good wildlife habitat.*

- 6.5. STAFF STRENGTH:** There is a total staff strength of 15. There is one FR, 2 Deputy Rangers, 3 Foresters and 9 Forest guards.
- 6.6. AMENITIES TO STAFF:** Very little or no amenity to staff has been provided.

## CHAPTER 7

### 7. AFFORESTATION

- 7.1. INTRODUCTION:** The Division was created in 1970. It has overlapping jurisdiction over forest divisions of Goalpara, Dhubri, Aie Valley, Haltugaon, and Kachugaon.
- 7.2. ADMINISTRATIVE SETUP:** It is headed by an officer of the rank of Deputy Conservator of Forests. There are 3 ranges and 6 account beats. The ranges are Abhyapuri, Mancachar, and Kuklung. The account beats are Hapachara, Bhairab, Manikpur (HQ), Goalpara, Dapli and Tipkai.
- 7.3. MAJOR ACTIVITIES:** The Division has several schemes for raising of plantation. Some of the schemes are Teakwood, matchwood, Sal, QGS (Quick Growing Spp.) etc. The schemes fall under General areas, BAC (Bodoland Autonomous Council) areas, and RHAC (Rabha Hajong Autonomous Council) areas. For past few years, the plantation activities have been badly affected due to irregular release of funds under various schemes. For example, the maintenance statistics for the Division for the last few years is given below: -

Year	Teak General	Teak RHAC	QGS G	QGS BAC	Sal BAC	Matchwood G
1999-00	63		30	190		
2000-01						
2001-02	200	24		395	100	45

Details of few other plantations are given in Table 22 in Part III of the Plan.

- 7.4. STAFF STRENGTH:** The total sanctioned strength is 63 including 1 DCF, 1 ACF and 4 FR. The present incumbency is only 54. The details of break up is given in Part III of the Plan.
- 7.5. AMENITIES TO STAFF:** All the administrative units have drinking water facility. Electricity is available only at HQ, Goalpara and Mancachar. There is one IB at Mancachar, but is poorly maintained, and is under dilapidated condition. There is 1 jeep, 1 tractor and 2 unserviceable motorcycles. Given the mandate and area coverage provided by the Division, facilities and working conditions appear to be far from satisfactory.
- 7.6. TABULAR DETAILS:** Further details can be seen at Table No. 20 to 22.

## CHAPTER 8

### 8. PUBLIC POLICY & INSTITUTIONS

**8.1. INTRODUCTION:** A set of distinct centres of governance were evolved under the 6<sup>th</sup> Schedule of the Constitution of India. These were the Autonomous District Councils initially spread over the hills districts of the then state of Assam, namely North Cachar Hills Autonomous District Council, Karbi Anglong Autonomous District Council (earlier known as Mikir Hills), and the two councils of Khasi & Jaintia Hills, Garo Hills (now a part of Meghalaya), Lushai Hills Council (now Mizoram). The main object was not only to let the people have a say in their own governance, but also preserve their own ethnic identities and culture. However, the protection provided by the Art. 244 of the Constitution of India and the Sixth Schedule do not cover the plains tribes at all.

The tract under discussion also falls under tribal belt. It is inhabited by plains tribes such as Bodo, Kachari, Rabha, Adivasi, Nepali etc. As the tribal communities elsewhere, land alienation was one of the major threat felt by different ethnic groups. There is a large gamut of issues associated with this alienation theory, including education, unemployment and economic growth and various socio-political reasons, beyond the scope of this small introductory note. A major movement was launched by the Bodos from the early seventies to early nineties, demanding a separate Bodoland (or Udayachal?), a homeland of the Bodo people. It culminated in signing of an accord at Kokrajhar Circuit House on 20<sup>th</sup> February, 1993 between the Bodo leaders, the Central and state Governments. The then Hon'ble Union Minister of Home Affairs Late Rajesh Pilot, Hon'ble Chief Minister of Assam Late Hiteswar Saikia were present in person on the occasion. The accord provided for the Bodoland Autonomous Council, which is the primary subject of this chapter and dealt with in some detail in the next paragraph.

**8.2. AUTONOMOUS COUNCILS:** There are two councils which concern the functioning of the various forest divisions described in the earlier chapters. One is the Bodoland Autonomous Council (BAC) and the other is Rabha Hajong Autonomous Council (RHAC). Since it covers part of activities (confined to Goalpara district) of the Afforestation Division alone, it won't be discussed any further.

The Bodoland Autonomous Council Act, 1993 issued vide Notification No. LGL.30/93/8 Dt. 14-05.93 is the principal act governing the functioning of the Council. It is composed of one General Council and one executive Council. The Chief of the Bodoland Executive Council and the Deputy Chief of the Bodoland Executive Council are the wholetime functionaries of the Council. There is also a Secretariat of the Bodoland Autonomous Council, headed by a Principal Secretary. He is the Principal Executive Officer of the General Council. He acts under the direction of the Chief of Bodoland Executive Council.

The territorial jurisdiction of the Council was initially notified vide notification No. TAD/BAC/26/93/18 Dt. 10.12.1993 and No. TAD/BAC/26/93/24 Dt. 18.09.1995. However, these notifications have been superseded by the last notification no. TAD/BAC/47/94 Dt. 02.04.1999. The notification includes all the forest villages falling under Aie Valley, Haltugaon and Kachugaon.

The Council has jurisdiction over 38 subjects including Forests. The Council formulates its own integrated plans and schemes for the development of the area. Under the BAC schemes, several amenities have been provided to the staff including vehicles. Several plantations have been raised under BAC schemes by the various divisions.

However, there has been some resentment from certain quarters, due to which the BAC is likely to be replaced by Bodoland Territorial Council which is likely to function as a 6<sup>th</sup> Schedule entity. If it happens, BTC would be first 6<sup>th</sup> Schedule Council set up for plains tribes.

- 8.3. PANCHAYATI RAJ:** It has been strongly felt by thinkers and planners that development efforts in rural areas could reach the targeted people only if the development design rests on the foundation of people's participation. It was conceded that rural development strategies can deliver outcome only through the motivation and active involvement of the rural people at grass root level. There is a strong need of Panchayati Raj Institutions (PRIs) to ensure people's participation in local planning and implementation, and building of local capacities for self governance, which is the ultimate goal of any democracy. With a view to provide constitutional status to local self-Government to impart "certainty, continuity and strength", for devolution of powers to local bodies (V.K. Rao Committee 1985) and for allotment of adequate resources (L.M. Singhvi Committee 1986) the Government of India moved for the, now historic, the 73<sup>rd</sup> and 74<sup>th</sup> Amendments to the Constitution of India in 1992. It had paved the way for constitution of Finance Commission in all States within a year of Constitutional Amendment Act and thereafter for every fifth year for looking into the finances of local bodies and devising a system of distribution of Government revenues to local bodies, its powers of taxation and its responsibilities for improving its local finances and capacities.

The Salient features of the 73<sup>rd</sup> Amendment are:-

There shall be a three-tier system of Panchayat at the village, intermediate and district level. States having a population of less than 20 lakhs will have the option not to have the intermediate level panchayat. Seats in panchayats at all the three levels shall be filled by direct elections.

MPs, MLAs and MLCs could also be members of panchayats of the intermediate or the district level. In all panchayats, seats would be reserved for SC/ST in proportion to the population. One-third of the total number of seats in all panchayats will be reserved for women.

Every panchayat shall have a uniform five-year term. In the event of dissolution, elections will be compulsorily held within six months. An independent Election Commission will be established in the State for superintendence, direction and control of electoral process and preparation of electoral rolls.

Assam follows the three tier system, and has its own Panchayati Raj Act called Assam Panchayati Raj Act, 1986. The last elections of the panchayats were held in December 2002.

- 8.4. JFM/FDA:** The Government of Assam has formulated a set of Rules called "Assam Joint (People's Participation) Forestry Management Rules, 1998", based on the Government of India guidelines and National Forest Policy, 1988, for involving the villages on the fringe of degraded forest areas by introducing the concept of Joint Forest Management. Forest Protection and Regeneration Committees (FPRC) are proposed to be set up in degraded areas with 25% sharing of the usufructs. *The Assam Joint (People's Participation) Forestry Management Rules, 1988 have come in force since 20<sup>th</sup> February, 1999.* However, the Government is having a second opinion on certain issues and a revised set of Rules/Guidelines is expected soon.

Meanwhile, the National Afforestation & Eco-Development Board (NAEB), the Ministry of Environment & Forests, Govt. of India, issued guidelines for formation of Forest

Development Agency (FDA), modeled on the lines of existing DRDAs, for smooth implementation of the programmes of the Ministry, and other Government Departments.

The State Government has already accepted the guidelines in principle and with some modifications, has notified the formation of FDAs. The FDAs in the state would be registered as a federation of all the JFMC(JFM Committees, earlier known as FPRCs) in each territorial/wildlife division. The agency would be headed by the Circle Conservator as Chairman, and the concerned DFO as Member Secretary. There will be a General Body and an Executive Body. The General Body will have the Conservator as Chairman, Presidents of the JFMCs general bodies, one non official representative to be nominated by the apex bodies of the panchayats etc, and ACFs, FRs. The total body should not have more than 50 JFMC members, and at any time out of them 20 shall be women representatives. The presidents would be nominated on rotation basis for a period of one year.

The Executive body shall be headed by the Conservator. The District Development Officer, District level officers of Agriculture, Rural Development, Fishery, Veterinary, and other line departments will be represented by their respective district officers/nominees. It will also have representatives from the Deputy Commissioner of the concerned district, and one non official member appointed by apex bodies of panchayats. The Executive body shall have fifteen nominees from JFMCs, including seven women members.

In order to propagate the concept of JFM/FDA, the Department has already constituted a high level JFM Coordination Committee from among the senior officials of the Department having exposure in this sector. The committee visits the various divisions, provides training to field staff, conducts PRA exercises and sensitizes the staff as well as the rural people on aims, objects, duties and responsibilities of JFMC and how to conduct the functioning of the committees and assist in forest regeneration. Such workshops already have been held in the Western Assam Circle, and preparation of micro-plans is in progress.

A list of existing JFM committees have been included in the Part III at Table No. 25.

## CHAPTER 9

### 9. FOREST MISCELLANY

**9.1. INTRODUCTION :** This chapter has been brought to high light may issues that once were of trivial nature, but have gained gigantic proportions, requiring attention of Forest managers, policy makers, legislators, parliamentarians and the public. Due to lack of data, not enough justice could be done to any of the topics included here. It is hoped that the next Working Plan Officer brings out detailed facts to focus issues in proper prospective.

**9.2. FOREST (CONSERVATION) ACT, 1980:** There was a diversion of some RF area for Champamati irrigation project for construction of head tanks and canals. Accordingly, an area of 56.003 ha was taken up for compensatory afforestation at Natarbari in a USF area during 1991-92.

**9.3. FOREST CRIME:** Year wise offence report for the Division is shown below:-

Year	No of Cases Drawn	Sent to Court	Amount Compounded (Rs)	Confiscation Proceedings drawn
1994-95	88	27	25,75,503.00	2
1995-96	37	4	2,62,520.00	7
1996-97	43	5	1,77,563.00	1
1997-98	58	5	1,17,465.00	7
1998-99	49	5	24,976.00	1

Details on seizure of logs, other details and offence reports is appearing in Part III. See Table No. 9, 10, 10A & 11.

As regards encroachment and setting up of relief camps, a local NGO called Chiknajhar Central Land and Forest Protection Committee, Ramphabil had lodged a case in the Hon'ble High Court, Guwahati against the District administration vide CR Case No. 5349/96.

Another NGO called the Ecological Conservation Society, Bongaigaon has also lodged a case in the Hon'ble High Court, Guwahati vide CR No. 2676/96 for a similar cause.

**9.4. WILDLIFE CRIME/DEPREDAATION:** It has not been reported. One case of poaching of 4 wild cats was caught by the author himself. Wildlife crimes may be going unreported.

Incidence of depredation by wild animals has been noticed only in the northern part of the Division. Details are not available.

**9.5. FOREST PROTECTION FORCE:** A special force called the Assam Forest Protection Force was raised under the Assam Forest Protection Force Act, 1986 (Act XXII of 1987). At present there is only one battalion with a force of about 600 armed personnel. Though the Force has come handy, it has failed to make any visible impact on forest protection. Chiefly, two causes can be attributed for this state of affairs, namely legislative and administrative. As envisaged in the Act, no Rules have been framed as yet (or at least, the author is not aware of any such Rules) to bring into force the relevant provisions of the Act.

As a result, the Battalion has remained a band-wagon of armed personnel without any locus-standi. The executive forest staff has also remained in the dark as to how to conduct themselves or guide the conduct of the forces in matters of forest protection. Secondly, the Force has been raised with its HQ at Guwahati, under the direct charge of a Commandant. For general day to day administration such as leave, ration, Salary etc. the members of the Force have to travel to Guwahati from the remotest corners of their posting, virtually breaking the field formation most of the times. The local executive staff do not have any administrative control over the member of the Force.

Though the framers of the Act had envisaged, yet in absence of any Rules, appropriate blending of the members of the Force and field executive staff has not taken place. Given the present law and order situation in the State, forest officials are second most vulnerable *soft* target (after the police, paramilitary and army). Already three DFOs have been kidnapped, one DFO killed, one DFO severely attacked and beaten by smugglers and anti-social elements, three Range officers killed, several foresters and forest guards mercilessly butchered in the past few years. Situation has worsened so much so that it is not safe to venture in the forests unarmed.

Under such conditions, certain steps must be taken necessarily. Immediate provision of security cover to the gazetted staff should be organized. The Force should be having additional battalions as well. Appropriate Rules should be framed for conduct of affairs of forest protection and management, laying out detailed and unambiguous procedures incorporating the relevant provisions of CrPC, IPC, Evidence Act, Assam Forest Regulation of 1891, Wildlife (Protection) Act of 1972, and the Assam Forest Protection Force. Forest offences should be notified to be cognizable and non-bailable to attract the provision of Chapter XI & XII of the CrPC, field staff from Forester I and upwards to Range Forest Officer should be awarded powers of investigation, and the ACF & DFO should be awarded the powers of Magistrate under the said Chapters of the CrPC and other relevant chapters as well.

Part of the administrative control of the members of the Force should be delegated to the Circle Conservators and DFOs. The Force should be raised in sufficient strength so as to house one Battalion each at the HQ of the territorial Circle Conservator under direct charge of a Commandant and under overall supervision of the Circle Conservator. In addition, all field staff starting from forest guard up to the Range Forest Officer should be suitably armed.

The AFPP has done the yeoman's service in protecting the forest property in the entire Circle. They deserve accolades. Several incidents were narrated where the jawans of the AFPP fought valiantly against anti social forces during the peak of violence in Kokrajhar and Bongaigaon districts. What ever little property is left unharmed, credit must go to AFPP.

**9.6. FOREST MAHALS:** The existing forest mahals have been shown in Table No. 23.

## CHAPTER 10

### 10. PAST SYSTEM OF MANAGEMENT

- 10.1. GENERAL HISTORY:** The forest areas pertaining to the present Aie Valley Forest Division were under the erstwhile Goalpara district created in the year 1866, and fell under the Bengal Conservancy. The then Conservator of Forests, Bengal submitted a management proposal on these forests in 1868. The proposal though accepted in principal, was kept in abeyance till 1872. That year part of the forests were declared open forests under Act VII of 1865 and the Bengal Forests Rules of 1871.

It is to be mentioned here that the forest areas of the division can be divided into two categories, one consisting of Manas RF, Bengtol RF which were brought under regular working plan quite early, and the rest of the areas which were either under Zamindari system earlier or were constituted after 1960. Of this Manas RF requires special mention, as part of it from the eastern most extremity to the Sukhanjan river on the west, was declared Wildlife sanctuary on the 1<sup>st</sup> October, 1928. Further, the western part of this RF upto Kanamakra river was a part of North Kamrup Division, and the rest of the western portion in the Haltugaon/ Goalpara East division. Moreover, the management from the very beginning in these tracts was Sal centric. Therefore, non Sal areas of Manas never received due attention.

The discussion in the following paragraphs must be seen in this light. The management history prior to the plan of MM Islam (1958-59 to 1972-73) is of little relevance to the forests of this division.

- 10.2. PRE- MANAGEMENT HISTORY:** Prior to the commencement of the first working plan of the erstwhile Goalpara Division in 1894, the areas were managed as open forests with a certain number of species declared as reserve trees or tax-paying trees. Initially there were 29 tax-paying trees, but the number was reduced to 12 in 1877. The removal of a tax-paying tree was allowed only in open forests without restriction. No uncontrolled removal could be made from the reserved forests from the year 1876. Forests were classified as Superior or Inferior in order to impose restriction on alienation of forests for agricultural purposes. In 1878, the open forests were converted into protected forest. However, till 1881, the open, protected and district forests (other wastelands), were exclusively managed by the Deputy Commissioner, assisted by a Forest Daroga. Full control of the areas was brought under the District Forest Officer with effect from 29.12.1881.

The forest areas were first surveyed by the Imperial Forest Survey in 1889. The work continued till 1893. The whole length of the Bhutan boundary was also surveyed during this period. The cost of survey per sq. mile came to Rs. 127.50. Working Plan surveys commenced in 1889 and terminated in early 1893.

**10.3. MANAGEMENT UNDER Lloyd (1893-94 to 1902-03):** Lloyd classified Sal into three types depending upon the stocking per acre. Pure Sal containing more than 50 trees per 1½' girth and more, per acre was constituted into type A. Pure Sal trees having trees 25 to 50 trees in number were classified as type B. Under type C, were included mixed Sal areas having less than 235 trees of 1½' girth per acre. The classification, however, was based on ocular estimates. He created 12 blocks, of which the last one is of relevance to the present working plan:-

- |            |              |                |              |
|------------|--------------|----------------|--------------|
| 1. Khalasi | 2. Samukha   | 3. Lungsung    | 4. Bhur      |
| 5. Laopani | 6. Dholpani  | 7. Maligaon    | 8. Haltugaon |
| 9. Amguri  | 10. Bansbari | 11. Saralbhang | 12. Bengtol  |

He fixed 5' as the exploitable girth for Sal, whereas the exploitable age was fixed at 90 years. Felling of trees upto 4½' girth was allowed if there were no silvicultural objections and trees of girth 5' were not in sufficient number. Such a removal had to be authorized by the Divisional Forest Officer.

Incidence of fire was reduced considerably. For example, 93% of the forests got burnt in 1875. In 1890, fire incidence covered only 56% of the area; and in 1894 only 0.04% of the area was ravaged by fire.

**10.4. MANAGEMENT from 1903-04 to 1905-06:** There was some delay in introduction of the plan after expiry of the plan of Lloyd in 1903. The then Inspector general of Forests, Sir S. Eardley-Wilmot inspected the forests in 1906 and recommended substitution of improvement felling for selection fellings. The Lungsung and Bhur blocks had less number of higher girth trees. The reason attributed was that the forests of these areas were of later origin.

**10.5.1 MANAGEMENT UNDER W.F. Perree's Plan(1905-06 to 1920-21):** Perree carried out a total enumeration of Sal growing areas down to 3' girth. % of trees in the various blocks. According to Perree, Sal took 120 years to mature to 6' girth and fit from the point of view of commercial maturity. He adopted improvement fellings in order to produce a continuous and large supply of high class timber. He also aimed to bring the forest under normal stocking. He assumed that it took 30 years for a 2<sup>nd</sup> class tree to pass to class I.

**10.5.2 The Rides and Parallels:** It was W.L. Fisher, the first Divisional Forest Officer of erstwhile Goalpara Division, who introduced the concept of Rides and Parallels in these forests. The idea was borrowed from the German model wherein the forests were divided into square mile a side, at right angles. The idea was put to use in the Guma reserve(now falling under Dhubri division) and parts of Sidli Reserve (subsequently amalgamated with Chirang) These lines not only served as traffic arteries for passage of man and produce, but also were useful for fire protection, coupe demarcation and general forest management. However, best of all, these lines provided precise co-ordinates for locational reference.

The rides and parallels in Ripu (Now under Kochugaon Division) and Chirang (now under Haltugaon Division) reserves were introduced by Perree. This stands as one of his greatest contribution to the management of these forests. He made the compartments in the Haltugaon, Maligaon, Bansbari and Amguri blocks by cutting ride lines east-west, numbering 1 to 8 and cutting north-south, numbering 9-17, making each compartment 259 ha. He also cut parallel lines in Samukha & Khalasi blocks, in east-west direction, numbering parallel 1 to 9. Parallel 1 to 5 were extended upto Lungsung river in the Lungsung block. Of these rides and parallels, Ride 13 became the north trunk road, now

NH 31; Ride 6 became Parree's road, Ride 9 also became a road. Parallel 7 became the Runikhata-Chiknajar motorable road.

LC Das extended the Parree's parallels further north. New parallels from 10 to 14 were cut in the Saralbhanga, Ultapani and Laopani A blocks. The older parallels 1 to 9 were extended upto the Bhur, Dholpani and Champamati rivers.

Rides were introduced in Manas RF by MM Islam. Rides were cut starting from the southern most boundary of the RF at an interval of 2 miles in the northward direction, spanning the entire reserve east west. Ride line 1 runs at a distance of 2 miles north of southern boundary road. Ride line 2 runs at a distance of 2 miles north of ride line 1, ride line 3 runs at a distance of 2 miles from ride line 2, and the ride line 4 runs at a distance of 1 mile north of the ride line 3. *(However, no evidence of these lines was found on ground. Probably, they were never laid.)*

**10.5.3 Evaluation of Perree's Plan:** The then Inspector general of Forests, Sir F. Beadon Brayant, who visited the forests in 1912, remarked on the girth fixed by Perree, "...do not represent the true exploitable girth of these trees. Sufficient data for correctly fixing what this girth is do not at present exist,...". He noted that the minimum girth for harvest of Sal could be raised to 5'6" safely. Fire protection was not emphasized during the currency of the Perree's Plan. It was given up as a policy in 1916, which resulted in large scale fires and destruction of standing crop. In areas such as Khalasi, Samukha and Lunsung, underfelling took place. Even the marked trees were not removed.

**10.6 MANAGEMENT from 1920-21 to 1929-30:** The revision of Perree's plan was not taken up in earnest, but instead, a felling scheme was drawn by the then Divisional Forest Officer, Mr. Simeon. The scheme continued till 1929.

**10.7. Management under N.L. Bor(1929-30 to 1938-39):** Bor constituted Sal forests into two working circles, namely Improvement Felling Circle and Terai W.C. The former was constituted of all the forests north of the North trunk Road (Parallel No. 13 and now the National Highway No 31), except Maligaon block. The other working circle comprised of the Maligaon, Haltugaon and Amguri blocks.

He prescribed removal of all interfering trees with the growth of sound trees in the upper story, including crooked, dying and mature trees. He also prescribed annual burning in these areas.

**10.8 M.C. Jacob's Plan (1939-40 to 1948-49):** Jacob's working plan covered for the first time the entire Manas RF which fell, during his time, under Haltugaon Forest Division (*the boundaries of which were extending upto the Manas river on the easternmost side*). It also is to be noted that the Manas game sanctuary consisting of the eastern part of the Manas RF (upto Sukhanjan river) and North Kamrup RF was already duly constituted on 1<sup>st</sup> October, 1928. Jacob's working plan covered the game sanctuary areas pertaining to Manas RF as well. He, in all, had prescribed 8 working circles. These are briefly described below:-

**Bhabar Sal Conversion Working Circle:** All the Sal falling under the Bhabar tract was assigned to this WC. The forests had a uniqueness silviculturally and topographically. Silvicultural system adopted for conversion of the irregular crop to a normal crop was uniform system. The method of treatment was assisted natural regeneration under a uniform shelterwood canopy. The key lay in judicious opening up of the canopy. The rotation was fixed at 150 years with the object of producing 6' crop. The 6' size was chosen due to main demand for sleepers and large size logs. The WC was divided into 5 periodic blocks (PBs), length of each period being 30 years. A regeneration period of 30 years was

adopted. The areas allotted to this WC pertaining to Aie Valley were Bengtol 1A, 1B, 2B and 3B.

**Terai Sal Conversion WC:** The area dealt with under this WC falls at present under Haltugaon Division.

**Sal Improvement Working Circle:** The areas allotted to this working circle were less accessible compared to the previous two. It had a mix of Bhabar and Terai type vegetation. The object of management was to manage these forests silviculturally realizing maximum amount of revenue. The silvicultural system adopted was improvement felling. The forests were subjected to thinning and improvement felling alone. A rotation of 150 years was fixed keeping in mind to produce 6' crop. The yield was prescribed by area. 1/10 of the working circle was worked every year. The areas allotted to this WC pertaining to Aie Valley were Bengtol 1A, 2A, 3A, 1B, 2B and 3B.

**Sal Clearfelling WC:** The area dealt with under this WC falls at present under Haltugaon Division.

**Khoir & Sissoo WC:** This WC was constituted by allotting best stocked Khoir & Sissoo areas of Manas RF, which occurred between river Aie and Sukhan Teklai for a distance of 2-3 miles from Bhutan border. The object of management was to link up the Khoir forests under this WC with other areas in the state and provide a harvest of "equal annual out turn" of Khoir for the katha industry. It was noted that in relatively accessible areas it was difficult to regenerate Khoir due to depredation of wild elephants who had a particular liking for young khoir shoots. The silvicultural system prescribed was selection system. For every 30 stems of Khoir exploited, 1 acre of area was to be planted up with *Michaelia champaca*, *M. oblonga*, *Phoebe goalparensis*, *Lagerstroemia flos-raginatae*, *Dalbergia sissoo*. Based on experience, 1' DBH Khoir trees were commercially acceptable.

**Evergreen Selection WC:** The area dealt with under this WC falls at present under Haltugaon Division.

**Simul WC:** This WC was constituted of the best stocked Simul areas now falling in the erstwhile Manas game sanctuary, and now the Manas National Park.

**Miscellaneous WC:** The miscellaneous deciduous patches occurred to a great extent in the Manas RF from Aie river to Mans river in a mix of savannah to deciduous. The forest areas grouped in this WC included low lying savannah to dense high land evergreen. The blocks/ areas allotted were, in addition to areas falling under present Haltugaon division, Bengtol and Manas RFs of present Aie Valley division. The area allotted in Manas RF was 1,83,000 acres. The object of management was to work the forest for maximum financial yield and gradually replace the poor stock with plantations of valuable species. The silvicultural system was that of exploitation by minimum girth limit and compensatory plantation in suitable areas. However, for other species, it was thought that there was abundant stock, and no danger of depletion was foreseen. Therefore, unlimited felling was allowed. For every 30 trees removed of a species for which minimum girth was prescribed, plantation was created with a maximum limit of 15 acres per year in mixed or pure patches of *Phoebe goalparensis*, *Michaelia champaca*, *Amoora wallichii*, *Dalbergia sissoo*, *Shorea robusta*, and *Lagerstroemia flos-reginatae*.

**10.9 INTERIM WORKING SYSTEM (1949-50 to 1965-66):** In absence of any working scheme, the prescriptions of MC Jacob were followed till the same was revised by LC Das.

**10.10 LC Das's Plan (1966-67 to 1981-82):** This plan was compiled for Goalpara East Division. See Chapter on Administrative Set Up (para 4.2) for details of divisional reorganization.

During that time, the Zamindari forests were also acquired and several of them were proposed for reservation. The Zamindari forest tracts have been dealt with separately in para 10.11. There may be some overlap in subsequent discussions on past systems of management, regarding this part. The readers are requested to bear with the same. The author was also responsible for several other working plans, including one on bamboo areas, and one on the Zamindari forests which have direct or indirect bearing on the management of these tracts. Some of the WCs prescribed in his working scheme (1964-1969) for the ex-Zamindari areas were also common to the prescriptions to the Goalpara East Division.

The author, who is also credited with extending the parallels made by Perree, divided the Manas RF, falling in the Goalpara East Division, (*Kanamakra river being the easternmost boundary of the Manas RF, and the river Saralbhangra on the westernmost boundary, of the Goalpara East Division*), into several blocks, namely Khungring, Aie, Langkhar, Sukanteklai and Kanamakra. No compartments were made. He also made compartments in the various ex-Zamindari forests falling under this division. The list of blocks, compartments of the various RFs is given in Part III of the Plan.

The WCs prescribed by the author are briefly discussed below: -

**Sal Clearfelling WC:** The majority of the Terai forest tracts and part of the lower Bhabar tract were allotted to this Working Circle. He included part of Chirang RF of Haltugaon Division and parts of Bengtol RF i.e. Bhur block (now in Haltugaon Division) and compartment 2 & 3 of the Bengtol block. These areas were to be worked under a system of clearfelling with artificial regeneration.

However, all efforts to bring Sal artificially failed due to heavy grazing and damage by field rats. As a result, all the felled areas had to be regenerated/ filled with mixed hardwood spp.

**Sal Improvement WC:** The area dealt with under this WC falls at present under Haltugaon Division.

**Sal Reclamation WC:** This WC was imported from his working scheme on the ex-Zamindari forests, referred to above. Two felling series, of relevance to this plan, were created-Bahalpur & Abhoyapuri. Under the former, areas allotted were Bhairab Hills, Digidari and Bhumeswar; and under the latter, Kakojana, Nakkati, Khakarapur and Mahadev. Rest of the details are similar to as in his scheme for ex-Zamindari forests.

**Miscellaneous WC:** Most of the areas of the Division, if already not allotted to any of the Sal bearing areas, including ex-Zamindari areas, and areas, barring the northern evergreen belt, of Chirang RF were allotted to this WC. The silvicultural system adopted was selection system with compensatory regeneration by clearfelling and planting. Exploitation of Sal was by volume, including dead wood and windfallen. The miscellaneous trees were to be removed as per minimum exploitable girth. Climber cutting in a 5 year cycle was prescribed for plantations of Sal, Titasopa etc.

The areas falling in this division, allotted to this WC were Bengtol 1, Manas RF- Aie block, Langkhar block, Sukanteklai block, and Teklai RF.

**Timber Trade WC:** This WC was imported from his working scheme on the ex-Zamindari forests, referred to above. Two felling series, of relevance to this plan, were created-Bahalpur & Abhoyapuri. Under the former, areas allotted were Bhairab Hills, Bhumeswar and Rakhalthakur; and under the latter, Kakojana, Nakkati, Bamungaon, Khoragaon and Mahadev. Rest of the details are similar to as in his scheme for ex-Zamindari forests.

**Evergreen Selection WC:** This WC was constituted by allotting areas from parts of Chirang RF (Haltugaon division ) and the Kanamakra block of the Manas RF. The chief object was to improve stock in future. The silvicultural system was Irregular Selection system with regeneration block fixed. Rotation was fixed at 150 years. Yield was regulated by area with check by number. The annual area to be felled was prescribed at 915 ha. The annual yield was converted to 2287 trees.

**Khoir- Sissoo WC:** The area allotted to this WC were Teklai RF, Manas RF – Aie, Langkhar, Sukanteklai and Kanamakra blocks. The silvicultural system adopted was selection system with girth limit of Khoir & Sissoo fixed. Rotation was fixed for both the species at 40 years. The conversion period was also fixed at 40 years. Annually 22.7 ha areas was supposed to be converted. The exploitation girth for khoir was 0.914m OB and for sissoo 1.829m OB. The yield was prescribed for both the species by number of trees, and check by area was applied. The annual yield for Sissoo was 16 number of trees, and for khoir it was 132. This would be checked by annual area of 22.7 ha.

**Simul OWC:** This WC was constituted in parts of Chirang RF (Dholpani block), under Haltugaon division, and Sissoobari RF, Aie block, Langkhar block, Sukhanteklai and Kanamakra block of Manas RF. The special objects of management were to provide sustained yield of Simul for the match factory at Dhubri and extend the Simul production area. The silvicultural system adopted was selection system with girth limit fixed. Rotation was fixed at 40 years. Annually 100 ha was fixed for exploitation. The exploitation girth for was 0.914m OB. The yield was prescribed for by number of trees, and check by area was applied. The annual yield was fixed at 700. This would be checked by area. For every 10 trees removed, 1 ha of Simul plantation was to be carried out. Annually 70 hectares to be raised.

**Savannah WC:** This WC was constituted entirely of Manas RF. Coppice system was adopted for the trees grown. The crop mostly belonged to F class of timber. No yield was prescribed. Only coppice was supposed to be worked out in future.

**10.11 MANAGEMENT OF THE EX-ZAMINDARI FORESTS:** There were in total 111 (or 112?) RFs and PRFs in the erstwhile Goalpara district that were earlier under the zamindari management, and the Government, subsequently acquired them. After the reorganization in 1968, division wise position of the areas was as under:-

Division	No	Notified Area (Ha)	Surveyed Area (Ha)
Goalpara	72	43,324.9	43,217.2
Dhubri	36	48,933.1	48,692.9
Kachugaon	2	445.2	445.2
Haltugaon	1	273.2	273.2

After the re-organization in 1980, the area falling under the three divisions of Aie Valley, Haltugaon and Kachugaon was as below. The details can be viewed at Table No. 36 in Part III of the Plan.

Division	No	Notified Area (Ha)	Surveyed Area (Ha)
Aie Valley	10	12,892.4	12,822.1
Haltugaon	9	9,004.8	9,005.8
Kachugaon	2	445.2	445.2

These forests were originally properties of Zamindars (estate holders under permanent settlement). The forests were acquired by the Government during 1955-56 by payment of compensation. Immediately on acquiring, the areas were classified as Unclassed State Forests (USF). It was expedient to submit proposals for reservation. Accordingly, the areas were surveyed, demarcated and proposals were submitted to the Government for reservation during 1956-59. Preliminary notifications were published for these areas during 1959-1963. Out of 111(or 112?) proposals, 53 proposals were cleared in 1960 and the remaining are still pending final notification. While considering the proposals, the villages were given wide rights in the shape of free availability of fire-wood, house posts, thatch, ploughs, sand and stone for domestic consumption, rights of way through the forests, and free grazing.

The forest types to which these areas belonged are:-

Eastern Heavy Alluvium Plains Sal	3C/C2d(ii)
Eastern Hill Sal	3C/C1a(ii)
Moist Sal Savannah	3C/C2/DS.1
Moist Mixed Deciduous	3C/C3b
Reparian Fringing Forests	4E/RS.1
Cane Brakes	1B/E1
Secondary Moist Bamboo Brakes	2B/2S1

The details of these types are described in Chapter II.

**Past System of Management:** To summarize briefly the long history of Zamindari system of mismanagement, quote from Kanjilal is most apt, "These forests have always been worked in a manner diametrically opposite to a rational treatment, the best stems being removed, leaving all damaged, crooked or deteriorating ones on the ground." He further observed, "...but the agency employed and the method followed leaves so much to be desired that it is very doubtful if the Estates itself is at all benefited." The tenants of the estates were entitled to remove everything from these forests for domestic use, except green timber, on payment of a tax (called "San-Ban" Tax) per household.

Kanjilal first prepared a management plan on inspection of the forests. He introduced two different systems. One was Improvement Cum Selection (with seven Felling Series), and the other was Coppice with Standards (with 32-50 standards per acre).

As the ownership passed from Zamindari system to the Forest Department, there was obvious resentment among the public. Even working plan parties were assaulted. However, on the basis of field works so carried, a working scheme was prepared by LC Das which is described below:

**LC Das's Scheme(1964-1969):** He devised three WCs. These were Reclamation WC, Timber Trade WC and Plantation WC.

**Reclamation WC:** All the plains Sal forests were allotted to this WC. Seven felling series were laid down. The prescriptions were for climber cutting, fire protection, thinning, coppicing of malformed seedlings and protection against grazing. A felling cycle of 5 years was adopted to remove deadwood.

**Timber Trade WC:** Part of the hill forests were allotted to this WC. It was envisaged that this WC would be able to feed not only the plywood industry at Dhubri, but also the industries outside the district as well. Annual area to be felled was kept at 100 ha, and the yield was fixed at 4100 trees arbitrarily. It was also prescribed that 30 Ha of compensatory forest would be raised annually.

Plantation WC: Some of the hilly and moist deciduous areas were allotted to this WC. It was purported to raise 190 Ha of area to be clearfelled and planted annulay. The choice of species was left to the DFO.

**PC Das's Scheme(1969-70 to 1973-74):** No field work was carried to write this scheme. The data of LC Das's plan was used here. The chief object was to replace the malformed, irregular coppice with fully stocked even-aged Sal forest. For the mixed forest areas, the aim was to replace the poor stock with regular plantations of more valuable spp. It also aimed to meet the requirement of plywood industry at Dhubri. The treatment adopted was clearfelling and replenishment by coppice and natural regeneration in Sal areas that were accessible. In rest of the areas improvement felling was prescribed. He prescribed 5 WCs. These are briefly described below: -

Sal Conversion WC: All the plains Sal forests heavily exploited in the past, and comparatively accessible and under heavy biotic pressure, were grouped under this WC. The treatment adopted was clearfelling and replenishment by coppice and natural regeneration. The WC was divided into 6 felling series of which only Bahalpur FS is of consequence to this Division. The rotation and conversion period was fixed at 150 years. The yield was regulated by area only.

Sal Improvement WC: The remaining Sal forests were included in this WC. The chief aim was to conserve the good Sal trees, and improve the lot of the existing growing stock. It was divided into two FS. Relevant to this was the Northern FS. The silvicultural system adopted was selection system. Rotation was fixed at 150 years. Yield was regulated by area.

Teak Plantation WC: The areas falling under mixed deciduous forests were allotted to this WC. Most of the areas being hilly, well drained and quite suitable for teak, plantation of teak was the chief aim. Barring Rakhalthakur, no other area from any of the three divisions of the Aie Valley, Haltugaon and Kachugaon fell in this WC.

Afforestation WC: The rest of the mixed deciduous areas, not allotted in the previous WCs, were allotted in this WC. The chief object was to cover areas of poor stock by regular plantations of teak and other fast growing hardwoods. It also aimed to meet the raw material requirement of the Jogighopa Paper Mill. The silvicultural system adopted was clearfelling with artificial regeneration. The rotation for teak, for felling, was fixed at 100 years.

Plywood WC: This WC was formulated with only aim to supply raw material to the plywood factory at Dhubri which used to manufacture tea chests. Only plywood species were recommended for planting. None of the areas allotted to this WC, fall under the jurisdiction of the current plan.

**RC Goswami's Scheme (1974-75 to 1978-79):** Six WCs were created. These are described briefly below. The chief object of management was same as that of PC Das's Scheme. It was expected that these schemes would be replaced by a regular working plan. No field work was carried out. The stocking as given by LC Das was assumed to be valid.

This working scheme differs very little from the previous scheme. The six WCs were Sal Conversion WC, Sal Plantation WC, Sal Improvement WC, Teal Plantation WC, Afforerstation WC and Plywood OWC. Some of the compartments allotted to the Sal Improvement WC were regrouped into Sal Plantation WC.

**10.12 Management of Areas falling earlier under North Kamrup Division:** Part of Manas RF from river Kanamakra to the Sukhanjan were administered earlier under the North Kamrup division. As already stated the area of manas RF between Sukhanjan river & Manas river

was constituted along with whole of North Kamrup RF, into Manas game sanctuary. The North Kamrup Division was created in July, 1956. Kuklung RF, for which preliminary notification were issued in 1952, came into existence in 1961. This reserve also fell in North Kamrup division. The management history here would start from where Jacob's Plan which included complete Manas RF (including the game sanctuary area as well) concluded.

After the expiry of Jacob's plan, these forests did not come under regular plan till the period of MM Islam. However, a large number of plantations were taken up. Manas RF was looked after from four plantation centers namely Panbari, Rangijhora, Borpathar and Kuklung. Starting from 1935, total plantation raised upto 1953 at these centers was 473 acres. The species planted were Sissoo, Bonsum, Hollock, Khoir, Sal, Sopa, Ghogra etc. Similarly Sissoo, Sal and Khoir plantations in Kuklung amounted to 210 acres. Regeneration of Khoir was also taken up in Kuklung. 150 acres of plantations were raised from 1954 to 1956.

**MM Islam's Plan (1958-59 to 1972-73):** He introduced ride lines in Manas RF. He introduced the following working circles. The WCs of relevance to the division alone are being quoted here. He covered Manas RF between Kanamakra and Sukhanjan rivers.

**Evergreen WC:** This included the evergreen forest patches of the Manas RF and other reserves of the NK division. These compact patches were found valuable in quality and quantity. In Manas, compartment 6,8, & 28 were allotted. Compartment 28 had high level evergreen forest, whereas other two compartments were having low level evergreen patches. The silvicultural system adopted was Selection cum improvement felling in order to avoid unnecessary opening up of canopy to make way for even aged crop. Trees above a prescribed girth were to be removed, if silviculturally available.

**Miscellaneous WC:** In this WC were included Manas RF (comp 1-5, 9-11, 13-18, 20,21, 23-32) and Kuklung PRF (comp 1-3). The chief object was removal of mature trees and plantation of valuable species by means of compensatory plantations. Five felling series were prescribed, of which the Kuklung series comprised of the two reserves under discussion. The silvicultural system prescribed was Selection cum improvement felling with compensatory plantations to be raised in plantation centers. Yield was in number of trees over the prescribed girth.

**Khoir & Sissoo WC:** Khoir and Sissoo bearing areas of the division were allotted to this working circle. It covered Kuklung and Manas (comp 1, 9-11, 14, 19-21, 25, 29& 32). Scattered Khoir & sisoos areas of Manas were not considered in this circle. The silvicultural system was selection. A felling cycle of 15 years was adopted for both the species.

**Simul WC:** This WC contained the well stocked Simul areas. It covered Manas (comp 1,2, 6-8, 13,14, 22-25) and Kuklung. The exploited Simul trees were to be replaced by compensatory plantation. The Panbari felling series covered compartments 6-8, and 22-25 of the Manas Rf; and Manas felling series covered Kuklung and Manas Rf (comp 1,2,13, 14).

**PC Das's Plan (1975-76 to 1984-85):** This plan did not examine the areas falling inside the game sanctuary. The relevant working circles are briefly described below:-

**Evergreen WC:** It comprised of, along with other areas, Kuklung (2), Manas (1-5, 10-19, 28-32). The formations were mostly semi evergreen. The silvicultural system adopted was modified Irregular shelterwood. Rotation was fixed at 130 years. The regulation of yield was by area only. The areas were divided into young, regeneration and unallotted blocks.

**Mixed Hardwood Plantation WC:** Plantations not included in the previous WC, and not belonging to Simul, Khoir & Sissoo and not raised by the Afforestation division were included in this WC. Area allotted included Kuklung RF (1,2) and Manas RF (1,2,4). To

create the plantations, clearfelling was prescribed. Three periodic blocks were formed – Young, Regeneration & Unallotted. The species to be were Sal, Hollock, Sopa, Ajhar, Teak etc.

**Matchwood Plantation WC:** The aim was to raise regular Simul plantations with a view to provide raw material for the local industry. Areas allotted to this WC included Kuklung (2,3) and Manas (1, 2, 4 13). The areas were to be clearfelled and planted. Rotation was taken to be 40 years.

**Afforestation WC:** It was constituted around fast growing species to be raised in grass lands by the afforestation division. The area allotted was Kuklung RF (3), Manas RF (2-5, 12). The silvicultural system was replacement of existing formation by regular plantation crop. Three periodic blocks were organized. In the regeneration block, total of 200 ha was to be regenerated annually by clearfelling. A strip of 20 m was to be left out on either side of water courses, and a strip of 3 to 5 m between successive plantations. In the young block, thinning was prescribed at 10, 20 and 30 years. No prescriptions were made under the Unallotted block.

**Simul OWC:** This overlapping WC was constituted over the Simul rich areas and comprised, among other areas, of Kuklung RF, Manas RF (1-5, 10-20, 26-32). The diameter wise distribution of Simul was found to be abnormal. There was preponderance of high diameter classes. The silvicultural system was selection with prescription of minimum girth limit for exploitation. A diameter of 50 cm was considered adequate for exploitation. Rotation was fixed at 60 years. Four felling series were prescribed, of which probably, the western series covered the terrain under discussion. Its yield was 1950 trees annually.

**Khoir- Sissoo OWC:** All the patches of Khoir & Sissoo, all the previous plantations raised and the savannah areas were constituted into this WC. The areas allotted were Kuklung RF (1-3), Manas RF (1-5, 9-11, 14-20, 26-32). Three felling series were prescribed, of which the western felling series covered the terrain under discussion. Silvicultural system was selection with minimum girth prescription for exploitation. The exploitable girth for Khoir was fixed at 90cm and for Sissoo at 150 cm.

**Miscellaneous Selection WC:** It consisted of the semi-evergreen, mixed deciduous and savannah formations not covered in the earlier WCs. The aim was to exploit silviculturally mature trees, and to accord a period of rest to the areas falling on hill slopes. It was divided into four felling series, of which the western felling series consisted of Kuklung RF (1), Manas RF (9-20, 26-32). The silvicultural system adopted was selection system with improvement felling. The selection felling was subject to minimum girth prescription. A felling cycle of 13 years was adopted. The yield was by area.

**RM Dubey's Plan (1990-91 to 1999-2000):** The field work for this Plan were carried out from 1986 to 1989 by the Working Plan Officer, Kokrajhar. The working circles proposed in this plan are discussed briefly. It is to be noted that within one year of the Plan, the areas were reorganized, and the Manas & Kuklung RF were taken into the Aie Valley division in 1992.

**Protection WC:** The chief objective was to provide protection to help the stock recoup by natural processes. The areas allotted were Manas (9, 11, 13,17,18-20, 26), & Kuklung (1). The tree density per hectare was found to be very poor.

**Semi-Evergreen WC:** The chief objective was to promote regeneration of Bonsum in these tracts. The areas allotted were Manas (1-3, 14). The silvicultural system prescribed was raising Bonsum plantation by underplanting and system of retention of shelterwood. Rotation was fixed on the basis of Bonsum, at 130 years.

*Miscellaneous Plantations WC:* The chief objective was to replace the existing poor stock by regular plantations. Areas allotted were Manas (1-4, 10,11,13-15, 17) and Kuklung (1-3). Plantations were that of Sal, Ajhar, Hollock, Kuhir and Poma.

*Matchwood Plantation WC:* The aim was to raise matchwood plantations in suitable areas and meet the demand of matchwood industry. The Areas allotted were Manas (1-5, 10-14, 16, 17, 28-31) and Kuklung (2). The silvicultural system was clearfelling in strips. Rotation was fixed at 45 years.

*Afforestation WC:* It was constituted covering areas raised by the Western Afforestation division. Areas allotted were Manas (2-5, 10-15, 27,28, 32) and Kuklung (3). The aim was replacement of existing formations by regular plantations of quick growing species.

*Simul, Khoir & Sissoo OWC:* The chief aim was exploitation of existing exploitable growing stock, get steady supply of Simul logs and help facilitate natural regeneration of Khoir & Sissoo. Areas allotted were Manas (1-4, 12,13,15-17, 30,32) and Kuklung (2,3).

*Selection WC:* This area was constituted of areas not allotted in any of the previous WCs. Areas were Manas (27,31,32). The silvicultural system was selection system with improvement felling.

**10.13 TK Das's Plan (1982-83 to 1991-92):** The field work for this working plan was completed in 1975-76. When the plan was compiled, the enumeration data was considerably old. The author had prescribed eight WCs. These are discussed briefly below: -

**Sal Clearfelling WC:** This WC was constituted with an aim to regenerate Sal artificially, since the regeneration had failed miserably in the natural conditions. The areas allotted to this WC were the compact Sal patches occurring in the Bhabar tract with mixture of moist deciduous formations. The silvicultural system adopted was clearfelling with artificial regeneration in blocks the principal spp. i.e. Sal, Ghogra and Sain. A rotation of 135 years was adopted for Sal. There were three blocks – Regeneration, Unallotted and Young block. The areas under unallotted block were subjected to improvement felling and thinning. The felling cycle was 10 years. Yield was regulated by area alone. The entire regeneration block was to be clearfelled during the period of the plan.

**Sal Selection WC:** Areas having compact Sal in the lower Bhabar and Terai belt were constituted into this WC. The status of natural regeneration was nil. The author felt that the areas under this WC were previously heavily exploited without replenishment of young crop due to utter failure of regeneration schemes. Therefore, this WC was constituted to provide rest to the areas during the period of the plan (*Unfortunately, everything was laid to rest permanently during the decade to follow i.e. 90s!*). Meanwhile, silvicultural experiments were suggested to root out the regeneration problem in these areas. The silvicultural system adopted was selection system. Only removal of dead and diseased trees were allowed.

**Miscellaneous Hardwood Plantation WC:** Selective miscellaneous patches of lower Bhabar and Terai areas were constituted into this WC. The main object was to replace the present degraded patches and areas of poor growing stock with commercially more valuable spp. The silvicultural system adopted was clearfelling with artificial regeneration. The WC was also divided into Regeneration, Unallotted and Young blocks. From the regeneration block, annually 50 ha was to be clearfelled and planted. No yield was prescribed from the unallotted block. The young block was subjected to thinning only.

**Evergreen Irregular Shelterwood WC:** This Wc was constituted for all the semi-evergreen and moist mixed deciduous formations, barring areas exclusively allotted to the Protection WC. It was observed that the tract was most vulnerable to erosion as a result of continuous

changes in the channel courses. It was also observed that the areas offered a spectacular niche for wildlife and the tract formed a buffer zone of the Project Tiger areas. The author envisaged a total protection for these areas.

**Sal Reclamation WC:** All the Sal forests managed under the Zamindari system were constituted into this WC. The areas fell under Eastern Heavy Alluvial Plains Sal and Eastern Hill Sal. The object was to convert the irregular and the unevenaged crop to a regular even aged crop. The silvicultural system adopted was uniform shelterwood system with regeneration operations confined to a stipulated PB. Yield was purely silvicultural and regulated by area only.

**Fuelwood WC:** Though the entire area was Sal bearing, these were subjected to excessive grazing and high incidence of fire damage and illicit felling. The areas fall under Heavy Alluvial Sal and Northern Secondary Moist Mixed Deciduous Forest type. The principal object was to meet demands of fuel-wood. The silvicultural system adopted was formation of regular plantation of chosen quick growing spp. with clearfelling and artificial regeneration. Keeping an all India standard, the period had been fixed at 8 years. The yield was regulated by area. The spp. suggested were Eucalyptus, Teak and *Acacia auriculiformis*.

**Teak Plantation WC:** Forest area bearing mixed deciduous forests as well as scattered Sal and occupying chiefly hillocks have been allotted to this WC. The rotation of teak was kept at 60 years for 50 cm dia.

*(The WCs described above are based on the author's plan of Haltugaon Division; and may be treated as imaginary. No copies of his plan for Aie Valley Division could be located in the Department. This shows amply what's in store for the working plans in future.)*

**10.14 INTERIM PERIOD (1992-93 to 2002-03):** As no compartment histories were maintained, it would not be possible to comment exactly upon the effect of the prescriptions of Das's Plan. In many a sense of the word, TK Das's Plan was a realistic departure from the traditional Sal type of working plan. He was bold enough to admit total failure of Sal regeneration in the traditional Sal areas. The situation in the two districts of Kokrajhar and Bongaigaon was far from normal during this period. Considerable damage was done to the forest establishments, staff were killed, beaten and kidnapped. The forest areas were virtually looted. By middle of the last decade, the Sal was slowly replaced by refugee camps, the victims of an ethnic strife.

Under such situation field works were commenced by the author in 1999 in the three divisions of Haltugaon, Kachugaon and Aie Valley, amidst fears that the mission may not come through.

**10.15 PAST REVENUE/EXPENDITURE & YIELD:** This para is of only historical interest. As this Plan is primarily a protection plan. The figures of past yield were not compiled. The out turn from these forests have only been going as seized timber. Table NO. 10 & 10A gives some details of out turn removed from the forest through seizure.

## CHAPTER 11

### 11 METHODOLOGY OF SURVEY & STATISTICS OF GROWTH & YIELD

**11.1 INTRODUCTION:** The three divisions of Haltugaon, Kachugaon and Aie Valley which fall in the strife and violence torn districts of Kokrajhar and Bongaigaon, are for administrative purposes come under the Western Assam Circle, and a Working Plan Division is also stationed at Kokrajhar to meet the requirements of the circle. However, the onus of survey and preparation of working plan of these divisions, where even police have to think several times before venturing into the forest tracts, fell upon the author who was then, holding the charge of Working Plans, Upper Assam Circle. Traditionally, these tracts were never before surveyed by the Upper Assam field parties. Terror and ethnic violence in the two districts was at peak, when the author was given marching orders. The job of convincing field parties, who at their best feared for kidnapping, and at the worst, probably to never see their families again, was tough, especially when one accounts for the fact that even the local field staff refused to venture inside. The author had to handpick boys who would do the impossible, and the morals were boosted by decision of the then Conservator (Development), OP Pandey IFS, who had served in these tracts long back, and had the experience and was willing to take the risk. Though the experiments were well designed and planned, but there was a strong gut feeling that even if the team could have a look and come back safe, the exercise would be considered a success.

The strategy was to order a set of GPS, and digital/hardcopy FCC on 1:50,000 scale. Though Sal gives distinct coloration on FCC, as can be normally seen in images of Uttranchal, when the scenes arrived, the author was in for a shock. There was no such trace of Sal, as to make the survey work easy. The tone had so thin a variation that it was impossible to tell from one type to the other. The images were shared with some experts from IIRS, Dehradun, who were then, on a visit to the region on bio-diversity hot spot project. They were also perplexed, as to how to look for Sal or even differentiate between two types of formations.

The old working plans pertaining to the forest tract under question, had such vivid and detailed description of the areas that it made the task at hand even worse than Herculean. There were insurmountable odds in front of the author- "Terrorizing" terrain with no chances of any proper survey, Washed out satellite imagery with no clue on vegetation discrimination, Excellent past management systems and vegetation classifications which would be impossible to attain in the present circumstances.

With such odds, the team landed in Kokrajhar. There was initial resistance from local field staff who simply refused to accompany. Strategies were made, police came forward in a big way, so did CRPF and Army. We also sought local support, support of NGOs and other citizens who had concern for forest conservation. As a result, a nucleus of 8 souls from Jorhat became a swelling sea of 50 to 80. Every day was a new day of prayer, reckoning, learning and experience. Occasions also came when, the author thought, it was time to say good bye to the near and dear ones, but the determination never lessened. Incessant rains and swelling streams were the only deterrent, as monsoon approached. The purity of the field work did suffer considerably. The time and the route plan did not permit to take as many as 100mX100m plots as planned, but during the entire exercise 1400 points were touched in the vegetated tracts. Not less than 20 km of rides and parallels were "cleared" during the exercise to make way for onward movement in the interior forests which did not show signs of any forestry activity for past several years. It was a lifetime experience to see and feel worst of forest devastation and the best of greed of man.

As the "expedition" gained momentum, more and more field staff joined hands. They were so desirous to go inside the forests and have at least one look. Such was the response that

many had to be politely refused showing constraints of resources such as vehicles. Many wood cutters and game hunters caught in the forest were given their rightful due. The staff rejoiced, and there was a feeling of oneness- a feeling which binds all foresters in their commitment to conservation. There were rare scenes to feast the eyes with- herds of golden langur jumping madly from branch to branch, colonies of hornbills, big cat pugmarks, glimpses of elephants, shyly running away deer, colonies of butterflies, snakes, and above all the majestic grasslands of Manas RF with *Oxy* full bloom in May, and a carpet of grass below- as if telling, "if heaven is there, it is here, it is here". And the unforgettable *Bhelu* with majestic buttress, near Bhutan border in Dholpani Block, that measured 34m GBH. There was omnipresent destruction to see as well. Beautiful Sal trees hacked into pieces of fire-wood. Magnificent forest IBs reduced to rubble. No trace of the tram line. Lone pillars of the tram bridge over Hel standing mute witnesses. The scene at Kachugaon was pathetic. Once pride of forest, it stood razed to the ground. Sal was conspicuous by its absence, barring solitary trees, scattered stumps, and few patches. There were sites where only stumps were visible all around. Stacks of fire-wood was seen along the national highway as a regular feature. Millions worth of forest wealth was right there on the road being sold for few rupees a kg. It all filled the team with anguish and agitation. As a result, wood cutters were chased left and right in the forest. So much was the terror created that seeing the car-a-van, people started fleeing from the forest. Even houses were raided at the dead of night, recovering a huge haul of sawn timber. This should be appreciated against the backdrop that there were occasions when police was trembling, and froth would come out from the mouth of local field staff. Deep inside the forest where the VHF sets simply would not function, police felt like fish out of water, and the local staff swore not to accompany the next day. But again every day was a new day...

The Kokrajhar "expedition" was a very potent and an extraordinary experience. So high were the emotions, that when the team was on its way home to Jorhat after the last stint, every one's eyes were filled with tears. Was it because every one was at last "safe" from the mission impossible? or because deep inside the soul, a forester was sobbing after witnessing the *tandava* of destruction.

Nevertheless, the author would admit that though a broad area covering a very large number of waypoints, was traversed, quality of survey was low. The situation prevailing at that time compelled to make compromises. In the major forest areas of Ripu, Chirang and Manas, only the main roads were open to a large extent. Rest of the approaches, mostly rides & parallels, had either to be "discovered" or "cleared" to make further progress. However, three very good traverses were made in Manas RF. In Chirang RF, blocks such as Dholpani, Laopani, Lunsung, Samukha, Ultapani, Saralbhang and Maligaon were touched. In Ripu RF, interior tracts of Janali, Bamba, Hel, Pekua, etc. were touched. The longest traverse on foot was about 28 km route from 7<sup>th</sup> Parallel on Bismuri-Sarbhanga road to the point where earlier existed the Laopani IB, thence to the confluence of Laopani & Dholpani and thence to the confluence of Champamati with Bhur, and thence to Runikhata IB.

**11.2 %ENUMERATION:** The intensity of enumeration was 1.2% against the gross areas of about 1,00,000Ha in all the three divisions.

**11.3 GROWING STOCK MAPPING:** The field work was planned on 1:50,000 FCC geo-coded sheets. Tone classification was carried out. However, as already mentioned, the visual imagery offered very little discrimination either on canopy cover or forest types. For each point visited in the field for ground truthing, its GPS location was recorded with Micrologic Handheld GPS having accuracy of 50m. In the plot description form, details of ground cover, canopy closure, species composition, biotic interference etc. was recorded. Thereafter a grid of 100mX100m in the north & east direction was laid, and 100%

enumeration was carried out. In case of uniform crops, a smaller subset of 25mX25m was taken and the enumeration was extrapolated for 100mX100m.

In addition soil sampling was also carried out at several places by digging one to two meter deep trench. The soil profile was noted, and samples were collected from each physical layer for further analysis. Though the original plan was to prepare a soil map of the forest, the same could not be achieved. The sample test results have been listed in Part III of the Plan along with their GPS locations.

After the field survey, an abstract of all the waypoints was prepared. As already stated, it was not possible to undertake a survey and classification in accordance with a large number of forest types mentioned in previous working plans. The waypoints were grouped into broad classes such as Evergreen, Misc, Sal Coppice, Teak, Grassland etc. and imported into the digital image processing platform of ENVI 3.6.

For digital classification, one set of image 109-52 of IRS 1D LISS III was obtained in 1999. However, given the dynamic ground situation and the inadvertent delay caused in submitting the plan, two additional images i.e. 109-52 and 110-52 of IRS 1D LISS III pertaining to November, 2002 were obtained. All the images were geo-referenced with help of GCP obtained from the digital mapping of the three divisions. As part of the area under classification pertained to hills, a ratio of B3/B4 (original bands being referred to as B1, B2, B3, B4) was made. In addition, PC transform was also carried out to achieve maximum separability. A combination image was built from the ratio and PC transformed images for final classification (five bands, 1 from Ratio and 4 from PC, serially referred as CB1, CB2, CB3, CB4, CB5).

The way points were then examined against the backdrop of the image so obtained, and training sets (hence forth called Region of Interest, ROI in short) were created around them. ROIs were either selected in pixel group of 5x5 or were grown. At each stage, ROI separability was calculated. Separability between the groups was maintained from 1.9 to 2 from an index of 0 to 2. By a continuous trial and error process, a consistent separability was obtained. To avoid mis-classification, a separate set of ROIs were developed for a particular type of terrain. For example, Mans RF, Ripu RF and Chirang RF were treated separately. The hilly tracts of Aie-valley Division and the Sal coppice areas of Haltugaon & Kochugaon were also treated separately. Two FCC band combinations were used to arrive at the final classification, namely CB1, CB3, CB9 and CB1, B3, CB9 as RGB channels respectively.

For each RF for which a digital map was available, a binary mask was prepared with interior areas =1 (ON) and exterior =0 (OFF). Classification was performed only on the subset generated by the masked images. The classification algorithm used was Parallelepiped with extraction of spectral signature from the corresponding set of ROIs. The classified image so obtained was subjected to post classification algorithm of "Majority/Minority Analysis". The pixel kernel defined was 9X9 and the weightage to the central pixel assigned was 5. The mode was majority. The algorithm was run on all the classes including "Unclassified". This resulted in merging of areas smaller than 9X9 (4.66 Ha) into nearby majority classes. This way the classified image was smoothed out.

The final output was framed with latitude/longitude values. All unclassified areas were redesignated as Blank. Barring two forest areas in Aie valley Forest Division, no where rivers are shown separately on the stock map. Rivers and water bodies also form a part of the Blank. The final output was, once again, checked calling the waypoints. The result was found satisfactory.

*As there is merger of areas in post classification process, and also as there are chances of mis-classification, beyond the control of the author, the field staff is advised to exercise caution while implementing field works. They are requested to verify the stock map, and note down discrepancies if any. The same may be intimated to the author.*

The author had only one wish, when it comes to stock mapping, "How I wish I had the reach of the past, and technology of today, the best forest stock map would have been produced." The current situation does not allow for the best exploitation of the technology.

**11.4 DIGITAL MAPPING:** The three divisions fall in the 78J (1-16) grid of the Survey of India. The westernmost periphery is covered by 78F (14-15). The relevant features pertaining to forest management such as roads, river, streams, rail, forest boundary, rides & parallels, contours (100m interval) were digitized. For the purpose, a polyconic grid was first made from a projection software called PS2000 developed by the author. Each map so digitized was fitted into / transformed (in AutoCAD Map by using a command "ADETRANSFORM") into real co-ordinates. These maps were, thus, brought into real world co-ordinates giving lengths in meters and area in sq m.

Thereafter, reserve wise maps were made separately. Reserve boundaries were, then, exported in SHP file format to the ENVI platform. Similarly some features digitized from the satellite images were imported to the AutoCAD platform using ENV to DXF to DWG conversion.

The digital maps were used to provide the GCP co-ordinates in x,y system for image to map registration of the satellite imagery. The projection system used was Polyconic with Indian Datum and Everest spheroid. The center of projection was 26° 30' N latitude and 90° 30' longitude.

The old stock maps, wherever available, were digitized. Unfortunately, the process of final editing and topology generation could not be carried out. In case of several RFs/PRFs, the consolidated maps could either be not fitted into the digital map generated from SOI topographic sheets, or the error was so much that the old stock map would lose meaning in the digital form.

The RFs/ PRFs and USFs which could not be mapped digitally, had either no maps or maps which could not be ported to SOI sheets in absence of a reference point. It was also observed that in case of some of the RFs/ PRFs that were surveyed and had bearing/ chainage data, the same when fed digitally showed closing error or criss-crossed its own boundary. In most of the case, it was found that the surveyed boundaries had not proper reference point, in absence of which, the same could not be located on the SOI maps. All the forest areas which could not, thus, be brought onto the SOI sheet was left out from any further analysis. Chakrasila is a glaring example (*The stock map of Chakrasila appearing in the Plan of Haltugaon Forest Division is an imaginary boundary drawn from the satellite image by including the Sal areas and the hill portion, as visualized during the field work*).

**11.5 STATISTICS OF GROWTH:** There is much material available on the growth of Sal and other species, in the earlier working plans. The author did not have the courage to even quote them for sake of continuity. It would render the Plan a farcical play. The monumental plots laid in Ripu and Chirang RFs by the foresters of the yore are left with no tale to tell.

**11.6 STATISTICS OF YIELD:** This is primarily a regeneration and protection plan. The commercial out-turn has been kept beyond the purview of the plan period. Only in case of Khoir, Sissoo, and Simul, total removal is recommended against a rotation period, depending upon growth statistics. The growth data for these species is very scanty and

conflicting. For fuel-wood plantations prescribed in the Plan, the rotation is very short, and the species are again fast growing. Volume equation developed by Forest Survey of India has been used to arrive at growth figures and yield. The details are enclosed in Part III of the Plan, as Excel document entitled Models of thinning regime and Fuelwood production.

## PART II FUTURE MANAGEMENT DISCUSSED & PRESCRIBED

### CHAPTER 12

#### 12 BASIS OF PROPOSALS

**12.1 INTRODUCTION:** Part of the forest tracts covered under this plan were once one of the most intensely managed and maintained areas for production of quality Sal timber. The destruction caused in the past two decades has wiped out the Sal forests of the division. Northern part of the Aie Valley Division bore the maximum brunt of the onslaught on the forests, so much so that virtually there is no trace of Sal, barring few standing specimens here and there - waiting for their turn to be felled. The pressure of fire-wood demand appears to be the primary cause of destruction at the moment.

Unlike Haltugaon & Kochugaon, Sal coppice/seedling regeneration is none or at best sparsely scattered in the southern part of the Division. The crop being mostly composed of 3<sup>rd</sup>/4<sup>th</sup> generation coppice, there is little promise to regain the lost high Sal forests of the area. Natural regeneration of Sal was found to be almost nil in the entire division.

The onus of the author, as working plan officer, has multiplied manifold given the complexities involved in the management issues of the day. The working plan exercise in itself was a challenge and a daunting task by any standards. To formulate prescriptions that would rejuvenate the lost Sal forests, appears to me a tougher task, knowing fully well how difficult it would be to implement the plan in the field.

In this venture of forest regeneration, the support and goodwill of the public is a must. Keeping this in mind, prescriptions have been carefully framed with twin objectives – first, to conserve and protect whatever is left, and secondly to regenerate the lost areas as much as possible.

**12.2 GENERAL OBJECTS OF MANAGEMENT:** The objects of management have been defined in line with the broad objectives referred to in the previous paragraph. Effort has been made to ensure that there is no conflicting objects and prescriptions. The general objects of management are defined below:-

1. To conserve/protect the existing forest cover
2. To recover the degraded areas under JFM/FDA
3. To protect the areas under Sal regeneration.
4. To promote production of NWFP

**12.3 FORMATION OF WORKING CIRCLES:** To fulfill the general objects of management, the following Working Circles have been constituted:-

1. Eco-development W.C. (SREWC)
2. Afforestation W.C. (AWC)
3. Manas Buffer Area W.C. (MBAWC)
4. Non Wood Forest Produce O.W.C (NWFPOWC)

**12.4 BRIEF REASONS FOR CONSTITUTION OF WORKING CIRCLES:** Brief reasons for constitution of the Working Circles are given below:-

**Eco-development WC:** This WC has been constituted to protect and manage the patches of scattered Sal forests now regenerated by coppice/ and natural seedlings, and assist

these areas in further regeneration of sal and associates, and other useful species by artificial means. The areas fall in a compact geographical tract, and could be managed most effectively as a single management unit.

This WC has been constituted for the enrichment of the degraded forests and denuded hills in the southern part of the division. Such areas could be effectively regenerated through JFM/FDAs and eco-development activities. The forests would be raised keeping in view the needs of the community, wildlife such as Golden langur which inhabit some of these areas. The surrounding villages would be engaged in regeneration/ protection and management of the forests, their chief demand being fire-wood.

**Afforestation WC:** The chief objective of constituting this WC is to bring back the damaged forests lying to the north of the Division. The objective of this circle would be partly to reclaim the Sal, Sissoo & Khair, and evergreen areas now fallen barren to excessive interference. There is a high concentration of forest villages in this WC, whose chief demand is fire-wood.

**Manas Buffer Area WC:** This WC has been constituted by clubbing together all the surviving forest tracts confined now to Manas RF alone. The exact area has been delineated based on the satellite image. The chief objective is to conserve flora and fauna. The areas under this WC form a part of the corridor from Manas National Park to Buxa Tiger Reserve.

**Non Wood Forest Produce OWC:** This WC has been proposed to tap the vast resources of the non-wood forest produce and harness their potential as income generating resource for the neighbouring villages.

**12.5 BLOCKS AND COMPARTMENTS:** No change in blocks and compartments has been proposed. The existing structure has been retained for sake of continuity. The Division requires a traditional block & compartment system in the northern side, and a watershed based system in the southern side. However, no attempt was made to devise any blocks and compartments, as situation is far from normal. A list of all the old blocks and compartments, RF wise is shown in Table No. 34. It is for reference that Manas Part II which was earlier in North Kamrup Division has been referred to as Manas block or simply Manas II.

## CHAPTER 13

### 13 WORKING PLAN FOR ECO-DEVELOPMENT WORKING CIRCLE

**13.1 SPECIAL OBJECT OF MANAGEMENT:** Once the southern part of the Division was rich in Sal forest. Due to excessive biotic interference, the standing trees were decimated gradually in course of time. Wherever little protection was awarded, coppice growth appeared. However, the vandalism did not stop till recently. Moreover, successive working plans allotted most of the areas under this circle to teak plantations. As a result, there was further degradation. The original forest composition has long been lost. Keeping the above in mind, the special object of management of this class of forests is outlined below:-

1. To accord protection to the existing crop
2. To carry out secondary silvicultural activities for better growth
3. To fill up the vacant areas with artificial regeneration of Sal, wherever possible.
4. To green the hill tops under JFM/FDA, preferably with fuel-wood species.

~~To achieve the above objectives, the Working Circle has been sub-divided into two Working Series:-~~

- ~~1. Sal Protection & Regeneration Series~~
- ~~2. Eco-Plantation Development Series.~~

*(The WC maps included in the Plan document show the WC as "Sal Regeneration & Eco-Development WC" as per the Draft Plan)*

**13.2 AREA ALLOTMENT:** All the RF, PRF and USF areas falling south of the national highway have been clubbed into this WC. Specifically, the areas are Nakkati, Bamungaon, Khoragaon, Kakoijana, Rakhalthakur, Digdari, Mahadev, Khakarpur, Bhairab hills, Baudia and Bhumeswar.

Though two working series have been proposed, due to difficulty in segregating Sal and non sal areas through image interpretation, attempt has not been made to allot specific areas to these series. The decision is best left to the executive field staff, as to treat the area for sal regeneration, or plant it up with Sal associates, plant it up with species such as Bamboo, Dimaru, Ficus, Bischofia etc, or take up fuelwood plantations.

As no distinct demarcation has been made between the two series, it is expected that the field staff, while executing the plan and prescriptions, shall categorize the plantations or the areas regenerated as belonging to either Sal Protection & Regeneration Series or Eco-Plantation Development Series, and follow the requisite prescriptions.

**13.3 ANALYSIS & VALUATION OF CROP:** The area was found to contain a large number of teak plantations, as a result of prescriptions from the previous plans. Though the areas, specifically Nakkati, Digdari, Khakarpur, Mahadev, Bhumeswar, and Kakoijana among others were known to have sal crop, and part of them continued to be prescribed for some sort of Sal related treatment, the fact today is that these areas bear very little sal, and that too scattered and scanty in growth. The soil was found to be highly exposed. The average girth of Sal was 0.40 cm to 0.60 cm.

Other than teak, and scattered Sal, the area also bears some miscellaneous deciduous formations as described in Chapter II of Part I of this Plan. It can also be mentioned here that in some areas such as Kakoijana, a good population of Golden langur thrives. They

have scarcity of food material, as teak plantations do not provide either any shade or food.

The hills were found to have considerable rock face, interspersed with miscellaneous growth. However, no survey could be conducted in the higher reaches of the hills. The stock map in these areas has been primarily derived from digital satellite data interpretation. Some teak plantations were also noticed in these areas. However, as their signature could not be successfully extracted from the satellite data, the areas would have got classified according to the signature of the nearest identifiable pixel, or got classified as unclassified and got merged with Blank, in course of post processing of the classified image.

Due to these constraints, classification and stock mapping has been restricted to primarily three categories namely Dense Miscellaneous, Medium Miscellaneous and Open miscellaneous depending upon the tone class representing extent of canopy closure and vigour of vegetation. Rest of the areas can be thought of as scrub or barren hill or blank.

In addition, a separate encroachment/blank map was prepared for these areas, showing possible extent of what can be termed as encroachment

**13.4 SILVICULTURAL SYSTEM:** These forests were managed as Coppice with Standards during the Zamindari days. There was a great temptation to introduce PB system, or at least inherit the system proposed by TK Das under the Sal Reclamation Working Circle. The crop composition during the 1974-75 survey, based upon prescriptions were made by TK Das, was quite different. There were seed trees, and middle aged to mature Sal trees. Prospects of an assisted natural regeneration was very high then. The present circumstances are that the crop has got a breather after severe interference, and is largely at pole stage.

Thus, most prudent approach would be to fill the vacant areas with artificial regeneration of Sal, including replacement in phased manner the peripheral whippy growth areas as well, and according protection to the existing pole crop, allowing only for secondary silvicultural operations.

Other arguments are also available as argument in favour of this mode of treatment. Several studies have been conducted on systems such as Coppice with Standards/Reserve with 10-15 year of rotation. According to Malhotra et al (TERI, 1999) raising *Sal* forests through coppice system is not advisable, coppice originating from infected stumps are most likely to be infected. They found incidence of 80% infection in Sal coppice crops. ***It can only be achieved by slowly replacing the coppice crop with a seedling crop.*** According to Chaturvedi, soil is exposed in short rotation, leading ultimately to total damage of Sal eco-systems.(Chaturvedi 1993, in TERI 1999).

As the soil in this working circle is very poor, raising of high density plantations would be a very expensive and untenable proposition. The best option is to evolve a people's silviculture tailor made to meet part of their requirement, specific to the locality, resources and means of production. In event of no such system evolves, the plantations raised under this Series shall be felled and managed on Selection system. However, any Sal raised would not be felled, except for thinning & silvicultural operations.

**13.5 ROTATION:**

Short rotation of 8-15 years could be adopted, depending upon the local requirement. For Sal patches, it is envisaged that they would not be felled. So no rotation is prescribed.

### 13.6 CALCULATION OF YIELD:

No yield has been prescribed for Sal. The yield as may be available from thinning of plantations alone is prescribed for Sal. For other species, besides thinning, final felling is prescribed. However, no yield has been calculated.

### 13.7 PRESCRIPTIONS: *(Though Series concept has been omitted, prescriptions hold good)*

#### 13.7.1 ~~Sal Protection & Regeneration Series:~~

1. JFMC to be constituted in villages surrounding the existing Sal areas. The Executive field staff and the committee members shall visit the forest area, among other things, to select suitable site for regeneration, to examine possibilities of natural seed fall, to determine intensity and nature of biotic interference, measures best suited to counter such interference for upkeep of the regenerated areas.
2. The executive field staff, in consultation with the JFMCs, demarcate and mark the area for regeneration latest by December every year. Latest by end of January, the areas so demarcated may be cleared of weeds, and the debris including leaf, dumped on the forest floor, and burnt. The burning should be controlled so that no damage is done to existing Sal saplings, if any. All established Sal pole crop must be retained as advance growth. Struggling Sal seedlings should be cut back at the lowest portion of the collar, in any case not more than 25 cm above ground. Blocks smaller than 30 Ha should be avoided as far as possible. The area should be fenced, if JFMCs are not in a position to provide protection from grazing, felling and wanton destruction.
3. 150 Ha is the annual target for regeneration through the JFM Committees. Species could be having a higher mix of associates, instead of pure Sal.
4. In areas, where the possibilities of seeding are remote or very poor, and not much regeneration is likely to come up on burning, seedling strips should be hoed up, and Sal seeds, within 48 hours of collection, dibbled at 10 cm apart. In each row, a set of 3 seeds could be dibbled. If Khurkhani soil is encountered, hoeing should be confined to the top of the mound, and a "thali" should be prepared in which the Sal seed should be dibbled. As regeneration is very poor, in one thali about 4 to 5 seeds can also be dibbled to ensure regeneration. Such operations would be necessary for most of the areas. Hoeing should be over by 1<sup>st</sup> week of May. Only mature seeds should be dibbled.
5. One weeding during rains, preferably in the months of July-August, should be carried out compulsorily.
6. Controlled burning in strips in the early winter is advisable. For this purpose, weeds, shrubs and climbers are cut and pressed in a row in the regeneration area. These are then torched, ensuring that fire does not creep into seedlings. Such burning is best done early morning, or late night, when the weather is very cool. It should ensure that there is no inflammable material in the regeneration area. The controlled burning process must be completed before 15<sup>th</sup> of November.
7. During the 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> years, weeding and controlled burning should be resorted to as described at Serial NO. 5 & 6 above.
8. In the 5<sup>th</sup> year a silvicultural thinning may be carried out. Of the total crop marked for removal so, 100% marking has to be done by an ACF, and 30% verification by the DFO.

9. From 5<sup>th</sup> year only controlled burning should be given, till such a time (few years) that the regeneration is established, and beyond the danger of being wiped out by accidental fire.
10. No felling, other than silvicultural, is permitted in this Series during the plan period. Subsequently, the areas may be worked on either selection or alternate strip (north-south).
11. Any out-turn removed from this Series may be disposed as per existing JFM guidelines/Rules of the Government or any other such law in force at that time.

#### **13.7.2 ~~Eco-Plantation Development Series:~~**

1. Prescription for site selection etc. same as at sub para 1 of para 13.7.1.
2. Prescription for site selection etc. same as at sub para 2 of para 13.7.1. All advance growth should be retained. However, struggling seedlings should be cut to the ground. The area should be given a good burn.
3. 250 Ha is the annual target for regeneration through the JFM Committees.
4. Teak should not be planted. Preferred species would be Sal, Sain, Ghogra, Gamari, Borpat, Sopa, Kadam, Ajhar, Bogipoma, Bamboo, Ficus, Bischofia etc. However, the choice of species should be left on the people, according to their requirements. To achieve this, the species choice be identified months in advance so that requiring planting material could be procured. Beneficiaries may be encouraged to raise their own nurseries of these species, close to the regeneration sites. The same planting material then can be purchased from them by the Department for use in the plantation. This activity should be able to generate some employment. Such "Peoples' Nurseries" would encourage participation in the programme. People should be encouraged to use certified seeds or collect seeds from known/identified seed orchards.
5. In case of direct sowing of seeds, thalis should be prepared of 25 cm dia. It should be hoed properly, and a stake be put at the center. At the time of sowing, seeds should be dibbled in the thalis. Only one species should be confined to a stake or a row of stakes.  
  
In case of transplants of seedling from nursery, care should be taken that the seedling is at least 9 months old. (*The seedling should preferably be raised in root trainers in the nursery*). Care should be taken to see whether the ball of earth of the seedling has to be removed or not. For example, Bogipoma when planted, its ball of earth should be removed. In case of Kadam, it has to be transplanted with ball of earth.
6. The regenerated area is subjected to 3 weedings during the rains in the 1<sup>st</sup> year and 2 weedings in subsequent years.
7. During the winter season, controlled burning as prescribed in sub para 6 of para 13.7.1 to be carried out.
8. The number of weedings may be reduced to 1 in the 3<sup>rd</sup> year and onwards. However, the controlled burning would be mandatory, till the plantation is established.
9. 1<sup>st</sup> mechanical thinning should be carried out in the 5<sup>th</sup> year, removing alternate stems. Marking ahs to done by the Beat Officer. Followed by 100% verification by the Range Officer and 10% by the ACF.

10. The usufructs shall be shared as per sub para 11 of para 13.7.1
11. In case the community adopts an agro-forestry model, or intercropping of NWFP, which they are free to do, provided, the soil permits and the decision has been duly approved by the FDA executive body, the provisions under sub para 6,7,8 may be suitably modified.

## CHAPTER 14

### 14 WORKING PLAN FOR AFFORESTATION WORKING CIRCLE

**14.1 SPECIAL OBJECT OF MANAGEMENT:** The reserve forests, namely Manas, Bengtol, Kuklung, Katribari, Ranisundari, Teklai and Sissoobari have been heavily affected in the last two decades. Barring parts of Manas, there is no vegetation worth reckoning in these areas. The entire terai Sal formation has been wiped out, and stands converted into level plain field strewn with refugee camps and agriculture. There are a total of 17 forest villages and several encroachments in these tracts. The main cause of devastation has been unsatiable demand for fuel wood for which the valuable Sal trees have been sacrificed. Reclamation of the devastated areas would be one of the greatest challenge that the field executives would face. Without a total social and political commitment, it would not be possible to achieve this task. Keeping these hurdles in mind, the chief objects of this working circle are:-

1. To bring the vacant areas under green cover
2. To ensure protection, so that the denudation line does not shrink further north.
3. To meet part requirement of fuel and fodder from the green cover

To achieve the same, the working circle would be sub divided into three Working Series namely:-

1. Sal/General Afforestation Series
2. Khoir-Sissoo-Simul Afforestation Series
3. Fire-wood Stand Series (or Fuelwood Stand Series).

*(The Sal Afforestation Series has been modified as Sal/General in pursuance of the directives of the Working Plan Committee, without modifying the spirit of the Series. Emphasis is laid on raising forest cover which would be protected zealously. The attached WC map also may be read as "Sa/General Afforestation Series")*

**14.2 AREA ALLOTMENT:** The area allotted to this working circle has been construed from the satellite imagery, wherein the surviving forest tracks and the denuded areas are clearly visible. Bengtol, Kuklung, Ranisundari, Teklai, Sissoobari, Katribari in entirety and parts of Manas have been constituted into this working circle.

For the purposes of area allotment under this, an approximate boundary of existing forest villages was taken, It was then superimposed upon the Blank areas marked from the latest satellite image (IRS 1D LISS III, November 2002). For Bengtol RF, a buffer (FV-BUFF) of 1609.3 m was drawn around the forest villages (which were earlier made into a network topology). The areas in The FV-BUFF outline, were allotted to Firewood series, otherwise, they were allotted to Sal Afforestation Series. A part of the fringe area on the west was allotted to Khoir-Sissoo-Simul series.

In case of Manas RF, first a network topology of the current river channels (obtained from satellite image) was drawn. Around it, a buffer of 500m was created. The buffer, if overlapped with existing blank areas as per satellite image, was allotted to Khoir-Sissoo-Simul Series. The balance areas of Sukanteklai, Langkhar and southern part of Aie block were allotted to Firewood Stand series. The northern part of the blank area of Aie block was allotted to Sal Afforestation Series, which could be best developed having Sal or miscellaneous plantation.

Katribari was allotted to Sal afforestation series due to its proximity to Bengtol. Ranisundari was allotted to Fuelwood series. Rest of the areas i.e. Kuklung, Teklai and Sissoobari were allotted to Khoir-Sissoo-Simul Series.

Fig No. P-1, P-2 and P-3 show the various areas allotted in this Working Circle.

**14.3 ANALYSIS & VALUATION OF CROP:** All the areas barring partly the northern, and eastern part of Manas RF, are denuded and devoid of forest cover. The tracts are strewn with cut/burnt stumps of trees amid light cultivation of crops such as mustard.

These tracts, as per earlier working plans supported terai Sal. The areas on the river banks have strewn population of Simul, Khoir and Sissoo. Parts of Manas sported savannah, semi evergreen and deciduous formations. At present, the areas allotted to this WC do not have any forest cover.

**14.4 SILVICULTURAL SYSTEM:** There would be artificial regeneration of the crops such as Sal, Sissoo, Khoir, and local fire-wood species, followed by mechanical thinnings, and silvicultural thinnings during the currency of the plan. High density fire-wood plantations would be preferred. These would be harvestable crop at the end of the stipulated rotation period.

The areas allotted to the Sal/general series have virtually no crop other than felled stumps, burned ground or light crop. There is option to plant Sal or other Miscellaneous species in this Series. The Sal would be planted along with its associates such as Sain, Ghogra, Chopra etc. This plan does not prescribe for any final felling of the Sal or other plantations raised. However, selection system would be adopted to remove out-turn by way of silvicultural thinnings.

**14.5 ROTATION:** As there is no felling intended under the currency of the plan, barring mechanical thinnings and silvicultural thinnings, no rotation period has been prescribed for Sal and its associates or other miscellaneous species.

In case of Khoir, Sissoo and Simul, it has been observed from previous working plans and available literature that a rotation of 30 years is sufficient to produce marketable out turn for these species. Khoir attains 45 cm in 30 years. Similar is the case with other two species. Therefore, rotation has been kept at 30 years for all the crop that would be raised under this series.

The high density fire-wood stands would be felled at short rotation of 10 to 30 years depending upon the decision making of the local management.

**14.6 CALCULATION OF YIELD:** There is no prescribed yield. For Khoir, it needs to be mentioned that the cost of the natural dye extracted is \$70 for 5lbs in the international market. Though, there is no provision for harvest of any existing Khoir tree under this plan, it is expected that the plantations would be able to generate considerable revenue to the state exchequer. Similarly, Sissoo is another important species for the rural population. The suggested plantations should be able to meet part of the demand.

However, annual plantation targets were arrived at, based on the stock maps, and analysis in GIS environment. 30% of the total area under the Sal/General Afforestation Series, was thought to be achievable within the plan period. One eighth of this has been fixed as the target for regeneration during the plan period. The annual area for planting comes to 169 Ha, which has been rounded to 150 Ha.

Similarly, for Khoir-Sissoo-Simul-Series, 60% of the area was seen as falling in current river courses. This was deducted out rightly. Of the balance area, only 30% was thought as achievable within the plan period. One eighth of this has been fixed as the target for regeneration during the plan period. The annual area for planting comes to 316 Ha, which has been rounded to 300 Ha.

In the Fuelwood Series, again, 30% area was taken as achievable under the current circumstances (as most of the areas under relief camps etc). Of the achievable area, one eighth of this has been fixed as the target for regeneration during the plan period. Annual area for planting comes to 412 Ha, which has been rounded to 400Ha.

#### **14.7 PRESCRIPTIONS:**

##### **14.7.1 Sal/General Afforestation Series:**

1. This would be purely departmental work. The assistance of the JFMCs may be taken, but, there shall not lie any claim to forest produce sharing, if explicitly not mentioned in these prescriptions.
2. The plantation of Sal and associate species, or other miscellaneous species, has to be raised in block strips of 100 m wide and at least 300m in length, in the north-south direction. However, strip width, length & direction may be varied suitably to meet certain prevailing ground conditions. These block strips would contain one meter wide seedling strips at 2 meter interval. Site clearance and preparation of strips should be done by end of March.
3. During April, the seed lines should be hoed in preparation for dibbling of seeds. This operation must be completed by 2<sup>nd</sup> week of May.
4. As soon as mature seeds are available, they should be sowed within 48 hours in the hoed strips at 10cmX10cm spacing. Sal seeds give better germination when soaked in water for 48 hours. As Sal seed years normally come once in three years, adequate planting stock should be maintained in the nursery. Root and shoot cuttings of at least 1 year old seedling may be planted in event of a bad seed year. The DFO is to maintain a calendar of seed years, a map showing areas from where the seeds are to be collected. All such trees in the forest should be marked with wide yellow band, and numbered. Publicity should be given to ensure protection of such trees.

Species such as Ghogra may be raised in nursery and transplanted.

Mix of the species should be such that Sal associates get more coverage than Sal/Miscellaneous species coverage.

Teak shall not be planted.

5. One rain weeding has to be carried out during the month of July and August. At the time of weeding, all coppice shoots of Sal, below 20 cm girth should be thinned out, leaving only one shoot per stump. Coppice shoots of other species, interfering with Sal seedlings should be cut back.
6. Controlled burning as prescribed in sub para 6 of para 13.7.1 should be followed. More details are described here for better execution. Shrubs etc. occurring in the seedling strips are to be cut and placed along the middle of the intervening space of 2 m separating the two seedling strips. Thatch and other growth occurring in the intervening space are then to be pressed down. The cut and pressed materials are then subjected to control burning either during late evenings or early mornings by repeated torching in cold dewy mornings of late November and early December. Care should be taken to ensure that no fire creeps into the seedling strip, by placing few workers with green branches to beat off flames moving towards it.
7. The fire line should be cleaned of any inflammable material, and burnt periodically. The fire protection measure should continue till the seedlings are fully established and beyond the danger of being wiped out in accidental fire.

8. During the 10<sup>th</sup> year, the crop may be subjected to one mechanical thinning.
9. The silvicultural thinning should be carried out in 15<sup>th</sup> year.
10. The mechanical thinning shall be carried out after a thorough inspection report by the ACF. Areas poorly regenerated shall not be thinned. Marking has to be done by the Beat Officer. Followed by 100% verification by Range Officer and 10% by the ACF.
11. The silvicultural thinning stems shall be marked 100% by the Range Officer. 30% verification has to be carried out by the ACF.
12. The out-turn arising out of the mechanical and silvicultural thinnings may be shared with the JFMCs, if the Conservator so decides.

**14.7.2 Khoir-Sissoo-Simul Afforestation Series:**

1. Natural growths of Khoir, Sissoo and Simul should be retained while doing advance work.

Teak shall not be planted.

2. Nurseries of these species should be planned well in advance. Though Khoir can be raised in nurseries, planted by direct sowing as well as by stump cuttings, it has been observed that Khoir shows good growth when raised by stumps. The concerned DFO would visit plantations raised by stumps in certain areas by the Social Forestry division. If the growth of plantations is found noticeable in comparison with those raised from seedling, the method should be adopted for raising of a certain percentage of the plantations after obtaining consent of the Conservator.

Similarly, Sissoo could also be raised either by direct sowing (in line at 2m apart), seedling transplant (9 to 12 month seedling to be transplanted either with the ball of earth removed or naked root, at a spacing of 2.5 mX2.5 m), stump cutting or from root suckers.

If the natural regeneration of Simul is poor, it could be raised by direct sowing or by transplanting seedlings raised in the nursery. In case of direct sowing, it has to be done in patches or along a line. Seeds are best collected from trees when the fruits begin to open. The collected capsules are then kept in the sun, safe from wind. In case of nursery, seeds are to be sown in beds. The young seedlings are retained in the nursery till they are about a year old. Thereafter, they are transplanted after suitably pruning their taproots.

While carrying out advance work, all advance growth of Khoir, Simul, Sissoo and other matchwood species such as Bhelkor, Kadam, Koro, Odal etc. should be retained, unless the seedlings are of struggling nature, and not likely to establish.

3. Each plantation block shall be attended to for a period of 3 years, for weeding around the seedlings, beating up operations, and measures against grazing, fire etc.
4. The plantations may be thinned mechanically at silviculturally at 3<sup>rd</sup>, 6<sup>th</sup> year and silviculturally at 10<sup>th</sup>, 20<sup>th</sup> and 30<sup>th</sup> year.
5. If the plantation has been raised in association with JFMCs, and protection has been accorded, the out-turn from thinnings and final harvest should be shared with them as per rules in force at that time.

6. The plantation shall be finally harvested at the age of 30 years. Prior to harvest, a survey shall be made by an ACF, to inspect the plantation and retain the best trees, keeping one tree per ha or two, to serve as mother trees. Only one species should be retained in a plot of one ha or two. Rest of the trees would be felled.

**14.7.3. Fuelwood Series:**

1. The fuel-wood plantations created under this series would be all high density plantations to be harvested from 8-15 years of planting, except as prescribed at sub para 3 below.
2. The plantations would be done through the JFMCs. The usufructs of thinning and final felling shall be shared as per existing rules of the Department in vogue from time to time.
3. If because of some reason, high density plantations cannot be raised, multicropping should be resorted to in the gap areas in a typical agro-forestry model. Such plantations should be encouraged around the forest villages. Short rotation crops could be seasonal or annual. The multicrops so raised in between the fuelwood plantations would be shared 100% with the JFMCs.
4. The species chosen for the plantation should not include Sal and Teak.
5. The soil work should be done in 30cmX30cmX30cm pits, or in water logged areas, on raised mounds sufficiently high so as not to allow water stagnation. Plantation should preferably be done in early monsoon. On planting the seedling, supervisory staff should ensure that water be not stagnating near the collar in case of pits as well as mounds.
6. As it would be community forestry, it is assumed that social fencing would be available. In case of excessive grazing/biotic interference, fencing of local material should be provided.
7. Three weedings to be carried out annually, ensuring that there is no growth of weeds.
8. The plantations may be mechanically thinned in the 4/5<sup>th</sup> year. If the target age is more than 10 years, another thinning should be resorted in the 8/10<sup>th</sup> year.
9. One year before the final harvest, the DFO shall ensure that sufficient planting stock for next plantation to be raised and other resources such as funds, manpower etc is available before harvesting the plantation.
10. The plantation should preferably be harvested in the winter season. Followed by advance work such burning, clearing and removal of stumps should be completed as advance work.
11. The area harvested should be replanted with a different set of species. Therefore, species selection should be carefully done from the very beginning.
12. The felling rules shall be as prescribed in the Miscellaneous prescriptions.

## CHAPTER 15

### 15 WORKING PLAN FOR MANAS BUFFER AREA WORKING CIRCLE

**15.1 SPECIAL OBJECT OF MANAGEMENT:** The Manas National Park which lies east of the the Aie Valley Forest division is a world heritage site, and is home to a number of endangered and endemic flora and fauna. To the west of this park, successively lie Manas RF, Chirang RF, Ripu RF in Assam and Buxa Tiger Reserve in West Bengal. The entire stretch within the boundary of Assam from Manas to Sankosh Rivers is just about 100 km in length. The green cover width of the corridor varies from approximately 11 km in Manas RF, to 0 km again in Manas RF (western part), to 28 km in Chirang RF, 19 km in Ripu RF and 9 km in Ripu RF (western most part). A corridor map showing the present and proposed width is available in Part III with title Manas Buffer Area Corridor. This corridor also has been termed as Manas-Buxa corridor, and is likely to be constituted into an Elephant Reserve. It is hoped that this wide corridor would provide the migration path for wild animals and reduce man animal conflict. In the light of the above, the special objects of management for the working circle are:-

1. Zealous protection of the existing forest cover in the working circle
2. To undertake conservation and secondary silvicultural measures for healthy growth of vegetation
3. To involve the villages falling inside in protection by ushering in eco-developmental works.

**15.2 AREA ALLOTMENT:** All the green parts of Manas RF falling in this division, and appearing covered with vegetation, including savannah. (as per IRS 1D, LISS III Nov, 2002 imagery). The total area under this WC is 38,088.2428 Ha.

**15.3 ANALYSIS & VALUATION OF CROP:** As already described in Part I of the Plan, the tract is Bhabar in the upper reaches, and there is scarcity of water. Evergreen forests bordering Bhutan, and along river banks and swamp and low lying lands are dominating. The areas are miscellaneous in nature. A brief description of the flora and fauna is given below:-

**Flora:** The belt varies from evergreen to moist deciduous from north to the south. The character is slowly changing to evergreen, as can be made out from the ground cover which shows evergreen characteristics. In the evergreen belt, the top canopy is occupied by *Tetrameles nudiflora*, *Bombax ceiba*, *Ailanthus grandis*. The second story is occupied by *Amoora walichii*, *Phoebe goalparensis*, *Michaelia champaca*, *Cinnamomum cecicodaphne*, *Cedrela toona*, *Duabanga sonnersoides*. The underwood is occupied by pole crops of these species and other species such as *Castanopsis*, *Eugenia*, *Gmelina arborea* etc. The top canopy is quite open, the medium storey is medium to open, and the underwood is dense. Fern, mosses, *Colocasia*, *Coffea*, *Piper*, *Begonia* etc are common on the forest floor. Compared to the forests of Upper Assam, these tracts are comparatively drier. The main reason being, rain is confined here mainly to about 5 months a year, as against its all across the year distribution in Upper Assam.

In the moist deciduous areas, the crop composition is similar, but the dryness increases. The ground at places is occupied by grasses. The top canopy is sparse, with few tall trees. There is threat from fire. The working plan team observed large areas of the floor burnt. As there is ample opening in several places, attack of weeds is high. Trees are less valuable in quality.

Some Sal patches were also seen. Most of them are young crop. However, due to overexploitation, such patches are few. However, preponderance of other evergreen species is noticed.

There is good mix of savannah forest. In the dry savannah, which occupies the Bhabar terraces, occurrence of scattered Sida, Simul, Udal, Oxi, Kum and occasional Gamari or Gohora is noticeable. There is no differentiation of top and middle storey. Some of the grasses occurring in this belt are Imperata cylindrical, Narenga porphyrocoma, Sacchurum arundinaceum, Themeda arundinacea. Grewia sapida and Premna herbacea are characteristic associates in these grasslands. Some of the climbers are Acacia pinnata, Butea spp, Dalbergia spp, Mikenia spp.

In the wet savannah, occurring in the low lying locations, there is appearance of Koroï, Uriam, Owtenga, Bhelkor, and Simul. Some of the grasses are Saccherum procerum, Saccherum spontaneum, Apluda aristata, Phragmites karka, Neyrundia reynaudiana etc. In locations containing perennial water (swamps), there are practically no trees. Here, the vegetation consists of Eichoria crassipes, Nyupnoides spp, Leersia hexandra, Vessia cuspidata, Polygonum spp, Phragmites karka, Thysanolenka arostis, Trapa spp. Ludmisia spp.

**Fauna:** A list of fauna has been included at the beginning of Part I (Though the aim was to provide Bodo equivalents of the English names, it could not be achieved). The overall observation has been that these tracts are excellent habitat for wild animals. There are several colonies of Hornbills, Golden langurs and Assamese macaque. A brief write up on the wildlife has also been provided in Part I of the Plan. It includes some data from the recent census of the elephant and the tiger. A separate table has also been provided on population of certain wild animals. It also contains reference to depredation done by wild animals. Going through that, one can easily estimate the urgency in reducing man animal conflict by adopting such measures of conservation that may act as buffer between the two.

This area is a part of the larger habitat covering on one end Sankosh river and on the other the Manas National Park. By ensuring protection alone, the wild population presently struggling would find a secure zone for themselves. Presence of rare animals with a broad range coupled with picturesque surroundings offer a unique sanctorum to not only wildlife but also nature lover.

There is another very strong purpose in protecting these tracts. With virtual denudation in upper catchment in Bhutan, landslides have become common. Moreover, the rivers in the Bhabar tract frequently change courses, giving rise to erosion. Discharge of debris and silt is very in these channels due to these two primary factors. It is necessary to maintain the existing forest cover, so as to provide protection to soil and stability to the rivers.

This area has also been listed as one of the Elephant reserves.

**Manas** was declared a game sanctuary on 1 October 1928, by amalgamating the entire North Kamrup RF and the eastern part of Manas RF (upto Sukhanjan river on the west). Hunting, shooting and trapping was allowed on special permits issued to approved sportsmen. It was in 1917 that the area became truly became a sanctuary, wherein hunting, shooting & trapping were totally prohibited, but angling for purpose of sport was only allowed under permits. The Manas wildlife sanctuary along with Kahitama & Koklabari RFs was carved out of the North Kamrup Division in 1967, and was brought under management of a newly created Wildlife Division, Assam. In 1970, the Wildlife Division was split in two, and the areas mentioned above were brought under intensive management of a new Western Assam Wildlife Division with HQ at Barpeta Road. (*The other division being the Eastern Assam Wildlife Division with HQ at Bokakhat; and now serving as the Directorate of Kaziranga national park*). The Manas Tiger Reserve was declared with effect from April 1973. It was inscribed on the World Heritage List in 1985 as Manas Sanctuary. The sanctuary was upgraded to a National Park status on 7<sup>th</sup> September 1990, and enlarged from 39,100ha to 50,000ha by the inclusion of the former

Panbari, Koklabari and Kahitama Forest Reserves in the eastern sector. It was placed on the List of World Heritage in Danger in 1992.

The entire belt of Manas-Chirang-Ripu has a population of 721 elephants as against 325 in Buxa, according to the 2001 census. The area has been included in the list of the elephant reserves in the country.

**15.4 SILVICULTURAL SYSTEM:** This is primarily a protection working circle with provision for secondary silvicultural operations to ensure a healthy vegetative growth.

**15.5 ROTATION:** No rotation for any crop has been fixed here, as there is no extraction.

**15.6 CALCULATION OF YIELD:** There is no yield from this working circle, barring whatever yield removed by way of secondary silvicultural operations.

**15.7 PRESCRIPTIONS:**

1. The area along with the entire corridor should be given status of protected area. As the elephant reserve has no legal sanctity, some of the options would be
  1. Declare it as Ripu-Chirang-Manas Wildlife sanctuary
  2. Declare it as Eco-Fragile Zone under EPA section 3(V), and Rule 5 (viii) & (x) of EPA Rules.
  3. Merge it with Manas National Park as buffer area, including Manas RF (Pt), Chirang RF and Ripu RF.
2. The area should be provided total protection. Some of the protection measures suggested are:-
  1. Cutting rides as suggested by MM Islam to increase reach in the interior. At the moment there are only two or three roads (north south) to go inside, and one east-west road running on the southern boundary of Manas.
  2. The field staff on duty should be provided with adequate arms.
  3. Aie, Langkhar and Sukanteklai blocks should be revegetated at any cost. Even one third area is recovered, it would be able to join to Chirang and Ripu and complete the corridor.
  4. The Southern boundary road of Manas should be maintained at any cost. It has been successfully able to prevent encroachment in the Manas II(or the Manas block of Manas RF).
  5. Patrolling on the Manas southern boundary road and the two north-south roads leading inside Manas should be intensified.
  6. Infrastructure at Kuklung is required to be rebuilt in order to make the patrolling effective and intensified.
  7. Regulated burning should be practiced, as is wont in the Manas Tiger Reserve, to keep/conserv e the ecology of the grasslands in the Manas RF.
3. Eco developmental work should be started in the fringe villages south of Manas RF, so that further advance of encroachers could be stopped.
4. The area should be monitored (entire Manas-Chirang-Ripu RFs) on annual basis to keep watch on the forest cover, by using satellite images and GIS.
5. A separate wildlife management plan should be prepared by a competent authority for wildlife management of the area. Whenever such a plan is approved and implemented in field, these prescriptions shall be treated as null and void.
6. Its flora/fauna, including birds, mammals, butterflies etc. should be documented properly.

7. Secondary silvicultural operations such a removal of dead, dying and diseased trees would be allowed. Such removal would be subject to once in 4 years in a block, until and unless, it is warranted by some widespread disease or windfall.
8. All such removals shall be subject to marking rules prescribed under miscellaneous prescriptions.
9. Trees having nests or hollows where fauna can make nest, normally, shall not be marked for removal.
10. The area should be mapped in respect of colonies of birds, types of food trees, troops of golden langur and other apes, migratory path of elephants, types of habitat niches etc.

## CHAPTER 16

### 16 WORKING PLAN FOR NWFP OVERLAPPING WORKING CIRCLE

**16.1 SPECIAL OBJECT OF MANAGEMENT:** The Division is very rich in floral bio-diversity. The forest types range from evergreen forests to savannah. The forest floor is rich in species composition. It offers an immense opportunity for the people living around the forest areas to be a part of the conservation of forests and wildlife and at the same time earn livelihood without jeopardizing forest cover.

The special object of this overlapping WC is to:-

1. Provide sustained sources of income to the villagers inhabiting on the fringe areas.
2. Use NWFP for growth of local industry
3. Ensure availability of resources over a period of time.

**16.2 AREA ALLOTMENT:** This is an overlapping Working Circle over entire forest area of the Division.

**16.3 ANALYSIS & VALUATION OF CROP:** There are a variety of Non Wood Forest Produce that occur on the forest floor. There are medicinal plants, edible plants, bulbs, flowers, seeds, oil seeds, spices which either already grow in the forest or can be cultivated under special schemes. There is a good demand for *Centela asiatica*, which grows wild on the forest floor., as a brain tonic. It is being exported to other parts of the country by scrupulous traders and middlemen. Other important medicinal plants include *Raulfia*, *Pippul*, *Terminalia chebula*, *Terminalia arjuna*, *Emblica officinalis* etc. which are available in these forests. The most important are the two products of Sal i.e. the Sal seeds and Sal leaves. The Sal seeds are one of the most important oil seeds and is used in the soap industry. Similarly, *Outenga*, *khokon*, *Nahor*, *Semul*, *Cinnamomum camphora*, *Croton tiglium*, *Garcinia*, *Hydnocarpus kurzii*, *Jatropha*, *Trewia nudiflora* etc are some of the seeds which are used in industrial purposes for making soap, cosmetics, pesticides etc. Sal leaves are used to make plate. There are products such as *Rudrakhsa*, *Dhuna*, resins which are of commercial use, if exploited properly. Similarly edible fruits, citrus, berries, mushrooms, tubers, fungus and roots are also available in the forests which people in general exploit. Even products such as honey, patidoi, ekra, thatch, fuljharu, tokopat are available, and being used by the people.

**16.4 SILVICULTURAL SYSTEM:** The non wood forest would be exploited on sustainable basis to ensure that maximum benefit goes to the people. These would be managed through the JFMCs/FDAs.

**16.5 ROTATION:** The products are largely annual in nature.

**16.6 CALCULATION OF YIELD:** The yield would not be possible to calculate, as there are a number of produce involved, and each varies in shape, size and content.

**16.7 PRESCRIPTIONS:**

1. All exploitation of the NWFP to take place through local JFMCs alone. Old mahaldar system, if existing, should be lifted in favour of the JFMCs, if necessary by taking up the matter with Government for suitable modification of old rules/guidelines.
2. The role of FDAs should be to arrange for market linkages, assist the committees in exports
3. Overexploitation of the resources should be checked. The JFMCs can carry out a survey, after doing PRA exercise, as to the availability of different NWFP, their

seasonality and usage. Accordingly, a calendar should be chalked out well in advance, and approved by the DFO.

4. The total exploitation of each produce to be properly recorded.
5. If so desired by the community, inter-crops such as piper, cucumber, zinger etc. including agro-forestry models, if so permitted by the FDA authorities, can be raised in exiting plantations.

## CHAPTER 17

### 17 MISCELLANEOUS PRESCRIPTIONS

**17.1 DEADWOOD:** Deadwood and windfall must be marked before removal from the forest floor. An area of 1 sq mile, if worked for deadwood, must not be allowed to work again for another 4 years, unless a calamity such as storm or pest attack makes it imperative. All such removal within the cycle of 4 years shall require the sanction of the conservator of the concerned circle.

**17.1.1 PETTY FELLINGS:** Petty Felling from RF/PRF to meet Departmental exigencies/works, subject to approval by Conservator, and upto a maximum ceiling of 5 Cu.M. from RF, 10 Cu. M. from PRF & 20 Cu. M. from USF areas in a year would be allowed, provided prior consent of the Conservator of Forests of the Circle has been obtained, based on details of requirement.

**17.2 MARKING RULE:** The prescriptions laid down below shall hold good for all removal of timber and fire-wood under all the Working Circles, as well as Deadwood & Petty fellings proposed in this Plan.

1. Trees shall be marked for removal only for purposes of thinning, silvicultural removal, final felling and petty felling.
2. Trees will be so marked as not to create any permanent vacancy or any large gap in the canopy.
3. No trees will be marked if it's a mother tree, or a part of preservation plot, or any silvicultural sample plot or a quality seed bearer, or is an endangered species.
4. Trees standing on steep slopes, precipice and edges, and on the bank of streams will not be marked for removal.
5. The Marking Officer shall cause one blaze to be cut at the base of the tree marked by him, and another at the Breast Height, and the serial number provided by him to be written on the two blazes legibly. Serial No. will be so codified by the Marking Officer, so that there should be no duplication in the Beat/Range/Division.
6. In case of pole crop where provisions of prescriptions in subpara 5 above cannot be adhered to, due to low girth, it would suffice if the individual trees are banded at BH in a unique color code (valid for the Division).
7. The marking Officer shall cause the girth at the base, GBH, height of the tree (with the help of Ravi Multimeter/Abney's level), length of the tree up to which out-turn would be considered timber (i.e. thin end girth say 50 cm) to be recorded in the marking register.
8. After felling, appropriate hammer and Serial No. as provided by the Marking Officer shall be engraved on the stump and the thick end of the log. The thick end girth, thin end girth, mid girth and total length of the log should be recorded. If there are branches of commercial timber value, the same shall also be sectioned and numbered and measured accordingly. However, the Marking Officer may provide an additional symbol/mark so as to identify it separately.
9. All small wood including branches that have no timber value, would be collected from the forest floor and brought to the Beat Depot, and stacked cubes of sizes specified by the Marking Officer. The stack dimensions will also be recorded.
10. The logs shall be brought to the Depot and sectioned into pieces of commercial sizes as per demand in the market. Each such piece shall bear the serial no. of the parent log in addition to its own number. It shall also bear appropriate hammer of the officer causing sectioning.

11. The logs would be measured again prior to being put up for Sale. The volume of the log would be calculated by Quarter Girth Formula based on this measurement for purposes of Sale. It shall also bear the hammer of the officer recording the final measurement.

**17.2 RIDES & PARALLELS:** Rides need to be cut in Manas RF as proposed by MM Islam. At places bridges and culverts may be required to be put up.

**17.3 INTERNATIONAL BOUNDARY:** Though the present condition of the boundary appears to be satisfactory, due to a clear cut tree line, the boundary pillars are difficult to locate. At certain places, the tree line is diminishing. The boundary pillars are in need of maintenance and replacement.

**17.4 SURVEY & MAPS:** Most of the RFs in the southern part of the Division have improper maps, and boundary pillars have no reference for field verification. Some of the old surveys done for the PRFs appear to faulty. The USF areas are not demarcated at all, either on the ground or on the map. All these areas require resurvey and mapping using GPS, which will be most economical for the Department.

**17.5 CONSTITUTION OF JFMCs:** No encroached village should be allowed to form a JFMC.

**17.6 ALL DIVISIONS TO COLLABORATE:** The three divisions namely Territorial, Social Forestry and the Manikpur Afforestation, need to pool resources in rehabilitation of these tracts. The sub targets and areas could be mutually worked out, depending upon the resource availability.

**17.7 SILVICULTURE & GENETICS:** The State Silviculturist and the Genetics Division should give a serious thought to the disappearance of Sal from these tracts, especially natural regeneration, which has bugged the foresters since early 1900 AD.

They should also try to introduce new technologies such as root trainers, clonal seed orchards, seed stands, tissue culture etc. so as to increase the productivity in the areas of fuel-wood/fodder/ and small timber in order to meet the local demand.

**17.8 MAHALS:** The mahals in the division has been listed out in the Part III of the Plan. The NFWP component of all such Mahals (barring sand, gravel, shingle etc.) should be managed through the local JFM committees, so that the economy at grass root level improves. The present system of auction of such mahals should be discontinued for NFWP.

**17.9 AMENITIES TO THE STAFF:** The terrain and working conditions are very harsh, but the facilities and infrastructure are few and far between. More number of protection force, vehicles, communication sets, computers, GPS and arms are required for better management of the forests. Such items are no more luxury, rather have become a bare necessity.

The quarters of the staff are in dilapidated condition. Maintenance of the offices, residences and IBs is poor to nil. Several of the establishments are under occupation of the Army, CRPF, and the civil authorities, making working of forest staff tough.

## **18 FINANCIAL FORECAST & PERIOD OF PLAN**

- 18.1 FORECAST OF REVENUE:** No forecast of revenue was don, as the Plan is primarily a protection plan, and does not envisage any fellings.
- 18.2 FORECAST OF EXPENDITURE:** The Plan envisages raising of 1100 ha of plantations annually during the period of the Plan. In addition, there is expenditure on clearing of rides and parallels, in addition to other regular works. However, no attempt has been made to forecast expenditure.
- 18.3 PERIOD OF PLAN:** The Plan period would be from 2003-04 to 2011-12 A.D.
- 18.4 REVISION OF PLAN:** There is no exigency felt for mid way revision of the Plan.
- 18.5 CONTROL FORMS:** All the control forms must be filled up annually by the concerned officials and submitted to the Working Plan Office for records and future use.

All such forms should be submitted by the 30<sup>th</sup> of June every year for the preceding financial year to the concerned Conservator of Forests, Chief Conservator of Forests, Conservator (Development) and the Working Plan Officer, Upper Assam Circle, Jorhat or any other Working Plan Office responsible for the territory.

The Control Forms have been designed for use as computer based data base. Some of the Forms are exceedingly long. However, they are flexible in use. Each item in the Form can be identified by the Form No. and Column No. Therefore, these can be broken up into convenient lengths to suit paper size and space, only the Form No. and Column No. must not be altered.

The Control Forms would give a fair idea to the DFO and his sub-ordinate staff as to the action to be taken from their end for execution of the Plan. Accordingly, Control Form No. has also been mentioned against each item of prescription in the Summary of Prescriptions appended just after this Chapter.

- 18.6 COMPARTMENT HISTORIES:** No previous compartment histories were received. However, it is mandatory to maintain the same. It is obligatory duty of the field staff to compile the compartment description form and write the history of each compartment annually giving brief details of inputs, activities, events regarding that compartment. With the advent of computers and entry of GIS in a big way, this particular function of the staff assumes great importance. The compartment history serves as time series database for future planning. The compartment histories are to be submitted to the Working Plan Officer revising the Plan. Therefore, compilation of annual compartment history and description form is made an essential duty of the field staff.
- 18.7 PLANTATION JOURNALS:** Plantation journals giving a map of the plot, brief description of area and terrain, species, source of planting material, source of seeds, nursery from which planting material obtained. Then the details of planting, weedings, controlled burnings should also be provided. Every plantation center should have a proper visitors register as well. The nursery should also similarly have registers.

## I. SUMMARY OF PROPOSALS

### SUMMARY OF PRESCRIPTIONS

Sl. No	Working Circle	Prescriptions	Para No.	Item No.	Sub Item No.	Control Form No.
1	<b>SREDWC</b>					
	<i>Sal Protection &amp; Regeneration Series</i>	Constitution of JFMC	13.7.1	1		1, 6A
		Selection/Demarcation of Sal regeneration sites		2		2
		200 ha annual target		3		3, 3A, 3B
		Artificial regeneration of Sal by direct sowing		4		3, 3A
		Compulsory Weeding in July-August		5		4
		Controlled burning		6		4
		Weeding & Controlled burning in 2 <sup>nd</sup> , 3 <sup>rd</sup> & 4 <sup>th</sup> years		7		4
		5 <sup>th</sup> year silvicultural thinning		8		5A
		5 <sup>th</sup> onward controlled burning till regeneration is established		9		4
		Silvicultural removal, if required		10		5B
		Any removed out-turn to be shared as per rules in force		11		6B
	<i>Eco-Plantation Development Series</i>	Prescription same as 1 of 13.7.1	13.7.2	1		1, 6A
		Same as 2 of 13.7.1. Struggling seedlings to be cut to ground		2		2
		100 Ha annual target		3		3, 3A, 3B
		Teak no to be planted. Choice of species left to the people. People's Nurseries should be encouraged		4		3B
		Direct sowing should be done in thalis. If transplanted from nursery, the planting stock should be at least 9 months old.		5		
		3 weedings in the first year. 2 weedings in subsequent years		6		4
		Controlled burning during winter as prescribed in 6 of 13.7.1		7		4
		Weedings may be reduced to 1 in 3 <sup>rd</sup> year. Controlled burning to continue		8		4
		1 <sup>st</sup> mechanical thinning in 5 <sup>th</sup> year		9		5A
		Usufructs to be shared		10		6B
		In event of agro-forestry models, provisions of 6,7,8 may be modified, subject to approval		11		
2	<b>AWC</b>					

	<i>Sal/General Afforestation Series</i>	Usufructs sharing not permitted, unless specifically prescribed so.	14.7.1	1	
		Plantation to be raised in 100m wide strips of at least 300m length laid in N-S direction. The same, however, may be varied to suit local conditions. The strips would contain 1m seedling strips at 2m interval.		2	3, 3A, 3B
		Hoeing of seed lines in April		3	
		Sowing/Transplantation & planting		4	3
		Compulsory weeding		5	4
		Controlled burning		6	4
		Fire line to be cleared & maintained		7	9
		Mechanical thinning in the 10 <sup>th</sup> year		8	5A
		Silvicultural thinning to be carried out in 15 <sup>th</sup> year		9	5A
		Mechanical thinning to be carried out after thorough inspection		10	
		Silvicultural thinning marking & inspection procedure		11	
		The out-turn of the mechanical & silvicultural thinning may be shared with JFMCs		12	5A & 6B
	<i>Khoir-Sissoo-Simul Afforestation Series</i>	Natural growths of Khoir, Sissoo and Simul to be retained while doing advanced work	14.7.2	1	
		Raising of nurseries & direct planting		2	3, 3A & 3B
		Weeding etc for 3 years		3	4
		Mechanically thinning at 3 <sup>rd</sup> & 5 <sup>th</sup> year, silvicultural thinning at 10 <sup>th</sup> , 20 <sup>th</sup> & 30 <sup>th</sup> year		4	5A
		Thinning & final output of harvest to be shared with JFMCs, if plantation raised with their assistance		5	5A, 5B & 6B
		Plantation to be finally harvested in 30 <sup>th</sup> year		6	5B
	<i>Fuelwood Series</i>	High density fuelwood plantations	14.7.3	1	
		Plantation to be raised through JFMCs		2	8, 3A & 3B
		Multicropping & agro-forestry model may be followed in suitable areas in lieu of high density plantation		3	7, 8
		Sal & teak not to be planted		4	

		Soil work to be done in 30cmX30cmX30cm pits, or in water logging areas, on mounds to ensure water does not stagnate near the collar		5		
		Protection against grazing by social fencing/low cost material		6		
		Three weedings to be carried out		7		4
		Thinning in 4 <sup>th</sup> /5 <sup>th</sup> year and another at 8 <sup>th</sup> /10 <sup>th</sup> year if the target age is more than 10 years		8		5A
		One year before final harvest, the DFO should ensure that planting stock & resources are available for the next planting		9		
		Plantation to be finally harvested in winter season preferably.		10		5B
		The area harvested should be replanted with a different set of species		11		
		Felling rules as prescribed in Miscellaneous prescriptions		12		
3	MBAWC	Area to be protected as Ripu-Chirang Wildlife sanctuary or with other options	15.7	1		
		Certain protection measures to be taken such as described in sub sections below.		2		
		Laying of rides as per Islam's Plan (see para 10.5.2 of Part I of this Plan			1	9
		Provision of adequate arms			2	9
		Aie, Langkhar and Sukanteklai blocks should be reforested. Minimum 1/3 area to be recovered			3	
		The southern boundary road of Manas Rf to be maintained at any cost			4	
		Patrolling in Manas RF to be intensified			5	
		Infrastructure at Kuklung to be intensified and built for effective patrolling			6	
		Regulated burning should be practiced, as is wont in the Manas Tiger Reserve, to keep/conserv e the ecology of the grasslands in the Manas RF.			7	
		Eco-development work to be carried out in villages south of Manas RF		3		6A
		Annual forest cover watch using satellite images		4		
		A separate wildlife management plan should be prepared		5		
		Documentation of floral & faunal diversity		6		
		Secondary silvicultural operations allowed, subject to once in a 4 year in a block		7		5B
		All removals as above to follow Miscellaneous prescriptions		8		
		Certain trees which provide nesting etc not to be felled		9		
		Habitat mapping of the area		10		
4	NWFPOWC	All exploitation of NWFP to take place through		1		7

		JFMCs				
		To provide market linkages			2	
		Overexploitation of resources to be checked			3	
		Total exploitation of each produce to be properly recorded			4	5B
		Intercropping may be practiced in plantations			5	7
5	<b>Miscellaneous prescriptions</b>	Deadwood & windfallen trees to be removed in a 4 year cycle from a block	17.1			5B
		Petty Felling from RF/PRF to meet Departmental exigencies/works, subject to approval by Conservtor, and upto a maximum ceiling of 5 Cu.M. from RF, 10 Cu. M. from PRF & 20 Cu. M. from USF areas in a year	17.1.1			5B
		Marking Rule	17.2			
		All trees to be felled as per Plan must be marked			1	10
		Marking not to create a permanent vacancy or large gap in canopy			2	
		No mother trees, sample plots, seed orchard to be marked			3	
		Trees standing on steep slopes, bank of streams etc not to be marked			4	
		Unique Marking Serial to be put on the marked trees			5	
		Color coded banding at BH for pole crop			6	
		Certain measurements to be recorded by marking officer			7	
		After felling certain measurements to be recorded. Branches of commercial value to be retained as logs, but to be identified separately			8	11
		Smallwood & branches to be brought to Depot & stacked			9	
		All felled logs to be brought to Depot and sectioned into pieces of commercial sizes. The officer causing sectioning to affix his mark on the logs			19	12
		Rides to be laid in Manas RF as per MM Islam's Plan, as described in para 10.5.2 in Part I of the Plan	17.3			9
		International boundary to be maintained	17.4			9
		Survey & Maps	17.5			9
		No encroachment villages should be allowed into JFMCs	17.6			
		All the three Divisions to put concerted effort	17.7			
		Silviculture & Genetics	17.8			
		All Mahals to be managed by JFMCs	17.9			
		Mahals	17.10			
		Amenities to Staff	17.11			9

## II. CONTROL FORMS

**III. TABLES**

**IV. MAPS**