

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 Kachugaon Forest Division under the Western Assam Circle Conservancy. The territorial division is spread over parts of present Kokrajhar and Dhubri districts, on the northern bank of river Brahmaputra. The area dealt with falls between $26^{\circ} 19' 33.24''$ N to $26^{\circ} 51' 54.36''$ N latitude and $89^{\circ} 51' 18.70''$ E to $90^{\circ} 16' 20.64''$ E longitude. The total geographical area of the division is 1393 sq km. The division is bounded on the west by the interstate boundary with West Bengal, on the north by an international boundary with Bhutan, on the east by the river Saralbhanga, which is also the western boundary of Haltugaon Division. On the south it is bounded by Dhubri Division. The southern boundary can be illustrated as follows:- It starts from where the eastern boundary touches the NF Railway line on the Saralbhanga river. From thence, it runs westward along the railway line till Fakiragram Junction. From thence, the boundary runs along the railway line to Dhubri till it meets the Sapatgram Gosaigaon Road. Thereafter, it runs northward along the said road till it meets the NF railway mainline to Alipur Duar. Thereafter, it runs westward along the rail track till it meets the interstate boundary with West Bengal. Plate No. 1 depicts the broad geographical, administrative and political outline of the division. Table No.1 shows the key statistics of Kokrajhar & Dhubri districts.

The HQ of the division is at Gossaigaon which is the most important town and is the HQ of the civil Sub Division, Gossaigaon, under Kokrajhar district. The forest division, however, itself derives its name from a place called Kachugaon, which was a hub of forestry activity in the pre violence days a decade ago, but today has lost most of its charm. Kachugaon was a busy forest citadel, with a wonderful forest IB, Depot and a number staff quarters. It was also the HQ of the legendary tram of the Department. In the past, Kochugaon was manned by an ACF whose designated official residence was known as "Lal Bungalow", now in ruins. Most of the forest complex, which otherwise had a high heritage value, has become camping ground of refugees during several waves of violence in the last decade. Though the division of Kachugaon was created in 1934, it functioned from Dhubri until the administrative reorganization of 1968 when the HQ was brought to Gossaigaon. Kachugaon like other places of import in the district have grown around the nucleus of forest complexes established in the pre-independence era.

The other important places are Fakiragram, Sapatgram, Serfanguri, Saraibil and Srirampur. Fakiragram is the main railway junction in the Division. It was also linked to the tramway. Sapatgram and Gossaigaon are also railway stations. Fakiragram, Sapatgram and Gossaigaon are linked together by the main BG line of the NF railway, and thus, form the main entry/exit points by rail. Serfanguri, Kachugaon, Gossaigaon and Srirampur are touched by the National Highway 31C. Srirampur is the border gateway for all vehicular traffic in the state, and holds strategic point for transport of forest produce as well. The Sales Tax Department, Govt. of Assam has recently put up a dedicated VSAT at Srirampur to monitor inflow/outflow of vehicles in the state. Saraibil is a sleepy hamlet strategically linked to the various forest areas such as Raimona, Kachugaon and Sapkata. Saraibil, earlier was the junction point where three to five roads converged.

Another very important feature of the Division which did not exist anywhere else in Assam, and probably no where else in the country (except Gorakhpur), was the forest Tramway

from Fakiragram to Hel block via Kachugaon. The main station was at Kachugaon. The tram had a track length of approximately 50 km. The main purpose was to carry men, materials and water to the upper tract of the forest. The violence in the last decade ensured that the tramway was vandalized in totality.

- 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 280 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 largely plain.

The major rivers and streams are Sankosh, Janali, Ranga, Ripu, Polo, Hel and Saralbhanga. The Sankosh and the Saralbhanga form the western and eastern boundary of the division. 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 Ripu reserve falls in the Sub-Himalayan tract under bhabar formation. There is gentle slope from north to south. The altitude is highest in the northern side along the foot hills of Bhutan. Rest of the terrain has gentle slope.

- 1.4. 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.

- 1.5. DISTRIBUTION & AREA:** The area dealt with in the plan comprises of the reserved forests and proposed RFs areas falling within the Kachugaon Forest Division. The name of the reserves along with other details is given in Table No. 2.

- 1.6. MAPS:** The Ripu RF is the only forest area with reliable maps on 4" = 1 Mile. Rest of the areas that were constituted much later, do not have any reliable map. However, Survey of India topographic sheets (No. 78F/14, 15, J/1, 2, 3, 7) 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. Ripu and Kachugaon RF are the only two RFs that appear on the map. Rest of the areas were

brought under reservation process in post 1960 period, and do not have appropriate boundary descriptions (including a well defined reference point) and map.

- 1.7. **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.
- 1.8. **LEGAL POSITION:** The Ripu RF is the oldest reserve constituted notification No. 7607 of 22nd September, 1893, and Kachugaon RF vide notification No. 4472R of 31st October, 1902 under the Assam Forest Regulation of 1891. The Elachijhar RF was notified in 1984. The proposal for Magurmari is pending final 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.
- 1.9. **RIGHTS & CONCESSIONS:** The rights and concessions are 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 Kachugaon are now left in few patches to be seen today. Good Sal patches can be seen between Ride IV to Ride VI in the Central and Sanfan Ranges, which are the best surviving stands. Regeneration of Sal is excellent in Magurmari PRF. The coppices in Elachijhar RF are in struggling stage. 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
 - 🌲 Bamba Sal
 - 🌲 Terai Sal Forest
 - 🌲 Eastern Heavy Alluvial Plain 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/CI b(i)) and East Himalayan Lower Bhabar Sal (E3 C/CI b(ii)).

This type occurs upto 15 km southwards from the foothills in the Ripu RF. This sub type is bounded by the Janali on the west and the Hel in the east upto Ride 2. It is difficult to distinguish between the Upper and Lower Sal sub types. Generally speaking, the Upper sub type occurred on alluvial well drained soil with deep boulders on the upper reaches of the Ripu RF. It is characterized by presence of dense sau grass (*Microstegium ciliatum*). The Lower Sal sub type occurs in the lower region of the Ripu RF in damper localities with less evidence of sau grass. The Sal quality in these sub-types is All India II to I/II.

The occurrence of Sal decreases as one approaches the foot of the hills. The chief reason is highly xerophytic nature of the terrain.

The relative occurrence of the Associates is in the ratio 100:3 or lower. The associates are *Dillenia scabrella* (Aksi), *Schima wallichii* (Ghogra), *Sterculia villosa* (Udal), *Stereospermum chelonoides* (Paroli), *Lagerstroemia parviflora* (Sida), *Lanea grandis* (Jia), *Terminalia belerica* (Bahera), *Gmelina arborea* (Gamari), *Vitex peduncularis* (Ahoi), *Amoora wallichii* (Amaari). Some of the associates which occur in the ratio 100:0.1 or below are *Albizia lebbek* (Siris), *Albizia procera* (Koroi), *Bauhinia* spp, *Alstonia scholaris*, *Cedrela toona*, *Tetrameles nudiflora*, *Bridelia retusa*, *Amoora rohituka*, *Eugenia* spp, *Terminalia chebula*, *Castanopsis* spp, *Garuga pinnata*, *Wrightia tomentosa*, *Caryea arborea* etc.

The middle story is very thin, and has the dominance of the following:- *Premna bengalensis*, *Premna latifolia*, *Wrightia tomentosa*, *Caryea arborea*, *Dillenia scabrella*,

Bridelia retusa. The ground cover is sau grass which yields to thatch wherever the canopy is thin, and the incidence of burning prolonged and heavy. *Eupatorium* comes up in plantations. Other flora are *Coffea bengalensis*, *Clerodendron infortunatum*, *Leea* spp, *Flamingia* spp. etc.

Climbers are found in good numbers. Chief among them are *Acacia pennata*, *Spatholobus roxburghii*, *Millettia auriculata*, *Vitis latifolia* etc.

It has been observed by Rajkhowa that all the advance growth mostly lie between rides 4 and 5, which also forms the tension belt between true bhabar and true terai zones. *Sal* seedlings were found in plenty in thatch grass areas, which have been coming year after year despite burning repeatedly. These seedling get established wherever fire protection is enforced by weeding and burning the cut grass under control away from the seedling.

2.1.2. **Bamba Sal Forest:** This type has been sub classified by Champion & Seth as E3 C/C b(i)IV.

This sub type represents optimum growing conditions for *Sal*. A well drained, gently undulating, greater proportion of fine loam, greater soil depth and less surface stones represents Bamba as the ideal ground for *Sal*.

This sub type of *Sal* has been characterized by the presence of fire tender evergreen species of associates. The terrain is well drained, gently undulating, has greater soil depth and less surface stones. The *Sal* occurring in this sub type was supposed to be excellent in height and girth, but the stocking was poor due to admixture of miscellaneous species of both mixed deciduous and evergreen type.

The relative occurrence of associates is in the ration 100:7.22 or lower. The principal associate are *Stereospermum chelanoides* (Paroli), *Schima wallichii* (Ghogra), *Terminalia belerica* (Bohera), *Dillenia scabrella* (Aksi), *Lagerstoemia parviflora* (Sida), *Gmelina arborea* (gamari), *Lannea grandis* (Jia), *Garuga pinnata* (Thutmola), *Amoora wallichii* (Amari), *Sterculia villosa* (Odal), *Premna latifolia* (Sil Gomari), *Simul*, *Eugenia*, *Vitex peduncularis* (Ahoi), *Amoora rohituka*, *Cedrela toona* (Poma), *Litsaea polyantha* (Sam), *Albizzia lebbek*, *Phoebe goalparensis*. Some of the associates that occur in the ratio 100:0.5 or below are *Bauhinia* spp, *Mallotus philipansis*, *Careya arborea*, *Tetrameles nudiflora*, *Hymenodictyon excelsum* (Pani kadam), *Michelia champaka*, *Bridelia retusa*, *Cinnamomum cecicodaphne*, *Polyalthia jenkinsii*, *Alstonia scholaris* etc.

The middle storey consists of *Premna latifolia*, *Mallotus philipansis*, *Wrightia tomentosa*, *Hollarrhena antidysenterica*, *Bridelia retusa*, *Amoora wallichii*, *Albizza* spp etc. The common climbers are *Vitis latifolia*, *Millettia auriculata*, *Dalbergia stipulata*.

The ground is mostly covered by sau grass with local associates of *Coffea bengalensis*, *Clerodendron Infortunatum*, *Litsea* spp, *Tabernmontana coronaria*. The regeneration areas get invaded by *Eupatorium* spp. Colonies of *Urena lobata* also occur.

There is no natural regeneration of *Sal* in Bamba.

- 2.1.3. **Terai Sal Forest:** This type has been classified as E 3C/C1c. This type occurred in a narrow belt south of the bhabar areas. It is sad to note that such virgin tracts now lay occupied by encroachers and are dotted with numerous relief camps housing thousands of victims of ethnic clashes.

In terai, water table is high and there is greater clay content in the soil. Due to high water table, drainage is poor. So, overall growth of Sal is poor. However, on high river banks in well drained area, the growth is comparable to that of Bhabar. In low lying areas where water table is high and drainage is poor, inhibited growth of Sal is reflected in reduced height, stag-headedness and high occurrence of epicormic branches.

The relative occurrence of associates is in the ratio 100: 4.08 or lower. Some of the associates are *Schima wallichii*, *Sterospermum chelonoides*, *Dillenia pentagyna*, *Terminalia belerica*, *lagerstroemia parviflora*, *Lannea grandis*, *Eugenia* spp. The associates which occur in the ratio 100:0.4 or lower are *Vitex peduncularis*, *Premna* spp, *Cedrela toona*, *Albizia procera*, *Simul*, *Gmelina arborea*, *Litsea polyantha*, *Phoebe goalparensis*, *Bridelia retusa*, *Amoora wallichii*.

The middle storey consists of *Terpinia perrifora*, *Talauma hodsonii*, *Machilus villosa* etc. The ground storey consists of *Morinda angustifolia*, *Leea sambucina*, *Alpinia allughus*, *Pollinia ciliata*, *Eupatorium* spp. The latter occurs in open spaces. Cane and ferns also occur in few places.

- 2.1.4 **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.

- 2.1.5 **Eastern Heavy Alluvial Plain Sal Forest:** This type has been classified as 3C/C2d(ii) by Champion & Seth. All the Sal patches falling in the Magurmari & Elachijhar areas come under this category. 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, except parts of Magurmari where growth has been excellent due to good protection provided to the crop.

Since all the crop is Sal today, the description below is purely of academic nature.

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-cenopy, and where-ever it occurs it is composed of mostly young saplings of Sal, Behera 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 seedling 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 colonizer in open grass-lands, river-flats and islands etc. He reckoned that the associates of Sal came in later in such areas.

- 2.1.6. **Moist Deciduous Forest:** This is Northern secondary moist deciduous forest typified as 3C/C3 2 SI. This formation is found in between Sal areas, between Sal and grassland, between Sal and Evergreen or riverain forest types. The species composition is same as that of the associates of Sal in the Sal bearing vicinity. Jacob considers it as transitional stage between riverain and Sal forests. Its succession is arrested at pre-climax stage due to local variations of soil such as its drainage and moisture retention capacity.

The principal species are fire resistant. Some of the important species are *Schima wallichii*, *Michelia* spp, *Albizia*, *Cedrela toona*, *Dillenia pentagyna*, *Bombax ceiba* etc. The middle storey is made up of the saplings of these species along with *Wrightia*, *Emblica*, *Bridelia* etc.

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

- 2.1.7. **Evergreen Forest:** This is the Wet Evergreen formation of the type 1B/C. RC Goswami calls it Semi Evergreen formation of type 2B/C1/ISI. It is found confined to the North eastern part of the Ripu RF in Bamba and Singimajuli blocks. It represents the climax vegetation of the locality. Three different sub types have been noted by Rajkhowa. These are Jam Bhelu Som Sub type (2B/C1/ISI(b), Sopa Sub type (2B/C1/ISI(c) and the Bonsum Sub type (~ to 2B/C1/ISI(b) & (2B/C1/ISI(c)). The Bonsum sub type is the true climax type occupying the upper regions of the reserve. Jam Bhelu Som sub type is transition from deciduous to evergreen type, characterized by deciduous trees in top canopy and evergreen trees in the lower canopy. Sopa sub type is the intermediate type.

Bonsum Sub Type: There is emergent top canopy composed of scattered trees of *Michelia champaka*, *Tetrameles nudiflora*, *Ailanthus grandis*, *Acrocarpus fraxcinifolius*, *Phoebe attenuata* with *Bombax ceiba*. Below this layer comes the top canopy proper which is closed. This is occupied by *Phoebe goalparensis* and *Mesua ferrea* mixed with species such as *Amoora wallichii*, *Sterculia alata*, *Cinnamomum cecicodaphne*, *Schima wallichii*, *Gmelina arborea*, *Terminalia belerica*, *Duabanga sonneratoides*, *Sterculia villosa* etc.

The third storey is composed of *Nyssa sessilifolia*, *Machilus bambycina*, *Amoora rohituka*, *Premna bengalensis* etc. The characteristic undergrowth is *Morinda tinctoria*, *Leea* spp, *Adhatoda vasica*, *Phlogocanthus thrysiflorus* etc. The ground cover consists of *Coffea bengalensis* and other evergreen shrubs.

Sopa Sub Type: This occupies high ground to the north of the Bonsum sub type. The canopy formation is not well demarcated as in Bonsum sub type. Top canopy emergents like *Tetrameles nudiflora*, *Acrocarpus fraxinifolius*, *Ailanthus grandis*, *Terminalia myriocarpa* etc. stand out in an open and undulating canopy of *Phoebe goalparensis*, *Amoora wallichii*, *Sterospermum chelonoides*, *Phoebe attenuata*, *Schima wallichii*, *Michelia champaka*, *Sterculia alata* etc.

Jam Bhelu Som Sub Type: This type is a transition from deciduous to evergreen. *Tetrameles nudiflora* is the pre dominant species. Its associates are *Syzygium cuminii*, *Machilus bombycina*, *Amoora wallichii*, *Albizia lebbek*, *Chukrasia velutina*, *Pterospermum acerifolium*, *Cedrela toona*, *Phoebe goalparensis* etc.

2.1.8 Savannah: This type occurs in Ripu RF. Broadly it can be divided in two categories- namely Dry and wet. These are described briefly below:-

Dry Savannah: This type occurs in well drained high lands, and is a transitional stage. Due to intense fire that annually sweeps through this area, it is not able to progress to the next successional stage i.e. the mixed deciduous formation. The principal grasses are *Saccharum arundanaceum* and *Imperata arundinaceae*. Along with *Sal* some other fire hardy species such as *Dillenia pentagyna*, *Kum*, *Bhelu*, *Amlokhi*, *Dudhi* etc. come up. However, due to annual fire, their growth is stunted.

Wet Savannah: This is a tall grass savannah occurring in badly drained low lying areas, and in stable riverain flats which tend to flood during the rains, but dry out in the winters. The soil is alluvial, mostly sandy with a thin layer of loam and a high content of humus. The main tree species are *Bombax ceiba*, *Albizia procera*, *Careya arborea*, *Bischofia javanica*, *Dillenia pentagyna*, *Grewia sepida* and *Premna herbaceae*. The principal grasses are *Sacchurum procerum*, *Sacchurum spontanum*, *Phragmites karka*, *Andropogan assimiles* etc.

2.1.9 Riverain: Two types of formations have been distinguished in the Ripu RF. They are the Khoir & Sissoo forests, and the Riverain deciduous forests.

Khoir & Sissoo Forests: This type, characteristic colonizer species, occurs on riverain 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. This formation is found along the Sankosh, the Hel, the Singi and the Saralbhanga rivers. In the Athiabari block, fair formation of Khoir occurs. Sissoo occurs mostly on the banks of the Sankosh river, and between the Hel & the Saralbhanga rivers.

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. In general, the principal associates are *Bombax ceiba*, *Bridelia retusa*, *Sterculia villosa*, *Dillenia pentagyna*, *Careya arborea*.

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

Riverain Deciduous Forest: This type occurs on the banks of the Sankosh river, and other streams. The principal species are *Albizzia procera*, *Trewia nudiflora*, *Cedrela toona*, *Bombax ceiba* and *Sterculia villosa*.

- 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 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 the 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 Fakiragram, Sapatgram, Gossaigaon and Srirampur. The rail cum road bridge at Jogighopa (in Bongaigaon district/division) has linked the entire region to Goalpara and Meghalaya on the southern bank of the Brahmaputra river. There are several roads, including the NH 31C criss-crossing the division.

From the forests on the north, there are three major roads i.e. Sanfan road, Kachugaon-Hajiraguri-Pekua Central path and Ride No.1, all of which culminate at Kachugaon. These are further connected to other forest roads and rides, but all of them require maintenance/bridges/culverts, especially near the forest areas. The communication map of the Division is shown in Plate No. 3.

- 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 so created 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 has got four territorial ranges, three Forest Depots and three overlapping ranges. The four territorial ranges are Eastern Range, Athiabari (now functioning from Serfanguri), Sanfan Range with HQ at Kachugaon, Central Range with HQ at Kachugaon, and Western Range with HQ at Raimona.

The three Forest Depots are headed by Forest Range Officers. They have independent territorial jurisdiction as well. These Depots are Fakiragram Forest Depot, Fakiragram, Sapatgram Forest Depot, Sapatgram, and Gossaigaon Forest Depot, Gossaigaon.

The three overlapping range jurisdictions are Logging Range with HQ at Kachugaon, Tramway Range with HQ at Kachugaon, and Consolidation cum Protection Range with HQ at Gossaigaon. However, as reported by the DFO, the Logging and the Tramway ranges do not have any jurisdiction. Srirampur was upgraded as a checkgate range.

The Beats and Sub beats are given below:-

Sl. No	Range	Beat	Sub-Beat	Remarks
1	Eastern	Bamba 13		
		Ride 5	Ride 2	
		Ride 10		
		Kolobari (Serfanguri)		
2	Sanfan	Phipsu		
		Ride 8		
		Ride 5		
		Janagaon		
		Islampur		
3	Central	Pekua		
		Jakati		
		Nayanagar		
		Ride 5		
4	Western	Jamduar		
		Jamduar		
		Dodikhola		
		Sapkata		
		Haziraguri		
		Sankosh	Jirampur	
			Phulkumari	
5	Gossaigaon Depot	Gossaigaon		
6	Saptgram Depot	Sapatgram		
7	Fakiragram Depot	Magurmari		
8	Srirampur Check gate			
9	Consolidation Range			
10	Logging Range			
11	Tramway Range			

- 4.4. STAFF STRENGTH:** Total number of personnel under harness are 306. A brief summary is given below:-

Sl No.	Category of Post	Existing Strength
1	DFO	1
2	ACF	3
3	FR	14
4	Deputy Ranger	11
5	Fr I	43
6	Fr II	17
7	Forest Guard	117
8	HA	1
9	UDA/LDA	18
10	Driver/Handyman	6
11	Draftsman	1
12	Surveyor/Chainman	1
13	Line Khalasi	38
14	Train Guard	1
15	Peon/Chowkidar	32
16	Sweeper	2

There are only 9 vacancies only. For details of staff position, and their pay & emoluments see Table No. 5 – 7.

A very few of the staff are trained in the Division. There are 12 Fr I and 31 Fgd. Having done training at Forest School, Jalukbari and Forest Guard School, Makum respectively.

- 4.5. AMENITIES TO STAFF:** Though a very old division, the infrastructure is very poor or totally damaged. There is no proper drinking water supply facilities. At few places only hand pumps or ring well were seen.

Barring Divisional HQ, other offices have 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. However, they are given uniform allowance.

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

Only 45 no of staff are occupying residential quarters. Due to disturbance, residential quarters outside the Div HQ are mostly abandoned.

- 4.6. PLANTATION WORKS:** Few plantation works seem to have been carried out in this Division. The two main schemes are Sal regeneration and Matchwood. No detailed list was provided, however an abstract can be seen in Part III of the Plan at Table No. 8.

CHAPTER 5

5. SOCIAL FORESTRY

- 5.1. 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.
- 5.2. ADMINISTRATIVE SETUP:** The division has 3 ranges, namely Gosaigaon, Fakiragram, and Basugaon. There are two Account Beats namely Kokrajhar and Sapkata.
- 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 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 Simultapu (Sapkata). Each nursery has a capacity of 1 lakh seedlings. However, for past few years due to non availability of funds only the nurseries under TSP scheme are being maintained. The Division has an annual target of distribution of 2 lakh seedlings annually to the public, NGOs, other Government departments.

- 5.4. 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.
- 5.5. 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.
- 5.6. TABULAR DETAILS:** No details were provided by the Division when asked for.

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.
- 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 Chakrasila is rich. There are estimated 200 Golden langurs, 4 Royal Bengal tigers, 15 Leopards, 40 Bison. In addition, there are Hog deer, Barking deer, Binturang, Flying squirrel, Chinese pangolin and a variety of avifauna.

In the Bahalpur-Nayakgaon area, there are about 7 troops of Golden langurs, totaling 85. Their major food source is the adjoining rubber plantations.

In the Chirang RF, 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. 24.

- 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.
- 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 ably 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 18 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. 15 to 18.

CHAPTER 8

8. PUBLIC POLICY & INSTITUTIONS

- 8.1. INTRODUCTION:** A set of distinct centres of governance were evolved under the 6th 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 20th 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 of which a brief description has been included in the earlier chapters. One is the Bodoland Autonomous Council (BAC) and the Rabha Hajong Autonomous Council (RHAC). Since the latter 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 6th Schedule entity. If it happens, BTC would be the first 6th 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 73rd and 74th 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 73rd 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 20th 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, and the District Development Officer and the district level officers of Agriculture, Rural Development, Fishery, Veterinary, and other line departments will also be represented as members. 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. 31.

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 has not been any reported diversion.

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
1997-98	3	-	5,000.00	-
1998-99	2	-	10,000.00	-

Details on seizure of logs and offence reports is appearing in Part III. See table No. 9 & 10.

As regards encroachment and setting up of relief camps, a local NGO called Chiknajhar Central Land and Forest Protection Committee, Ramphalbil 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 have been noticed. Details, however, 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 provided. The AFPF 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 AFPF 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 AFPF 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 AFPF.

9.6 FOREST MAHALS: The existing forest mahals have been shown in Table No. 11.

CHAPTER 10

10. PAST SYSTEM OF MANAGEMENT

10.1. GENERAL HISTORY: The forest areas pertaining to the present Kachugaon 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.

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 tree 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 mix Sal areas having less than 235 trees of 1½' girth per acre. The classification, however, was based on ocular estimates. He created 15 blocks, of which the 1st 14 are of relevance to the present working plan:-

- | | | | |
|-----------|---------------|----------------|----------------|
| 1. Maula | 2. Janali | 3. Ranga | 4. Ripu |
| 5. Pekua | 6. Pechadabri | 7. Maktaigaon | 8. Gangia |
| 9. Polo | 10. Hel | 11. Charaideka | 12. Singimajli |
| 13. Bamba | 14. Atiabari | 15. Guma | |

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.

As per Perree, who visited the forests for his plan, he found satisfactory regeneration in Bamba, Singimajli, and Polo. Regeneration was found to be deficient in Hel. In Gangia satisfactory regeneration is recorded, except for one compartment. In Pekua, regeneration was found poor everywhere. Similar was the case with Ripu Block. Ranga and Janali had similar conditions of regeneration. Regeneration was found to be satisfactory in western part of Maula, and over high Sal forest areas of Pechadabri and Charaideka blocks.

- 10.5 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 2nd class tree to pass to class I.

Perree's other major contribution after the rides and parallels was the prescription of the Experimental Sub Circle to study the regeneration of Sal. It was located in Ranga & Ripu blocks. The prescriptions under this were discontinued after few years. Jacob laments upon it as being one of the greatest blunders of the executive field staff.

- 10.5.1 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 (under Kochugaon Division) and Chirang (under Haltugaon Division) reserves were introduced by Perree. This stands as one of his greatest contribution to the management of these forests. The details of rides and parallels is shown in Table No. 25

- 10.5.2 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 lumsung, 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.

According to Bor, who visited the forests for his Plan, the exploitation near the tramway was very high. Whereas trees though marked according to Plan elsewhere, did not get sold. Though overfelling took place in accessible areas, overall there was heavy underfelling and accumulation of annual increment in excess of planned removal. Moreover, fire protection

measures were taken as a result of which soil conditions were altered in favour of evergreen vegetation.

Thus, it could be visualized that in more inaccessible areas such as Bamba and Pekua, there was considerable underfelling resulting in consequent increase in canopy cover. Fire protection measures coupled with underfelling resulted in formation of vigorous evergreen undergrowth. Fire protection measures resulted in introduction of evergreen undergrowth even in more accessible areas such as Pechadabri and Charaideka. These factors went against Sal regeneration. Subsequent abandoning of fire protection did not help, as it became difficult to lead the fire to Sal stands. Therefore, there was considerable loss of regeneration.

- 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. comprising the Sal areas of the Ripu RF. The bhabar Sal forests of the inaccessible areas of Pechadabri West, Pekua, Ranga, Ripu, Janali, Maktaigaon and Maula were allotted to improvement felling where felling of evergreen was permitted.

The more accessible areas of Bamba, Atiabari, Hel, Polo, Gangia and Singimajli were allotted to Conversion WC with a shelterwood compartment system with 100 years of rotation. Terai WC prescribed rest for heavily felled areas.

According to Jacob, the scenario did not improve at all after Bor's prescription. At places, it made the things worse either for wrongly allotting areas to PB I where there was deficiency of advanced growth or not following up of the prescriptions by the executive field staff.

- 10.8 M.C. Jacob's Plan (1939-40 to 1948-49):** Jacob, in all, had prescribed 8 working circles. These are briefly described below:-

Bhabar Sal Conversion WC: All the Sal forests in the Bhabar tract which, in the opinion of the author, were capable of being managed intensively were constituted into this WC. The forests were topographically and vegetationally belonging to one type. Areas allotted were parts of Bamba (6, 7, 10B, 11), Pekua (5AB, 6AB), Hel (5AB, 6A, 7AB, 8AB, 9AB, 10A, 11A, 3,4, 9C), Polo (7B, 6A, 7A, 8A, 11A, 3-5, 6D, 9), Ranga (1, 2B), Janali (3B, 4B). The silvicultural system adopted for conversion of these forests into regular crop was uniform system. The method of treatment was assisted natural regeneration under uniform shelterwood. Rotation was fixed at 150 years with object of producing 6' crop. The areas were divided into 5 PBs of 30 years period.

Sal Conversion WC: The forest areas of this WC comprised of the major portion of the Terai Sal formations and fell into Gangia, Janali, Pechadabri and Kochugaon blocks. The silvicultural system adopted was conversion to uniform. The method of regeneration was assisted natural regeneration under shelterwood. 150 years of rotation was fixed. 5 PBs of 30 years were devised.

Bhabar Sal Clearfelling WC: The chief object of this WC was to obtain compact patches of Sal. Two felling series were constituted. Under the Sal felling series, the following compartments were allotted- Hel (5C, 6C, 7C, 8C, 9C), Polo (6C, 7C, 8C). In the Teak felling series, the following compartment were allotted:- Bamba (1-5, 8, 10A, 12). The rotation in the Sal felling series was fixed at 100 years. A rotation of 80 years was fixed for Teak series.

Terai Clear Felling Series: The main object of constitution of this WC was, as owing to the successful fire protection for a long period, conversion of areas into evergreen tract and that it would take long time to induce conditions for natural regeneration of Sal, therefore, to

regenerate these areas artificially. The area allotted was Charaideka block (whole) of Ripu RF and areas now falling in Dhubri Division. Rotation was fixed at 100 years.

Sal Improvement WC: The less accessible areas were allotted to this WC. The blocks & compartments allotted were Singimajli (1-6), Bamba (13A), Atiabari, pechadabri South B, Pekua (1-4, 5C, 6C, 7), Maula (1A, 3, 4, 5A), Janali (1A, 2, 3A, 4A, 5), Ranga (2A, 3, 5, 7), Ripu (1-8), Hel (1A, 11A, 3-5), Maktaigaon, and areas of Kachugaon RF. The silvicultural system adopted was improvement felling. Rotation of 150 years was fixed. Yield was regulated by area.

Khoir WC: To this WC were allotted the best stock of Khoir in the Atiabari block and scattered area along the Sankosh, Pekua, Ranga & Polo rivers. The silvicultural system was selection and compensatory plantation. For every 30 stems of Khoir exploited, 1 acre of plantation of Sissoo was recommended. 1'DBH was fixed for exploitation.

Miscellaneous WC: To this WC were allotted areas not allotted to other WCs. The forest vegetation varied from low savannah to evergreen. Extensive tracts of high land savannah occur in Janali, Maula, Maktaigaon and Atiabari blocks. Low level savannah occur in Gangia block. Cane was found common in Charaideka and Pechadabri blocks. The silvicultural system adopted was to exploit trees with minimum girth prescription.

10.9 Jacob's Interim Scheme (1946-1957): There was heavy windfall in the terai Sal areas soon after the introduction of Jacob's plan. To conserve yield and to compensate for the heavy wind fall that had taken place, Jacob's plan was suspended in 1946-47. An interim plan was drawn up by Jacob to cover the period 1946-1951. In the interim scheme all sal bearing areas were included in a conversion working circle. According to Rajkhowa, though the yield was removed, but the progress of regeneration lagged behind.

10.10 Rajkhowa's Plan (1958-59 to 1972-73): His plan pertained to the erstwhile Goalpara West Division. He classified the forests into the following types:- Sal forests (Bhabar, Bamba and Terai), High level Evergreen forests, Miscellaneous Deciduous forests, savannah forests (Dry and Wet) and Riparian forests (Khoir- Sissoo and Miscellaneous Riveraine). He prescribed five WCs which are described briefly below:-

Bhabar Sal Conversion WC: The areas included in this WC belonged to the Sal of Champion's type D2 including D2a. The composition was found to contain excess of old age classes and deficient in young crop. Natural regeneration was found mainly in open grass patches. The chief aim was to provide steady yield of large size timber and to obtain Sal regeneration by natural means. The area allotted was Bamba(5, 6B, 7,8), Hel 9B, Polo (9, 5B, 6B), Gangia 5, Pekua 7, Ranga 4, Janali 3,4, Maula 4 in Regeneration block , Hel (5A, 8B, 9A, 10A, 10B, 11a), Polo (6A, 7A, 8A, 9B, 10A, 11A), Gangia 4A in the Young block, and Bamba (1, 2, 3B, 4B, 10A, 10B, 11, 12, 13A-C), Atiabari (1B, 2, 4B), Singimajuli (1-6), Hel (4, 5B, 7B, 8C, 10C, 11B), Polo (6C, 7B, 7C, 8B, 9A, 9C, 10B, 11B), Gangia (3, 4b), Pekua (1-4, 5A, 6), Ripu (3-8), Ranga (3-7), Janali (2, 5), Maula (1C, 3, 5B, 6,7) and Kochugaon B in Unallotted block. Enumeration showed on average (of 4" DBH and above) 19 in Regeneration block, 17 in Unallotted block and 32 in Young block, against yield table number of stem per acre of I/II site class Sal of 36 stems. The silvicultural system chosen was alternate strip system under regeneration block.

The compartments in the Regeneration block were divided into a number of strips 3 chain wide, running north-south and alternate strips were clearfelled and regenerated from seeds blown to the clear strips from the Sal in the unfilled strips. [This monumental feature created by Rajkhowa has still its imprint in Ripu RF. Satellite images clearly show regularly spaced alternate strips. More details can be had from the original plan document of Rajkhowa]. Rotation was fixed at 150 years. The WC was divided into PBs. The yield was by area.

Sal Shelterwood WC: The area allotted to this WC belong to the Bhabar and Terai sal, and mostly fall in the transition zone. The stocking in most part was found to be depleted. The aim was to have normal age classes and normal yield in due course. The area allotted were Bamba 9A, Hel (5C, 6C) and Pekua 5C in Regeneration block, Bamba (3A, 4A, 6A, 9B), Atiabari (1A, 4A), Hel (1A, 2A, 3A, 5D, 6A, 7A, 8A, 9C), Polo (1A, 2A, 5A, 6D, 8C), Gangia (1A, 4C), Charaideka (1A, 2A), Pekua 5B, Ranga (1A, 2A), Janali 1A, Maula (1A, 1B, 5A), Maktaigaon A, Pechabri West A and Kochugaon A in the Young block, and Hel (1B, 2B, 3B, 6B), Polo (1B, 2B, 3), Gangia (1B, 2B), Charaideka (1B, 2B), Ripu (1,2), Ranga (1b, 2B), Janali 1B, Maktaigaon B, Pechadabri B, Pechadabri South A & B in Unallotted block. The silvicultural system adopted was shelterwood system with floating PB method of yield regulation and assisted natural regeneration. Rotation was fixed at 150 years. In the young block yield was prescribed by area, where D grade thinning was recommended. The author marked "Quartier Blue" or a regeneration block of 1169 acres so as to regenerate the whole area within the plan period.

Evergreen WC: This WC included all the evergreen forests of Bamba 13 including all the sub types, and a part of the miscellaneous deciduous forests occurring in between. The aim was to manage sustained yield of commercially valuable spp. Bamba 13 A-C were allotted to this WC. The silvicultural system adopted was modified Irregular shelterwood system wherein yield was calculated from the whole growing stock, removable under girth limit from anywhere in the WC according to the availability of mature stock and keeping in view silvicultural needs. It was found that there was deficiency of Bonsum, Nikahi, Tita-sopa and Gomari. Under-planting at a wide spacing was suggested as a measure of regeneration of this areas. The author remarked that since the species concerned were all shade bearers in the young age, and were clean boled even when grown apart, and that they grew very often singly so much so that question of control of branchiness or the rate of diameter growth by varying the degree of thinning does not arise, after they grow above the middle canopy level. This was the primary reason for the prescription of underplanting at wide spacing, without disturbing the ecological balance.

Khoir-Sissoo-Simul OWC: This OWC was designed to take advantage of wide spread of Khoir and Simul trees not only concentrated in the riverine belt, but also all over the Ripu RF. The author subdivided the WC into three FS, one each for Khoir, Sissoo and Simul. The exploitable limit for Khoir was 3', Sissoo 4' and simul 5'. For Khoir, it was worked out that 2000 trees above 3' would be removed during the Plan period in any manner convenient to the DFO. The author prescribed one acre of compensatory plantation for every 40 trees of any of the three species removed, to be raised in Atiabari and Sankosh plantation centers. The spp. Chosen would be Khoir, Sissoo, Simul and any other match wood species.

Miscellaneous OWC: This WC encompasses all the miscellaneous deciduous forests, even those occurring as Sal associates. The aim was to exploit the marketable spp. Under girth limit. The silvicultural system was Selection system. No yield was prescribed. The area was to be leased out to saw mills on suitable terms.

Assessment of Rajhkowa's Plan: Despite detailed prescription on regeneration of Sal in the alternate strip system, the overall impact was very poor. The regeneration failure rate was 60-90% in different strips. The main cause attributed was improper felling, accumulation of debris on the floor which was not cleared. As a result, proper burning could not take place. Moreover, areas were never clearfelled properly, as because the contractors only removed valuable wood, leaving behind kukat and other species unfilled and un-removed. Therefore, proper burning and soil working could not be carried out.

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 annually. 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. 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 Division was the Northern FS in which were included the Magurmari PRF and Elachijhar RFs (Elachijhar at that time was also a PRF) 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 RF belonging to Aie Valley Division, 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, Afforestation WC and Plywood OWC. Some of the compartments allotted to the Sal Improvement WC were regrouped into Sal Plantation WC.

10.12 INTERIM PERIOD (1973-74 to 1983-84): Rajkhowa's plan expired in 1973. The field works for the new plan were started in late 1973 and continued till 1975. The plan could not be compiled before 1982. In the late part of Rajkhowa's plan, the Goalpara West Division was bifurcated, and Kochugaon Division came into existence once again [See Para 4.2 for more details on administrative reorganization].

10.13 R.C. Goswami's Plan (1983-84 to 1998-99): This was the first plan covering the new Kochugaon division of today. Goswami prescribed 4 WCs. They are briefly described below:-

Sal Conversion WC: All the Sal areas of Bhabar and Terai region as well as some of the savannah and the non Sal areas capable of conversion into Sal forests were allotted to this WC. Natural regeneration was found in open grassland patches. The chief aim was to replace mature Sal crop by clearfelling and raise plantation in different plantation centers. It was also thought to take advantage of the existing Sal regeneration in the grassland to raise them in even-aged crops. The areas allotted were Sal patches of Bamba (1-13), Pechadabri South & West, Maktaigaon 1B, Maula (1-7), Janali (1-5), Ranga (1-7), Ripu (1-8), Pekua (1-7), Charaideka (1,2), Gangia (1-5), Polo (1-11), Hel (1-11), Singimajli (1-6), Atiabari (1-4). The total Sal bearing area was 27356 ha of which 1104 ha was covered by young crops, 14361 ha by middle aged and 8831 ha by mature crops. The silvicultural system adopted was clearfelling with regeneration of Sal by regular plantations. Rotation was fixed at 150 years. The conversion period was fixed at 180 years. Only the Regeneration & Young blocks were allotted, rest of the areas were lumped together in Unallotted block. Yield was regulated by volume with area check.

Matchwood Plantation WC: Areas allotted to this WC were miscellaneous forest bearing areas of Maula (1B, 2b, 3B). The object was to raise Simul plantations over the areas. Silvicultural system adopted was clearfelling and regeneration of Simul along with other matchwood spp. Rotation was fixed at 40 years with an average crop girth of 2m. An area of 40 ha was to be taken up annually for felling and planting.

Miscellaneous WC: Almost entire evergreen forests, miscellaneous moist deciduous forests were included in this WC. It overlapped all Sal and non Sal patches capable of yielding non Sal timber. The primary object was to meet the demand of local plywood industry and to exploit marketable species under a diameter limit. The silvicultural system adopted was Selection system and the trees to be removed by fixed diameter limit. The minimum exploitable diameter fixed for Bonsum, Gomari, Gonsurai, Tita-Sopa was 0.70 cm. For Sissoo it was fixed at 0.60 cm. The area allotted to this WC was Bamba (part), Hel (part), Atiabari, Polo, Singimajli, Pekua, Gangia, Janali, Ripu, Maula, Ranga and Maktaigaon. The prescribed yield varied from 1200 trees for Bahera to 28 trees for Sissoo.

Khoir WC: All the Khoir areas were included in this WC. The species was found to occur along Sankosh, Hel and Singi rivers, and in Atiabari block between Hel and Saralbhanga. The aim was to exploit mature trees and preserve the immature stock. The silvicultural system adopted was selection system with exploitable girth of 100 cm BH. The yield was fixed at 220 trees above the exploitable girth per annum.

10.13 INTERIM PERIOD (1998-99 to 2002-03): As no compartment histories were maintained, it would not be possible to comment exactly upon the effect of the prescriptions of Goswami's Plan. Soon after the Plan was introduced, the situation in the western Assam began to deteriorate. In the nineties, the overall situation in the two districts of Kokrajhar and Bongaigaon was far from normal. 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 teeming with the victims of ethnic strife. Maktaigaon, Pechadabri, Gangia, southern part of Ripu, Polo, Hel and Atiabari blocks of Ripu RF were clearfelled and converted into paddy. The tramway was the next great loss. Its rails and sleepers were carried away by miscreants, who were so very oblivious of the heritage that they were "*raping*".

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

10.14 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. 7 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 7th 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 the 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 smoothened 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: 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 not only stripped off large and continuous patches, kilometer after kilometer, but also have altered the original composition considerably. Kachugaon Division bore considerable brunt of the onslaught on the forests, so much so that virtually there is little left of Sal. There was loss of 10,000 ha of forests. Exception can be taken of the Sal stands between Ride IV and VI in Ripu RF which have been mysteriously retained. The pressure of fire-wood demand appears to be the primary cause of destruction at the moment.

However, the protected Sal coppice/seedling regeneration is praiseworthy in the Magurmari PRF. The crop has attained good height and girth. However, due to biotic interference, the growth in Elachijhar is poor.

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
5. To restore the heritage of Kachugaon, even if partly.

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

1. Sal Reclamation & 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)
5. Tramway & Heritage Restoration WC (THRWC)

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

Sal Reclamation & Eco-development WC: This WC has been constituted to protect and manage the patches of purely Sal forests now regenerated by coppice/ and natural seedlings. The areas fall in a compact geographical tract, and could be managed most effectively as a single management unit.

This WC has also 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. 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 to north of the National Highway. 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.

Tramway & Heritage Restoration WC: This WC has been proposed to restore the old and glorious Tramway (one of its kind in the whole country), along with Lal Bungalow and Kachugaon Forest Complex.

12.5 BLOCKS AND COMPARTMENTS: No change in blocks and compartments has been proposed. The existing structure has been retained for sake of continuity. A watershed based approach would not be very successful, as the area is mostly flat, and strewn with numerous small and medium streams inter-linked to each other. A list of all the blocks and compartments, RF wise is shown in Table No. 30.

CHAPTER 13

13 WORKING PLAN FOR SAL RECLAMATION & ECO-DEVELOPMENT WORKING CIRCLE

13.1 SPECIAL OBJECT OF MANAGEMENT: Since Zamindari times, the Magurmari and Elachijhar forests were Sal bearing areas. 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. Past few years have seen comparatively better protection, resulting in good stands of Sal coppice of uniform age and girth class, especially in the Magurmari PRF. 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.
4. To green the hill tops under JFM/FDA, preferably with fuel-wood species.

13.2 AREA ALLOTMENT: All the areas falling under Magurmari PRF and Elachijhar RF are included in this WC.

As there was no authentic map available for these areas, the image interpretation, classification and post processing could be taken as approximate. Though field work was done in some of these areas, but in absence of map, it was not possible to translate, especially in Magurmari, the same into accurate stock maps.

The areas are also shown in Fig No. P-1

13.3 ANALYSIS & VALUATION OF CROP: The crop in most of these areas is Sal coppice of varying growth and vigour. The variation was noticed from young whippy shoots to pole stage and lower middle aged class structure. This variation was mainly caused by heavy biotic interference, especially on the periphery. To assist in assessment, the crops were divided into three categories i.e. Sal Coppice D (Dense), Sal Coppice M (medium) and Sal Coppice L (Light). The dense category of the crop was found to be tall and healthy, with more 800 trees per hectare. The medium class crop showed less vigour, shorter in height and less dense having 400-600 trees on average. The light category coppice were found to be no better than tea bushes, scattered and scanty in growth. The soil was found to be highly exposed in this category. *(The word Coppice has been used here primarily to distinguish the crop from the Sal occurring in the northern belt of the Division. The crop, though described, in generic terms as Sal Coppice, is a mix of coppice and seedling from seeds occurring due to natural regeneration.)* The girth was found to vary from 0.08 cm to 0.80 cm. The average girth was 0.40 cm to 0.60 cm.

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 in the Working Plan of Haltugaon Division. 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).

The silvicultural system adopted would be Artificial regeneration, or assisted natural regeneration of Sal and protection thereafter.

13.5 ROTATION:

No rotation fixed in this Series.

13.6 CALCULATION OF YIELD:

No yield has been prescribed, except that which comes by way of thinning.

13.7 PRESCRIPTIONS:

13.7.1

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. 50 Ha is the annual target for regeneration through the JFM Committees.
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. Such operations may be necessary for a very limited area. The action at SI No. 1 prescribed above, in this case, should be reported to the DFO, and after his personal inspection and decision. Such hoeing should be over by 1st 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 15th of November.
7. During the 2nd, 3rd, 4th years, weeding and controlled burning should be resorted to as described at Serial NO. 5 & 6 above.
8. In the 5th year a silvicultural thinning may be carried out. Of the total crop marked for removal so, 100% marking has to be done by the Range Officer in charge, and 30% verification by an ACF.
9. From 5th 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.
12. The standing pole crop of Magurmari having the best growth may be given silvicultural thinning within the 1st and 2nd year of the Plan, so as to promote good growth and reduce competition.

CHAPTER 14

14 WORKING PLAN FOR AFFORESTATION WORKING CIRCLE

14.1 SPECIAL OBJECT OF MANAGEMENT: The reserve forests, namely Ripu and Kachugaon have been heavily affected in the last two decades. The vegetation in the Ripu RF has been severely affected from Ride 1 upto Ride 6 in varying degrees of expanse. However, most of the terai Sal formation has been decimated, and stands converted into level plain field strewn with refugee camps and agriculture. There are a total of 106 forest villages with area 22,820 ha and population of 1,05,700 souls (*According to Jacob, there were 117 forest villages, with population of 3538 in 1938*) 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 Afforestation Series
2. Khoir-Sissoo-Simul Afforestation Series
3. Fire-wood Stand 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. The areas which are blank as per satellite imagery are shown as Encroachment/blank map for the whole division, as well as for Ripu & Kachugaon RFs. It may be seen at Fig P-4 to 6. The blank area shown also includes forest villages which have not been shown separately. It may be noted that the recorded FV area of Kachugaon RF is 19,092 Ha, and that of Ripu is 3,728 Ha. These areas have been deducted while calculating the regeneration targets.

The blank areas of Ranga, Ripu, Gangia, Polo and Hel blocks have been assigned for Sal afforestation.

The blank areas along the river Sankosh, the blank areas of Atiabari block, and the areas appearing as scrub in the classified map of Ripu RF were allotted to Khoir-Sissoo-Simul Series. The areas along Sankosh in the Kachugaon RF were also assigned to this series.

The rest of the areas of Kachugaon RF and Ripu RF, shown as blank from the satellite images were assigned to Fuelwood Series. They also contain most of the forest villages.

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

14.3 ANALYSIS & VALUATION OF CROP: All the areas barring a small portion in Ripu & Kachugaon RF, and those shown as scrub, 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.

- 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.

Sal would be required to be regenerated artificially, as there is total lack of natural regeneration of this species. Moreover, the areas allotted to this series have virtually no crop other than felled stumps, burned ground or light crop. 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 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.

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. 70% of the total area under the Sal Afforestation Series, has been fixed as the target for regeneration during the plan period. The annual area for planting comes to 150Ha.

Similarly, for Khoir-Sissoo-Simul-Series, 70% of the area was fixed as target to be planted within the plan period. The annual area for planting comes to 550 Ha.

In the Fuelwood Series, 70% area was taken as achievable under the current circumstances (as most of the areas under relief camps etc). The annual area for planting comes to 350 Ha.

14.7 PRESCRIPTIONS:

14.7.1 Sal 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 has to be raised in block strips of 100 m wide and at least 300m in length, in the north-south direction. However, strip length, width & 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 2nd 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.

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 10th year, the crop may be subjected to one mechanical thinning.
9. The silvicultural thinning should be carried out in 15th 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 Range Officer. Followed by 50% verification by ACF.
11. The silvicultural thinning stems shall be marked 100% by 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.
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, Koroi, 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 3rd, 6th year and silviculturally at 10th, 20th and 30th 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, and the silviculturist 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, it can be raised on mounds sufficiently high to keep the seedling out of water. 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 4/5th year. If the target age is more than 10 years, another thinning should be resorted in the 8/10th year.
9. One year before the final harvest, the DFO shall ensure that sufficient planting stock for the 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 Mansas RF, Chirang RF, Ripu RF in Assam and Buxa Tiger Reserve in West Bengal. The entire stretch within the boundary of Assam from Manas River to Sankosh 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 forested tracts of Ripu RF that has been shown covered in the satellite image of IRS1D LISS III, Nov, 2002 have been constituted into this WC. The total area under this WC is 43,092.00 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. Sal has mostly been removed, except in few pockets. Rest of 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. Sal trees of girth varying from 2.10 m to 3.80 m were also noted. However, due to overexploitation, such patches are few. However, preponderance of other evergreen species is noticed.

Fauna: This description occurs for the first time in TK Das's Plan of Haltugaon Division. 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 on the banks of Saralbhangga Golden langurs are present in large numbers. 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 7th 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 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. Regular clearing of all the rides, so that the patrolling path are open through the year. This would, however, involve a huge amount of funds.
 2. The field staff on duty should be provided with adequate arms.
 3. The Atiabari-Bamba road should be closed for the public. There should be restriction on plying of vehicles on the road.
 4. River side patrolling in the Saralbhanga, Sankosh, and Hel should be made a regular feature.
 5. A camp at Ride 5/6/7 is required to make the patrolling effective and intensified.
3. Eco developmental work should be started in the fringe villages south of Ride 1, 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 WORKING PLAN FOR TRAMWAY & HERITAGE RESTORATION WORKING CIRCLE

- 17.1 SPECIAL OBJECT OF MANAGEMENT:** The Division had the privilege of having the only tramway in the eastern region of the country. The only other parallel is probably the tramway of Gorakhpur. This tramway had been used for several decades in the past to carry men, materials, drinking water, logs etc. to and from the inaccessible areas of Ripu RF, especially the Hel, Polo and Bamba blocks.

It's a great misfortune that this glorious tramway was totally destroyed in the decade long strife that engulfed the Kokrajhar district. It is proposed to resurrect the tramway as a hallmark of conservation, a symbol of heritage and a means of awareness for conservation of the remaining forests of the Division. Along with the tramway, it is proposed to resurrect the old forest complex of Kachugaon including the Tramway Shed, IB, Lal Bungalow etc. The Kochugaon proper could be built up as a Forest Heritage Center with parks, avenue trees and interpretation center etc.

The special object of this WC is to:-

1. Reconstruct the tramway, and extend it further in a loop.
2. Preserve the old buildings at Kochugaon after reconstruction
3. Build an interpretation cum awareness center at Kochugaon
4. Build a memorial to the forest personnel who have laid down their lives for the cause of wildlife & forest conservation.

- 17.2 AREA ALLOTMENT:** This shall be co-terminus with the Tramway Range or may extend, as suggested, to Haltugaon Division as well.

- 17.3 HISTORY OF THE TRAMWAY:** The tramway was set up in the early part of this century from Kachugaon to Hel block, running between Pekua & Hel rivers.. On way up to the north, it used to carry labour and water, and on way down to the south, it used to bring logs. Utility of the tram was great in those early days when roads were very few, and there were not many ways to extract timber. Since there was no water in the bhabar tract, it was even used to carry water for the plantation workers in the inaccessible areas.

The tramway had two distinct sections. The forest section ran from Kachugaon to Hel. Several extensions of it were made to cover the various parts of Polo, Hel and Bamba blocks. There was a fair weather extension to Bamba across the Hel river was also made in order to access Bor's regeneration area. Today the RCC pillars of the tramway still stand in the river as a sad testimony to the greed of man. The utility of the tram could be gazed from the yeoman services it provided, which otherwise were impossible to achieve, according to Jacob, "The tramway is not only useful for extraction and transport of timber from the forests, but on it depends the water supply of a few thousand labourers working in the waterless bhabar tract during summer and cold weather periods."

The other section ran from Kachugaon to Fakiragram Railway station, then falling under Eastern Bengal Railways. On this track, the sleeper supplies were made for the railways. Along this track, 15km down was the Longa river from which timber was floated to Sapatgram. There was another extension of the line from Kachugaon to Garufella river 5 km south, for floating timber to Sapatgram. Due to siltation of the river, this extension line was given up. Later on the river became floatable again, but the extension line was given up.

At the time of writing of Jacob's Plan, the tramway had the following infrastructure. It had 4 steam locomotives of 20-30 HP, 71 pairs of still log trucks, numerous water carriers. It carried in one trip, on average 800 cft of timber. The calculated capacity, as per the Forest Engineer, was 1250 cft.

The bridges of the tramway were improved during the period, by replacing wooden joists with steel girders.

The importance of the tramway reduced after development of roads. The notable among the road network are Bamba-Atiabari road, Raimona-Gossaigaon all weather road, Fakiragram-Serfanguri Road. The opening of the new railway station at Gossaigaon also reduced the role of tramway considerably.

AS per Rajkhowa, the total length of the tramway within the reserve was 41 km, and outside, it was 25 km. The details of the sections/branches is given in Table No. 27.

- 17.4 HERITAGE:** It is no denying that several townships in Assam sprang up nucleating around forest complexes and forest bazaars. It cannot be more true for Kokrajhar, Kachugaon, Saraibil, Haltugaon, Runikhata etc. Thus, the contribution of the Forest Department in the urban growth of the state is immense and fundamental. It is no denying that most of the bazaars in the hinterland were initially forest bazaars (barring Tea Garden weekly markets). In absence of bridges, the ferry services were provided and are being provided by the Forest Department. The contribution of the Bazaar Mahal and Ferry Mahal to urban growth is worth documenting.

Kachugaon is a great example of contribution of the Forest Department in urban growth. Its very foundation were the Forest complex and the Kachugaon Forest Bazar which was the biggest in the locality.

The tram station, the Lal Bungalow which was the ACF's official residence, the Forest IB are all hallmarks of a glorious forest history, and at that, once hailed as one of the best managed Sal tracks in the country. It is time that this hitherto unrecognized contribution of the Department be given its due by resurrecting the dilapidated structures at Kachugaon, and setting up of an awareness cum interpretation center.

- 17.5 OUTCOME:** The kind of damage that has taken place in the Kokrajhar and Bongaigaon districts is of a high order. In total about 40,000 ha of high quality Sal and other forests have been lost in the past decade from the reserves of Ripu, Chirang, Bengtol and Manas RFs. Their place has been taken away by numerous refugee camps and thousands of human population.

Restoration of the forest cover would be an Herculean task by any standard. Raising several thousands of hectare of forest from the root would not only require mobilization of funds, resources, nurseries, manpower, but also a great will and support of the public. It is here that this WC can be put to immense use as a catalyst of motivation and public awareness.

The restoration of the forest cover and the heritage tramway is also going to boost the economy of the region by increased infrastructural investment, increased generation of mandays for carrying out nursery, planting and cultural activities on 32,000 ha of plantations to be raised [in various RFs/PRFs of Kachugaon, Haltugaon & Aie Valley Forest Divisions] for a period of 8-10 years, increased inflow of tourists, and above all production of large quantum of firewood for local consumption, and restoration of ecosystem which is badly disturbed at the present.

17.6 PRESCRIPTIONS:

1. Kachugaon should be officially declared as a Forest Heritage Site
2. The Indian Railways/RITES should be invited by the Government to survey and prepare a project of restoring the tramway based on steel structures and diesel engines, preferably on meter gauge in a large loop such as Kachugaon-Ride 6-Bamba-Ultapani-Bismuri. (Bismuri, because it is another focal point which showcases the total damage of Sal in Kachugaon, and hence is critical from motivation/awareness point of view).
3. The new look tramway should be under the direct control of the establishment of CF, WAC.
4. The new look tramway should have onboard facilities for multimedia/audio video presentation, and conference.
5. It should be made a world tourist destination.
6. The Forest complex at Kachugaon should be reconstructed with a master-plan by retaining/renovating the older structures.
7. An awareness park should be built in Kachugaon along with an interpretation center.
8. A fitting memorial should be erected to the memory of the personnel who have laid down their lives for the cause of conservation.

CHAPTER 18

18 MISCELLANEOUS PRESCRIPTIONS

18.1 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.

18.1.1 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.

18.2 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 removal and 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 sub para 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.

- 18.3 RIDES & PARALLELS:** All the rides and parallels should be maintained. They should be regularly cleared of any obstacle. At present, all the rides and parallels are fallen to disuse. At places bridges and culverts may be required to be put up.
- 18.4 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.
- 18.5 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.
- 18.6 CONSTITUTION OF JFMCs:** No encroached village should be allowed to form a JFMC.
- 18.7 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.
- 18.8 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.
- 18.9 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.
- 18.10 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.

CHAPTER 19

19 FINANCIAL FORECAST & PERIOD OF PLAN

- 19.1 FORECAST OF REVENUE:** No forecast of revenue was done, as the Plan is primarily a protection plan, and does not envisage any fellings.
- 19.2 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.
- 19.3 PERIOD OF PLAN:** The Plan period would be from 2003-04 to 2011-12 A.D.
- 19.4 REVISION OF PLAN:** There is no exigency felt for mid way revision of the Plan.
- 19.5 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 30th 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.
- 19.6 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.
- 19.7 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	SREDWC	Constitution of JFMC	13.7.1	1		1, 6A
		Selection/Demarcation of Sal regeneration sites		2		2
		50 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 nd , 3 rd & 4 th years		7		4
		5 th year silvicultural thinning		8		5A
		5 th 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
		Thinning of Magurmari Sal		12		5A
2	AWC					
	<i>Sal 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 th year		8		5A
		Silvicultural thinning to be carried out in 15 th year		9		5A
		Mechanical thinning to be carried out after		10		

		thorough inspection			
		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 rd & 5 th year, silvicultural thinning at 10 th , 20 th & 30 th 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 th 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 th /5 th year and another at 8 th /10 th 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		2	

		as described in sub sections below.				
		Regular clearing of all rides			1	9
		Provision of adequate arms			2	9
		Atiabari-Bamba road should be closed for public			3	
		River patrolling to be introduced			4	
		Camp at Ride5/6/7			5	
		Eco-development work to be carried out in villages south of Ride 1		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 JFMCs		1		7
		To provide market linkages		2		
		Overexploitation of resources to be checked		3		
		Intercropping may be practiced in plantations		4		7
5	THRWC	Kachugaon should be declared a Forest Heritage Site		1		
		The Indian railways should be invited to prepare a project on the tramway		2		
		The new Tramway to be under CF, WAC		3		
		The Tramway to have onboard conference & presentation facility		4		
		Tramway to be made a tourism destination		5		
		Reconstruction of Forest complex at Kachugaon		6		
		An Awareness park cum Interpretation center to be built at Kachugaon		7		
		A Memorial to be raised to the memory of the forest personnel who have laid down their lives for conservation		8		
6	Miscellaneous prescriptions	Deadwood & windfallen trees to be removed in a 4 year cycle from a block	18.1			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	18.1.1			5B
		Marking Rule	18.2			
		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		3		

	be marked			
	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 & parallels to be maintained	18.3		9
	International boundary to be maintained	18.4		9
	Survey & Maps	18.5		9
	No encroachment villages should be allowed into JFMCs	18.6		
	All the three Divisions to put concerted effort	18.7		
	Silviculture & Genetics	18.8		
	All Mahals to be managed by JFMCs	18.9		
	Mahals	18.10		
	Amenities to Staff	18.11		9

II. CONTROL FORMS

III. TABLES

IV. MAPS