# THE WORKING PLAN
# FOR
# SONITPUR EAST FOREST DIVISION
# (Northern Assam Circle)

## For the period of
## 2019-2020 to 2028-2029

by

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**2018-2019**

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# PREFACE

This Working Plan has been prepared as per the National Working Plan Code-2014, for the Sonitpur East Forest Division of Assam for the period 2019-20 to 2028-29. The Working Plan has been prepared for sustainable management of the forest division keeping in mind the availability of resources and the issues therein along with measures to control the pressure on the forest reserves and increase the green cover of the division. The reserved forests covered by this Working Plan lie within the geographical limits of 26°37'48.50"N, 92°53'20.73"E and 27° 1'27.44"N, 93°42'25.24"E longitude and latitude. Measures to control pressures on forest reserves and enhance the green cover and forest productivity of the division have been emphasised in the working plan.

The sample plots were laid as per the GPS coordinaties supplied by the North Eastern Space Applications Centre, Shillong (NESAC) and relevant other surveys including plantation, socio-economic surveys (forest and fringe villages) were conducted. NESAC supported the division by mapping the forest type, canopy density, slope, aspect etc. that were verified on the ground with the support from IORA Ecological Solutions Pvt Ltd . Mapping of trees outside forest, forest carbon stocks, compartment wise growing stocks, waterbodies, delineation of microwatersheds, estimation of USF, LULCF were carried out with support from IORA Ecological Solutions Pvt Ltd. The findings of the survey were finalized after being duly discussed with the relevant stakeholders. The forest type, growing stock, land use, which was further verified on the ground and final calculations, were carried out. This Working Plan has been prepared in consideration of ever-intensifying forest-degradation, and recommends appropriate prescriptions for bringing about qualitative and quantitative improvement in forest quality, checking any encroachment, mitigate Man Elephant Conflict, increase cooperation with local community, increasing forest productivity to meet fuelwood, fodder, enhancing carbon sink and enhance biodiversity and restore the ecosystems services of Sonitpur East Forest Division.

Place: Biswanath
Date: March, 31st, 2020

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## ACKNOWLEDGEMENT

Working plans are central to anything related to formulations of policies and programmes. They direct the state to resolve it's priorities to develop the forests in terms of conservation and management. Nestling in cradle of Mother nature Sonitpur East Division's forests boasts of one of the valuable green patch that remains after massive encroachment of Forests. It gave me great pleasure to undertake the responsibility of drafting Working Plan for the territorial division of Sonitpur East Division, Biswanath, that was entrusted to me, during the year 2015. This draft plan has been done after going through all aspects of the statistics collected by this division and by using the information and statistics supplied by division administration. The initial data collection was started by Shri Anirudha Dey AFS, then DFO Sonitpur East. I wish to gratefully thank the following officials who have contributed ideas, information and valuable help in various ways in formulating this working plan. Shri

P Sivakumar IFS then Conservator of Forests Northern Assam Circle, Tezpur has contantly provided inputs and guided during various stages of writing the plan. Rohini Ballave Saikia IFS DCF , RE and WP, Shri Suhas Kadam IFS DFO Sonitpur East, Shri Biswajit Das ACF Sonitpur East Division and Md Yunus Salim ACF, RE and WP have provided inputs in various chapters of the working Plan.

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I shall remain grateful to Shri A. M Singh IFS PCCF and Head of Forest Force for directions issued from time to time, which helped in shaping up the final plan.

Dated: March 31st 2020

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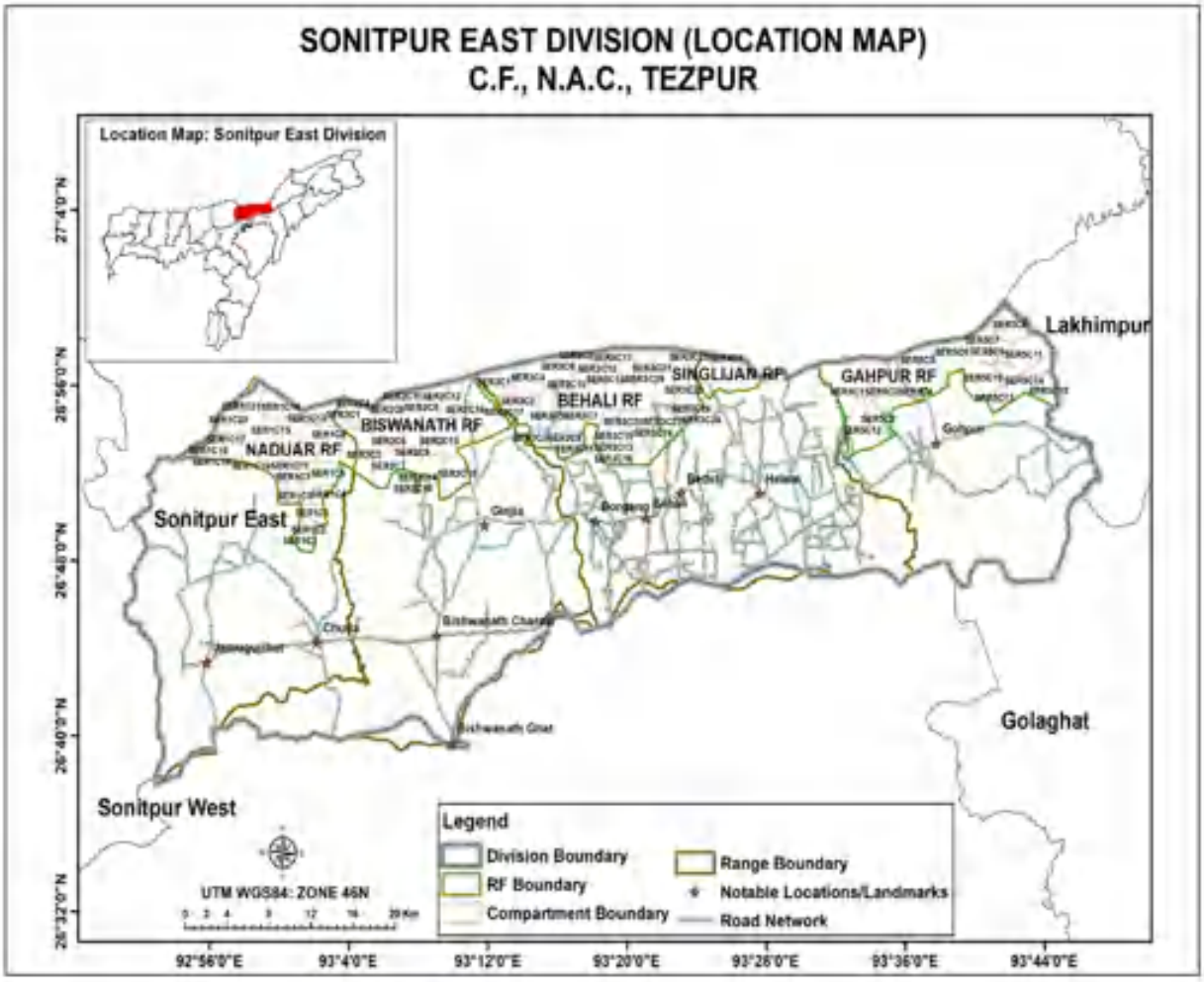


**Figure 1: Location map of Sonitpur East Forest Division, Assam**

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# EXECUTIVE SUMMARY

## I. INTRODUCTION

Forest working plan for Sonitpur East Forest Division, Assam for the period 2018-2019 to 2027-2028 has been prepared as per National Working Plan Code-2014. The current initiative is undertaken to efficiently plan and sustainably manage, conserve and utilize the state forests, its biodiversity, and improve flow of ecosystem goods and services. Further, the working plan aims to steer processes to guide the increase in the percentage of forest area and trees outside forest.

The Sonitpur East Forest Division is a belt of plain land with the Himalayas on the north and the Brahmaputra River to the south. With the eastern and western boundary flanked by reserve forest, prominent rivers of Assam namely, Jia-Bharali, Giladhari, Borgang, Buroi, etc. flow from the hills of the North into the Brahmaputra.Northern side of the reserve forest has hilly terrain surrounded by the state boundary of Arunachal Pradesh.

### a) Vision Statement

Encroachment is a major issue in the Sonitpur East Forest Division.The semi-evergreen forest of Behali RF and Singlijan RF are under immense pressure from both Arunachal Pradesh and Assam, depleting the rich floral and faunal diversity. The need of the hour is to consolidate the areas free from encroachment and take action focusssing on the conservation by involvement of local people through initiatives like Joint Forest Management Committees (JFMCs).

### b) Goals and Objectives of Management

The goal of this working plan is to focus on the conservation of the degraded forest areas and ensure participation of local communities along with the forest department in controlling and prevention of further degradation of the Reserve Forests (RF). Additionally, there is a need for massive plantation in the open forestland and use of new techniques to assist natural regeneration of healthy growing stock through JFMC, and look for areas of improvement for reduction of man-animal conflict for example elephant related deaths. The objectives of the Working Plan is as follows:-

i) To increase the forest cover and improve quality of existing forest

ii) To check further encroachment of Reserve Forests

iii) To mitigate Man Elephant Conflicts.

iv) To increase community participation in conservation of forests and mitigation of man animal conflict

v) To check all illegal fellings for Timber both inside and outside Reserve Forests.

vi) To remain vigilant and not to allow any interstate border dispute to become pretext for encorachment

## c) SWOT Analysis

Sonitpur East is enriched with diverse floral and fauna, that holds key to numerous interactions and ecological services among the ecosystems of the division.

The division is surrounded by the perennial rivers, mostly tributaries of the Brahmaputra. The rivers flow from north to south, discharging into the mighty Brahamputra in the south. Thus, creating ideal conditions for fast growing forest species to thrive in the alluvial regions of the division with appropriate water availability throughout the year. The division also shares its boundary with the state boundary of Arunachal Pradesh, enabling the Forest Protection Camp established along the border of the state to play an important role in the conservation of resources and check illegal extraction beyond the state boundary. The species *Musua ferrea,* Bola, Khokan, Sopa and Bamboo has a good natural regenerative capacity that can be further enriched by formation of protected forest, by utilizing work force available in the fringe villages for the plantation activities.

Forest fragmentation due to illegal settlements and human intervention in the forest areas lead to the endless pressure on the available resources and depletion of forests in the division. River bank erosion is a major cause of degradation in the Behali RF whereas interstate border disputes are also the reason for uncontrolled encroachment issues. Illegal felling in the reserve forest area for firewood by the local population is the most challenging threat to the Division, as the people thriving near to the forest fringes collect firewood on daily basis and felling of trees causing nutation of the forest. Uncontrolled and extensive cattle and elephant grazing poses another major threat to the Division with random rampages by wild elephants leading to loss of the forest resourses.

A detailed SWOT analysis carried out for prescriptions and strategies for achieving the goals and objectives is shown in the Table 1 below :-

**Table I: SWOT analysis of the Sonitpur East Forest Division, Assam**

| STRENGTHS | WEAKNESS |
|---|---|
| ➢ Flora and faunal species diversity<br>➢ Presence of perennial rivers<br>➢ Presence of forest protection camps (FPCs) along the border of Arunachal Pradesh. | ➢ Poor implementation of policies and guidelines<br>➢ Lack of skilled and trained manpower<br>➢ Increased anthropogenic interferences due to urbanization<br>➢ Fragmentation due to illegal settlements and encroachments.<br>➢ River bank erosion<br>➢ Interstate border disputes |
| **OPPORTUNITIES** | **THREATS** |
| ➢ Good natural regeneration of tree species *Mesua ferrea.*<br>➢ Availability of work force – fringe villages for plantation activities. | ➢ Encroachments<br>➢ Illegal felling<br>➢ Firewood collection<br>➢ Grazing pressure – domestic cattle and wild elephant. |

## d) Expected Outcome

The expected outcomes of the Working Plan are described below:–

i) Improvement of quality of existing forest

ii) Increase in forest cover by demarcation of Forest Rights Act areas and consolidation of boundary.

iii) Promotion of JFMCs leading to Forest Protection and Conservation through increased livelihood opportunities, ecotourism, NTFP collection and JFMC plantations.

iv) No fresh encroachment in interstate border areas and along southern boundary of Reserve Forests.

v) Mtigation of Man Elephant conflict through intensification of Wild Ele[phant Anti Depredation Squads (ADS) activity through community participation and timely distribution of outstanding exgratia/compensation.

## e) Abstract of Plan Prescriptions

The abstract of plan prescriptions in the Working Plan of Sonitpur East Forest Division, Assam, for the plan period 2018-19 to 2027-28 is summarized in Table I as per the format laid out under the National Working Plan Code 2014.

**Table II: Abstract of plan prescription**

| Chapter No. | Para No. /Sub Para No. | Prescribed Activity |
|---|---|---|
| Part II, chapter 2 | Part II / 2.10.2 | 760 Ha new Plantations within the Plan period |
| Part II, Chapter 3 | Part II / 3.5.3.1 | 2100 Ha for Improvement and 1845(1545 AR Plantation and 300 Ha ANR) Ha new creation |
| Part II, chapter 4 | Part II / 4.15 | 850 Ha Bamboo Plantation. 760 Ha area for NTFP Collection |
| Part II, chapter 5 | Part II / 5.11.1 | Joint Patrolling of Interstate Border areas with Police and maintenance of FPCs, |
| | Part II/5.11.2 | Construction of Boundary Pillar |
| Part II, chapter 6 | Part II / 6.11.1 | Delineation of Boundary in Forests Rights Act Areas |
| Part II, chapter 7 | Part II / 7.7.5 | Low cost power fencing as EPF |
| | Part II 7.7.6. | Anti Depredation Measures |

### f) Abstract of Works prescribed during the Plan Period along with Annual Target

The abstract of works prescribed in the working plan of Sonitpur East Forest Division, Assam, for the plan period 2018-2019 to 2027-2028 showing its year wise target is summarized below in Table III as per the format laid out under the National Working Plan Code 2014.

**Table III: Abstract of work prescribed for Sonitpur East Forest Division, Assam for 2018-2019 to 2027-2028**

| Chapter No. | Para No. /Sub Para No. | Prescribed Activity |
|---|---|---|
| Part II, chapter 2 | 2.10.1 | Appraisal of Existing JFMCs and Gradations. Gradation of JFMC in Grade A, B , C and D. |
| | 2.10.2 | Plantation Activities. After assessment of survival % in older plantations, those area where survival is less than 35% shall be taken up for new Plantations<br>760 Ha New Creations in Plantation with 4 years maintenance. |
| | 2.10.3 | Training Programmes and formation of SHGs. Capacity building of JFMCs members and dovetailing with National Missions of Livelihood |
| | 2.10.4 | Adoption of APFBC Manual for JFMC |
| Part II, chapter 3 | 3.5.3.1. | Year wise allotment of areas for improvement w.e.f 2020-26<br>**Name of the working series Area in hectares**<br>• Rangagora-Hathidepot plantation improvement working series. 1200 Ha<br>• Bedeti-Golbil-Hathimora plantation improvement working series. 900 Ha<br>**Total area 2100 Ha** |
| | 3.5.3.2. | Rules of marking and extraction |
| | 3.5.3.3. | Operations for Improvement |
| | 3.5.3.4. | Rangaghora- Hathidepot Improvement areas*( Bola, koroi, borhamthuri, Outenga, bogipoma, phulgomari* should be promoted and planted in ANR)<br>Bedeti-Golbil Hathimora Improvement Areas *(Pansopa, Hollock, Amari, Phulgomari, Oxi)* |
| | 3.5.3.5. | Regenartion |
| | 3.5.3.6. | ANR is proposed with 3 year maintenance |
| | 3.5.4.1 | Total 1845 Ha area is proposed for Plantation, where 300 Ha is proposed for ANR and 1545 Ha have been proposed for Block plantation(AR).<br>Prescription for Plantation, Yearwise allotment of areas |
| | 3.5.4.5. | Plantation models with 4 yrs maintenance prescribed |
| Part II, chapter 4 | 4.13 | Prescription for NTFP<br>No collection of NTFP or medicinal plants to be encouraged from areas outside allotted area. However, inventorisation and identification of medicinal plants in the reserve forests would be |

| Chapter No. | Para No. /Sub Para No. | Prescribed Activity |
|---|---|---|
| | | taken up over the tenure of the current Working Plan.<br>Plantations of medicinal plants shall be created in JFMC areas. Such Medicinal plants shall be harvested in a sustainable manner.<br>Training programmes shall be organised for Farmers/fringe villagers about sustainable cultivation as well as harvesting of medicinal plants. |
| | 4.15 | Precription for Bamboo Plantation<br>850 Ha Bamboo Plantation proposed in Biswanath and Naduar RF with 3 Years maintenance and harvesting during 5$^{th}$ year of plantation. |
| Part II, chapter 5 | 5.11.1. | Maintenance of Dikal Radhasoo Road; The road may be maintained on annual basis and strictly restricted to use only for forest protection patrolling. The road should not be allowed to be used for non forestry purposes.<br>The forest protection camps sanctioned by Min of Home Affairs Govt of India at Dikal, Radhasoo and Naharjan may be maintained regularly.<br>Strength of Police personnel in Radhasoo FPC should not be reduced below One Company. Any reduction in police force may lead to major retaliation from Arunachali local militant groups.<br>Mandatory Joint Patrolling by Forest and Police Authorities all along Naharjan, Radhasoo, Dikal and Chauldoha for preventing any further encroachment.<br>The encroachments from Assam Side in Naharjan should be checked effectively. No increase in numbers of houses may be allowed till final eviction. |
| | 5.11.2. | Consolidation of Boundary<br>Survey, Construction and Maintenance of Boundary Pillar Year wise |
| | | |
| | 5.11.3. | Illicit Felling<br>Regular patrolling and monitoring. Patrolling Register shall be maintained by all Beat Officers and Range Officers. |

| Chapter No. | Para No. /Sub Para No. | Prescribed Activity |
|---|---|---|
| | | Such Registers shall be fortnightly signed by DFO/ACF<br>All Beat Officers and Range Officers shall maintain Beat Map, Compartment Map and Range Map in toposheets.<br>Beat records and registers to be kept uptodate.<br>Ilicit felling should be immediately reported. Stump seizure made and steps taken to salvage the remaining out turnoff timber.<br>Arms should be in serviceable condition. RO and Beat Officers should ensure maintenance of arms and inform headquarter for sufficient supply of ammunition.<br>Firing incidents should be reported promptly with a copy marked to local Police Station. Blank shells from firing should be salvaged and submitted wherever possible.<br>GPS based patrolling to be introduced so that effective monitoring is possible.<br>Forest offense register should be maintained and Offence Registered should be pursued in proactive manner to ensure conviction.<br>Maintenance of Forest Roads and bridges |
| | 5.11.4. | Grazing and lopping<br>The concept of rotational grazing and lopping must be adopted. The area may be divided into 5 blocks each. Each blocks can be opened for grazing and lopping for two months in a year. |
| | | |
| Part II, chapter 6 | 6.11.1 | **Steps for Delieneation and demarcation of boundary**<br>Awareness generation on the Forest Right Act, 2006, among the stakeholders.<br>Participation of the villagers in the entire process of implementation of FRA.<br>Demarcation of land boundaries of each stakeholder of the Forest villages.<br>Demarcation of the forest boundaries as on the formation date of |

| Chapter No. | Para No. /Sub Para No. | Prescribed Activity |
|---|---|---|
| | | Gram Sabha which would impart a vital role in controlling further encroachment.<br>Formation of the Local Biodiversity Committee to manage the local resources.<br>Classification of vegetation types and land use patterns on the historical time scale (1980 & 2005 if possible) |
| | 6.11.2 | Erection of Boundary Pillars |
| | 6.11.3 | Duties of Boundary Pillars |
| | | |
| Part II, Chapter 7 | 7.7.1. | Improvement of habitat quality<br>Establishment of Nursery at Singlijan and Bihmari for Elephant fodder plantation, removal of weeds, elephant fodder plantation, installation of power fence, creation of new water bodies and cleaning of exisiting water bodies |
| | 7.7.2 | Prevention of encroachment |
| | 7.7.3 | Controlled grazing |
| | 7.7.4 | Prevent illegal mining |
| | 7.7.5 | Temporary Mitigation measures; Low cost electric fencing as in Table 7.1 |
| | 7.7.6. | Annual ADS meeting should be convened at DFO Office as annual feature without fail.<br>The meeting of District Level Task Force for Wild Elephant Antidepredation Committee notified by Government shall be convened before onset of elephant depredation season.<br>ADS register should be maintained at Range and Division level as well.<br>Forest Staff on Antidepredation duty shall carry a Elephant Duty Register with them whenever they visit villages for such duty. Village headmen or any villager or ADS member may sign such |

| Chapter No. | Para No. /Sub Para No. | Prescribed Activity |
|---|---|---|
| | | Elephant Duty Register. Such Elephant Duty Register is record of forest staff discharging duty in Revenue areas. Such Register may be diligently maintained and issued by Concerned Range Officer.<br><br>ADS meetings shall be recorded in register. All phone numbers of ADS members may be circulated among DFO, ACF, RO and BO. The phone numbers of DFO, ACF and RO should be compulsorily shared with ADS members.<br><br>The RO/BO and ADS members shall be close connection with local Police Station/ OP, Veterinary Doctor and Revenue Official of the Rank of Circle Officer.<br><br>During September meeting with Tea Garden Officials, SDO Civil Gohpur, all members of ADS, Police shall be convened at SDO Civil Gohpur office and preparedness for upcoming Elephant depredation season should be reviewed.<br><br>Similar meeting should be convened at DC Office Biswanath.<br><br>6.Crackers and Torch Lights shall be procured in advance , in credit if necessary before the onset of Elephant depredation season. Such Crackers and Torch lights may be distributed liberally among the ADS members and Staff.<br><br>Community Solar powered electric fence is ideal for location of high intensity conflicts. Division headquarter should maintain conductor, energizer, Solar plates, Battery 12 V so that during emergency it can erected immediately.<br><br>Two(2) Kumki Elephant may be hired for man animal conflict |
| | 7.7.7 | Joint Patrolling with Railways Personnels in the Elephant corridors and movement pattern was surveyed and recorded as in **Annexure XII** |
| | 7.7.8 | Citizen Engagement Plan<br>To develop some good audio-visual Modules on Wildlife and Man Animal Conflict for interaction with community.<br>To develop some Documentaries on good practices/examples to be shown to the community.<br>To develop some One-Act Plays or short Plays on critical issues and make arrangements for performances with the help of Civil |

| Chapter No. | Para No. /Sub Para No. | Prescribed Activity |
|---|---|---|
| | | Society Groups or Schools.<br>To engage school/college students to take out processions to convey important messages on important Wildlife Week, Forestry Day, International Elephant Day , etc.<br>Make use of Van Mahotsava and Wildlife Week Celebrations or cultural occasions to convey messages.<br>Organize Household visits through volunteers/school college students/civil society groups to create awareness.<br>Make arrangements for sending bulk messages on critical issues.<br>Create a Website or Interactive Portal to transfer knowledge and get feedback from the community.<br>Institutionalise a system of analysis of the feedback from the community and factoring it in the departmental plans. |

# II.A GLOSSARY OF TERMS

| Term | Definition |
|---|---|
| Abiotic | Pertaining to the non-living parts of an ecosystem, such as soil particles bedrock, air, and water. |
| Afforestation | The establishment of a forest or stand in areas where the preceding vegetation or land use was not forest. |
| Agroforestry | A collective name for land-use systems and practices in which trees and shrubs are deliberately integrated with non-woody crops and (or) animals on the same land area for ecological and economic purposes. |
| Artificial Regeneration | Establishing a new forest by planting seedlings or by direct seeding (as opposed to natural regeneration). |
| Aspect | The direction toward which a slope faces; its exposure in relation to the sun. |
| Basal Area | The area of the circle formed by the cross-section of a tree taken 1.3 m above the ground. |
| Benefit/Cost Analysis | A set of procedures for defining and comparing the quantified benefits and costs of a project or course of action; used as an aid to decision making |
| Biodiversity | The biological diversity of plants, animals, and other living organisms in all their forms and levels of organization, including the biological diversity of genes, species, and ecosystems. |
| Biofuel | Biomass or materials derived from biomass that can be used to generate energy. |
| Biomass | The dry weight of all organic material, living or dead, above or below the soil surface. |
| Biosphere | The portion of the earth comprising the lower atmosphere, the seas, and the land surface (mantle rock) in which living organisms exist. |
| Biosphere Reserve | A management model proposed by the United Nations Man and the Biosphere Program, in which a core area is preserved free from human disturbances, surrounded by buffer zones, which then lead into more intensive areas of disturbance and human activity. |
| Biota | The animal and plant life (fauna and flora) of a given area. |
| Block Cutting | Removal of the crop in blocks in one or more operations, generally for wildlife management purposes, encouraging regeneration, or protecting fragile sites. |
| Breast Height | The standard height, 1.3 m above ground level, at which the diameter of a standing tree is measured. |
| Buffer Zone | A strip of land where disturbances are not allowed, or are closely monitored, to preserve aesthetic and other qualities adjacent to roads, |

| Term | Definition |
|---|---|
| | trails, waterways, and recreation sites. |
| Canopy | The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees. |
| Carbon Budget | Comparative evaluation of the amount of carbon stored in natural forests (sinks) and the amount emitted by them (sources), which is undertaken to determine whether the forests are sequestering more carbon than they are emitting to the atmosphere. Carbon budgets can be drawn up on various scales, including global. |
| Carbon Sequestration | The uptake and storage of carbon. Trees and plants, for example, absorb carbon dioxide, release the oxygen and store the carbon. Fossil fuels were at one time biomass and continue to store the carbon until burned. |
| Carbon Sink | An area where the rate of carbon uptake by living organisms exceeds the rate of carbon release. The surplus carbon is actively sequestered into organic or inorganic forms. |
| Carrying Capacity | The average number of livestock and (or) wildlife that can be sustained on a management unit, compatible with management objectives for the unit. It is a function of site characteristics, management goals, and management intensity |
| Climate Change | An alteration in measured quantities (e.g., precipitation, temperature, radiation, wind, and cloudiness) within the climate system that departs significantly from previous average conditions and is seen to endure, bringing about corresponding changes in ecosystems and socio-economic activity. |
| Conservation | The management or control of human use of resources (biotic and abiotic) and activities on the planet, in an attempt to restore, enhance, protect, and sustain the quality and quantity of a desired mix of species, and ecosystem conditions and processes for present and future generations. |
| Contour Map | A topographic map that portrays relief by means of lines that connect points of equal elevation. |
| Crown | The live branches and foliage of a tree. |
| Crown Density | The amount and compactness of foliage of a tree crown. |
| Dbh (Diameter At Breast Height) | The stem diameter of a tree measured at breast height, 1.3 m above the ground. |
| Decision Support Systems (DSS) | Analytical tools (e.g., computer models) that aid decision making by providing information on the projected implications of alternative management actions. |
| Deforestation | The long-term removal of trees from a forested site to permit other site uses. |

| Term | Definition |
|---|---|
| Degradation | i) The erosional removal of materials from one place to another, which lowers the elevation of streambeds and floodplains.<br>ii) Any process or activity that removes or lessens the viability of ecosystem functions and processes, and hence biological diversity. |
| Depletion | The use or consumption of a resource at a rate greater than the resource that can be replenished within a defined time period. The notion of time is important, since many renewable resources can be restored if consumption is halted. |
| Ecosystem Services | Valuable, ongoing streams of benefits provided by healthy ecosystems, such as air and water purification, biodiversity maintenance, climate stabilization, mitigation of floods and droughts, detoxification and decomposition of wastes, generation and renewal of soil and soil fertility |
| Endemic Species | A species that is indigenous to a particular area; not introduced and often with a limited geographical range. |
| Environmental/Ecological Assessment | A process designed to contribute pertinent environmental information to the decision-making process of forest management and other resource projects and programs. |
| Evergreen | Never entirely without green foliage, leaves persisting until a new set has appeared. |
| Forage | Grasses, herbs, and small shrubs that can be used as feed for livestock or wildlife. |
| Forest | A complex community of plants and animals in which trees are the most conspicuous members and where the tree crown density—the amount of compactness of foliage in the tree tops—is greater than 10 percent. |
| Forest Cover | Forest stands or cover types consisting of a plant community made up of trees and other woody vegetation, growing more or less closely together. |
| Forest Cover Type | A group of forested areas or stands of similar composition which differentiates it from other such groups. Forest cover types are usually separated and identified by species composition and often also by height and crown closure classes. In detailed typing, age, site, and other classes may also be recognized. |
| Forest Encroachment | The intrusion or establishment of a significant number of trees on grassland(s). |
| Forest Fire | Any wildfire or prescribed fire that is burning in forest, grass, alpine, or tundra vegetation types |
| Forest Floor | Layers of fresh leaf and needle litter, moderately decomposed organic matter, and humus or well-decomposed organic residue. |
| Forest Management | The practical application of biological, physical, quantitative, managerial, |

| Term | Definition |
|---|---|
| | economic, social, and policy principles to the regeneration, management, utilization, and conservation of forests to meet specified goals and objectives while maintaining the productivity of the forest. Particularly, that branch of forestry concerned with the overall administrative, economic, legal, and social aspects and with the essentially scientific and technical aspects, especially silviculture, protection, and forest regulation. Includes management for aesthetics, fish, recreation, urban values, water, wilderness, wildlife, wood products, and other forest resource values. |
| Gap Analysis | A technique that assesses conservation plans and identifies ecosystems, land formations, or habitat types that are currently not adequately represented in the existing system of protected areas and reserves. This should be performed at regional, subregional, landscape, and watershed scales. |
| Genetic Diversity | Variation among and within species that is attributable to differences in hereditary material. |
| GPS (Global Positioning System) | A method of accurately determining or relocating a ground position using the signal from several satellites simultaneously. A small portable computer evaluates the time for each signal to reach it and then computes a three-dimensional location. |
| Global Warming | A real and projected trend in the warming of the earth's surface caused by natural changes in the global climate system and by human activities such as the release into the atmosphere of the gaseous by-products (principally carbon dioxide) of fossil-fuel consumption, which trap long-wavelength radiant energy. |
| Greenbelt | A strip of undisturbed soil and vegetation left along waterways or access routes to minimize the environmental impact from development. |
| Greenhouse Effect | The warming of the earth's atmosphere caused by increasing levels of carbon dioxide and other gases in the air, which trap the sun's heat within the atmosphere. |
| Greenhouse Gases | Those gases, such as water vapour, carbon dioxide, tropospheric ozone, nitrous oxide, and methane, that are transparent to solar radiation but opaque to longwave radiation. Their action is similar to that of glass in a greenhouse. |
| Ground Truthing | The use of a ground survey to confirm the findings of an aerial survey or to calibrate quantitative aerial observations. |
| Groundwater | Water below the level of the water table in the ground; water occupying the subsurface saturated zone. |
| Growing Stock | The volume estimate for all standing timber at a particular time. |

| Term | Definition |
|---|---|
| Habitat | The environment in which a population or individual lives; includes not only the place where a species is found, but also the particular characteristics of the place (e.g., climate or the availability of suitable food and shelter) that make it especially well-suited to meet the life cycle needs of that species. |
| Harvest | To fell or remove timber, other than under a silviculture treatment. |
| Height Class | Any interval into which the range of tree or stand heights is divided for classification and use (commonly 3-, 5-, or 10-m classes); also the trees or stands falling into such an interval. |
| Hydrology | Science that deals with the waters above and below the land surfaces of the earth, their occurrence, circulation, and distribution, both in time and space, their biological, chemical, and physical properties, their reaction with their environment, including their relation to living beings. |
| Institutional Arrangements | The laws, regulations, policies, social norms, and organizations governing and participating in resource use. Institutional arrangements specify who has access to resources, guide resource development activities, and define who will monitor and enforce the rules. |
| Intergovernmental Panel On Climate Change (IPCC) | A panel open to all members of the United Nations Environment Programme and the World Meteorological Organization. The IPCC assesses the scientific, technical, and socio-economic information relevant to the understanding of the risk of human-induced climate change. |
| Invasive Species | Any species not native to a particular ecosystem whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health. |
| Litter | The surface layer of the forest floor that is not in an advanced stage of decomposition, usually consisting of freshly fallen leaves, needles, twigs, stems, bark, and fruits. |
| Livestock | Farm animals regarded as an asset. |
| Lopping | Chopping branches, tops, and small trees after felling into lengths such that the resultant slash will lie close to the ground. |
| Mean Annual Increment (MAI) | Stand volume divided by stand age. The age at which average stand growth, or MAI, reaches its maximum is called the culmination age. Harvesting all stands at this age results in a maximum average harvest over the long term. |
| Microclimate | The climate of small areas, such as under a plant or other cover, differing in extremes of temperature and moisture from the climate outside that cover. |
| Mitigation | To minimize, reduce, or moderate a certain force such as potential for |

| Term | Definition |
|---|---|
| | wildfires. |
| Mortality | Death or destruction of forest trees because of competition, disease, insect damage, drought, wind, fire, and other factors (excluding harvesting). |
| Native Species | A species known to have existed on a site before the influence of humans. |
| Net Present Value (NPV) | A stand's present worth before harvesting once costs associated with its establishment and tending have been subtracted. |
| Non Timber Forest Products (NTFPs) | Any commodity obtained from the forest that does not necessitate harvesting trees. It includes game animals, fur-bearers, nuts and seeds, berries, mushrooms, oils, foliage, medicinal plants, peat, fuelwood, forage, etc. |
| Plantation Forest | Forest stands established by planting and (or) seeding in the process of afforestation or reforestation which are either of introduced species (all planted stands) or intensively managed stands of indigenous species, which meet the following criteria: one or two species at plantation, even age class, and regular spacing. |
| Plot | A carefully measured area laid out for experimentation or measurement. |
| Reforestation | The re-establishment of trees on denuded forest land by natural or artificial means, such as planting and seeding. |
| Regeneration | The act of renewing tree cover by establishing young trees naturally (natural seeding, coppice, or root suckers) or artificially (direct seeding or planting). Regeneration usually maintains the same forest type and is done promptly after the previous stand or forest was removed. |
| Reserve | An area of forest land that, by law or policy, is not available for harvesting. Areas of land and water set aside for ecosystem protection, outdoor and tourism values, preservation of rare species, gene pool, wildlife protection, etc. |
| Sapling | The stage of tree development in between the seedling and the pole stage. Saplings are typically 1–2 m tall and 2–4 cm in diameter, with vigorous growth, no loose, dead bark, and few (if any) dead branches. |
| Silviculture | The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis. |
| Spacing | The removal of undesirable trees within a young stand to control stocking, to maintain or improve growth, to increase wood quality and value, or to achieve other resource management objectives. |
| Species | A group of individuals that have their major characteristics in common |

| Term | Definition |
|---|---|
| | and (usually) can only breed with each other. |
| Sustainability | A state or process that can be maintained indefinitely. The principles of sustainability integrate three closely interlined elements—the environment, the economy, and the social system—into a system that can be maintained in a healthy state indefinitely. |
| Temperate Forest | One of three main forest zones in the world. The woodland of rather mild climatic areas; composed mainly of deciduous trees. |
| Timber | Trees, whether standing, fallen, living, dead, limbed, bucked, or peeled. |
| Topography | The collective physical features of a geographic area, such as those represented on a map, especially the relief and contours of the land. |
| Volume | The amount of wood or fibre contained in a tree, stand, or forest, or parts of these measured in cubic units (e.g., cubic metres per hectare) inside the bark. |
| Wetland | A swamp, marsh, or other similar area that supports natural vegetation that is distinct from adjacent upland areas. |

# 11.B ABBREVIATIONS

| Abbreviation | Expansion |
|---|---|
| ACF | Assistant Conservator of Forests |
| AACP | Assam Agricultural Competitiveness Project |
| AFR | Assam Forest Regulation |
| APCCF | Additional Principal Chief Conservator of Forests |
| APFBC | Assam Project on Forest and Bio-Diversity Conservation |
| AR/ANR | Artificial Regeneration/Aided Natural Regeneration |
| BCD | Biodiversity Conservation and Development |
| BFO | Beat Forest Officer |
| BMC | Bio-Diversity Management Committee |
| BTAD | Bodoland Territorial Area District |
| CAI | Current Annual Increment |
| CAMPA | Compensatory Afforestation fund Management and Planning Authority |
| CASFoS | Central Academy for State Forest Service |
| CCF | Chief Conservator of Forests |
| CF | Conservator of Forests |
| DBH | Diameter at Breast Height |
| DCF | Deputy Conservator of Forests |
| DFO | Divisional Forest Officer |
| DGF & SS | Director General of Forests and Special Secretary |
| DGPS | Differential Global Positoning System |
| DSMs | Defence Series Maps |
| EC | Environmental Clearance |
| FAO | Food and Agriculture Organization |
| FC | Forest Clearance |
| FCA | Forest Conservation Act |
| FDA | Forest Development Agency |
| FRA | Forest Rights Act |
| FRH | Forest Rest House |
| FSI | Forest Survey of India |
| FSR | Forest Schedule of Rates |
| FYP | Five Year Plan |
| GCS | Geographic Co-ordination System |
| GDP | Gross Domestic Product |
| GHGs | Green House Gases |
| GIM | Green India Mission |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| HoD | Head of Department |
| HoFF | Head of Forest Force |
| ICFRE | Indian Council of Forestry Research and Education |
| IGNFA | Indira Gandhi National Forest Academy |
| IIFM | Indian Institute of Forest Management |
| ITRF | International Terrestrial Reference Frame |
| IUCN | International Union for Conservation of Nature |
| IVI | Importance Value Index |
| JFM | Joint Forest Management |
| JFMC | Joint Forest Management Committee |
| LULUCF | Land Use and Land Use Change and Forestry |
| MAI | Mean Annual Increment |
| MAPs | Medicinal and Aromatic Plants |
| MAR | Monitoring Assessment and Reporting |
| MEoF | Minister of Environment and Forests |
| MFP | Minor Forest Produce |
| MHW | Mixed Hard Wood |
| MIS | Management and Information System |
| MODIS | Moderate-resolution Imaging Spectroradiometer |
| MoU | Memorandum of Understanding |
| MRV | Measuring Reporting and Verification |
| MSL | Mean Sea Level |
| NAP | National Afforestration Project |

| | |
|---|---|
| NBM | National Bamboo Mission |
| NaRMIL | National Resource Management and Intrigated Livelyhood |
| NFI | National Forest Inventory of India |
| NGO | Non-Governmental Organization |
| NH | National Highway |
| NP | National Park |
| NPV | Net Present Value |
| NREGS | National Rural Employment Gurantee Scheme |
| NREP | National Rural Employment Programme |
| NRSC | National Remote Sensing Centre |
| NTCA | National Tiger Conservation Authority |
| NTFP | Non-Timber Forest Produce |
| NWAP | National Wildlife Action Plan |
| NWDB | National Wastelands Development Board |
| OSMs | Open Series Maps |
| PA | Protected Area |
| PBRs | Peoples Biodiversity Registers |
| PCCF | Principal Chief Conservator of Forests |
| PCU | Project Co-ordination Unit |
| PESA | Panchayats (Extension to Scheduled Areas) Act |
| PIU | Project Implentation Unit |
| PF | Protected Forests |
| PRA | Participatory Rural Appraisal |
| PRF | Proposed Reserved Forest |
| PWPR | Preliminary Working Plan Report |
| RAPCCF | Regional Additional Principal Chief Conservator of Forests |
| RBA | Relative Basal Area |
| RBAFs | Relative Basal Area Frequencies |
| RD | Relative Density |
| REDD | Reducing Emissions from Deforestation and Forest Degradation |
| REWP | Research Education and Working Paln |
| RET | Rare, Endangered and Threatened |
| RF | Reserve Forests |
| RoFR | Recognition of Forests Rights |
| RFO | Range Forest Officer |
| RS | Remote Sensing |
| SC | Schedule Caste |
| SD | Standard Deviation |
| SF | Social Forestry |
| SFDs | State Forest Departments |
| SFM | Sustainable Forest Management |
| SMC | Soil and Moisture Conservation |
| SOI | Survey of India |
| ST | Schedule Tribes |
| TOF | Trees Outside Forests |
| UF | Unclassified Forests |
| UNDP | United Nations Development Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WGS | World Geodetic Survey |
| WII | Wildlife Institute of India |
| WLS | Wildlife Sanctuary |
| WP | Working Plan |
| WPO | Working Plan Officer |
| WPU | Working Plan Unit |

# III. LIST OF FLORA OF SONITPUR EAST FOREST DIVISION

Sonitpur East Forest Division is known for a diverse flora. Plant species found in the division is listed below with their vernacular name and the scientific name in Table 4, below.

**Table IV: List of diverse flora found in Sonitpur East forest Division, Assam**

| Vernacular Name | Botanical Name | Status |
|---|---|---|
| Ahoi | *Vitex peduncularis* | Common |
| Ajhar | *Lagerstroemia flosreginae* | Common |
| Am | *Mangifera indica* | Common |
| Amari | *Amoora wallichii* | Common |
| Amol | *Myristica kingii* | Few |
| Amloki | *Emblica Officinalis (Syn. Phyllanthus embellica)* | Common |
| Amora | *Spondias mangifera Willd* | Common |
| Amsia (Amseleng) | *Drimycarpus recemosus* | Common |
| Badam | *Streculia alata* | Common |
| Bandardima | *Dysoxylum binectiferum* | Common |
| Barun | *Crataeva religiosa* | Common |
| Bhamora | *Terminalia belerica* | Common |
| Bhela | *Semecarpus anacaradium* | Common |
| Bhatghila | *Oroxylum indicum* | Common |
| Bhe | *Salix tetrasperma* | Common |
| Bhelu (Tula) | *Tetrameles nudiflora* | Common |
| Bhelkor | *Trewia nudiflora* | Common |
| Boal | *Ehretia anacua* | Common |
| Bogipoma (Mikirdima) | *Chukrassia tubularis* | Common |
| Bogijamuk | *Eugenia praecox Roxb.* | Common |
| Bojorni (Borjonoli) | *Zanthoxylum budrunga* | Common |
| Bola | *Morus laevigata* | Few |
| Bonhualu | *Cryptocarya floribunda* | Common |
| Bonjolokia | *Cryptocarya amygdalina* | Common |
| Borkoliori | *Polyalthia simiarum* | Common |
| Boramthuri | *Talauma hodgsonii* | Common |
| Borpit | *Ailanthus grandis* | Common |
| Bonsum | *Phoebe goalparensis* | Common |
| Bhomloti | *Symplocos spicata* | Common |
| Bohot | *Artocarous spp* | Common |
| Bo, Bot , Jori | *Ficus spp.* | Common |
| Bon marla (Morola) | *Pterospermum acerifolium* | Common |
| Chalmogra | *Taraktogenos kurzii* | Few |
| Chtiabola | *Hovenia dulcis* | Common |
| Champ (Tita Sopa) | *Magnolia champaca* | Common |
| Dewachali (dewacham) | *Artocarpus lakoocha* | Common |
| Dhamin | *Heritiera macrophylla* | Common |
| Dhuna | *Canarium resiniferum* | Few |
| Dobahingori | *Quercus lanceifolia* | Few |
| Pakdima | *Trema orientalis* | Common |
| Figs | *Ficus spp.* | Common |
| Galronga | *Elaeocarpus aristatus* | Common |
| Garumoria | *Myristica spp. (Crypteronia paniculata)* | Common |
| Gendhelipoma | *Dysoxylum hamiltonii* | Common |
| Gohora | *Premna bengalensis* | Common |
| Gomari | *Gmelina arborea* | Common |
| Gonsoroi | *Cinnamomum cecicodaphne* | Common |
| Hatipoila | *Pterospermum acerifolium* | Common |
| Haldu (Haldusopa) | *Adina cordifolia* | Common |
| Hengunia | *Meliosma pinnata* | Common |
| Hillikha (Silika) | *Terminalia chebula* | Common |
| Hingori | *Castanopsis spp* | Common |
| Hijal | *Barringtonia polyantha* | Common |
| Hoalu | *Litsea polyantha* | Few |
| Hollock | *Terminalia myriocarpa* | Common |
| Jamuk | *Syzygium cumini (syn. Eugenia jambolana)* | Common |
| Jatipoma (Poma) | *Cedrela toona* | Common |

| Vernacular Name | Botanical Name | Status |
|---|---|---|
| Jinari | *Podocarpus neriifolia* | Few |
| Jobahingori | *Echinocarpus assamicus* | Few |
| Jutuli (Jikri) | *Altingia excelsa* | Common |
| Jia Poma | *Garuga pinnata* | Common |
| Kadam (Roghu) | *Anthocephalus cadamba* | Common |
| Kanchan | *Bauhinia purpurea* | Common |
| Kathal | *Artocarpus integrifolia* | Common |
| Kathal sopa | *Michelia oblonga* | Common |
| Kathalpotia sopa | *Pachylarnex pleiocarpa* | Common |
| Kaunla (Kawla) | *Machilus globosa* | Common |
| Keseru | *Heteropanax fragrans* | Common |
| Koliroi | *Polyalthia jenkiisii* | Common |
| Khair | *Acacia catechu* | Common |
| Khukan (Khokon) | *Duabanga sonneratioides* | Common |
| Koroi | *Albizia odoratissima* | Common |
| Kuhir | *Bridelia retusa* | Common |
| Kujithekera (Tepol tenga) | *Garcinia xanthochymus* | Common |
| Kum | *Careya arborea* | Common |
| Kau-thekera | *Garcinia cowa* | Few |
| Laban | *Ulmus lancifolia* | Common |
| Leteku | *Baccaurea sapida* | Common |
| Lewa | *Engelhardtia spp.* | Common |
| Mach-khtta (Haskhtia) | *Callicarpa arborea* | Common |
| Maipak | *Evodia meliaefolia* | Common |
| Mekahi | *Phoebe cooperiana* | Common |
| Miritenga (Hamoi tenga) | *Spondias axillaris* | Common |
| Modar | *Erythrina suberosa* | Common |
| Moj | *Albizia lucida* | Common |
| Morhal | *Vatica lanceaefolia* | Common |
| Motanahor | *Peterospermum lancifolium* | Common |
| Mauhita | *Celtis australis & Celtis terrandma* | Common |
| Moipuri-urohi | *Parkia roxburghii* | Common |
| Nagabhu (Ghugra) | *Schima wallichii* | Common |
| Naga-dalchini | *Cinnomomum obtusifolium* | Common |
| Nahor | *Mesua ferrea* | Common |
| Nahori | *Mansonia dipikae* | Common |
| Odal (Udal) | *Sterculia villosa* | Common |
| Outenga | *Dillenia indica* | Common |
| Okashi (Akashi) | *Dillenia pentagyna* | Common |
| Panidodam | *Hymenodictyon execelsum* | Common |
| Panimudi | *Glochidion ferdinandi* | Common |
| Pansopa | *Magnolia montana* | Few |
| Paruli | *Stereospermum chelonoides* | Common |
| Pathihunda | *Cinnamomum spp* | Common |
| Phulgomari | *Endospermum chinense* | Common |
| Phulsopa | *Manglietia insignis* | Common |
| Pinchola | *Kydia calycina* | Common |
| Poma | *Cedrela toona* | Common |
| Poreng | *Elaeocarpus regosus or olea spp* | Common |
| Ramanbih | *Aesculus panduana* | Common |
| Rudrakhya | *Elaeocarpus genitrus* | Common |
| Ruhimola | *Lannea grandis* | Few |
| Sal | *Shorea robusta* | Common |
| Sam | *Artocarpus chaplasha* | Common |
| Sasi (Agar) | *Aquilaria agallocha* | Few |
| Satiana | *Alstonia scholaris* | Common |
| Seleng | *Sapium baccatum* | Common |
| Sia Nahor | *Kayea assamica* | Common |
| Sida | *Legastroemia parviflora* | Common |
| Simul | *Salmalia malebarica (Syn. Bombax malabaricum)* | Common |
| Sirish | *Albizia procera* | Common |
| Shissp | *Dalbergia sissoo* | Common |
| Som (soom) | *Machilus bombycina* | Common |
| Sonaru | *Cassia fistula* | Common |
| Sopa | *Michelia & Mangnolia spp.* | Common |

| Vernacular Name | Botanical Name | Status |
|---|---|---|
| Soratgach | *Laportea plerostigma* | Common |
| Sow (sou) | *Albizia stipulata* | Common |
| Teak (segun) | *Tectona grandis* | Common |
| Tezrahga | *Myristica angustifolia* | Common |
| Thekera | *Garcinia spp* | Common |
| Titasopa | *Talauma phellocarpa* | Common |
| Thutmola | *Garuga pinnata* | Common |
| Thowtiowa | *Meliosma simplicifolia* | Common |
| Udal | *Sterculia villosa* | Common |
| Uriam | *Bischofia javanica* | Common |

# IV LIST OF FAUNA OF SONITPUR EAST FOREST DIVISION

Sonitpur East Forest Division provides a suitable habitat for diverse animal life. The list of fauna found in this division is provided below in Table 5.

**Table V: List of diverse fauna found in Sonitpur East Forest Division, Assam**

| Local Name | English Name | Scientific Name |
|---|---|---|
| Hati | Elephant | *Elephus maximus* |
| Nahar Phutuki Bagh | Leopard | *Panthera pardus* |
| Lata Makari Bagh | Leopard cat | *Felis bengalensis* |
| Bon Mekuri | Jungle cat | *Felis chaus* |
| Banaria Gahari | Wild pig, Civet cat | *Sus scrofa* |
| Jahamal | Large Indian civet cat | *Viverra zibetha* |
| Jahamal | Small Indian civet | *Viverricula Indica* |
| Shial | Indian Fox | *Vulpes bangalensis* |
| Shaha pahu | Hare Rufous tail | *Lepus nigricollis* |
| Bon row | Chinese Pangolin | *Manis pentadactyla* |
| Udd | Smooth Indian Otter | *Lutra perspicillata* |
| Baduli | Flying Fox | *Pteropus giganteus* |
| Baduli | Short nose fuit bat | *Cynopterus sphinx* |
| Malua Bandar | Rhesus macaque | *Macaca mulatta* |
| Kerketua | Three striped palm squirrel | *Funambulus palmarum* |
| Newul | Mangoose | *Herpestes javanicus* |
| Chagali pahu | Indian barking deer | *Munitiacus muntjak* |

| Name of Birds | Scientific Name |
|---|---|
| Cormorant | *Phalacrocorax carbo* |
| Little Cormorant | *Microcarbo niger* |
| Great whitebellied heron | *Ardea insignis* |
| Grey heron | *Ardea cinerea rectirostris* |
| Cattle egret | *Bubulcus ibis* |
| Large egret | *Casmerodius albus* |
| Medium egret | *Mesophoyx intermedia* |
| Little egret | *Egretta garzetta* |
| Open bill stork | *Anastomus oscitans* |
| White stork | *Ciconia boyciana* |
| Black Kite | *Milvus migrans* |
| White eyed buzzard eagle | *Butastur teesa* |
| Indian Pond heron or Paddy Bird | *Ardeola grayii* |
| Greater adjutant stork | *Leptoptilos dubius* |
| Lesser adjustant stork | *Leptoptilos javanicus* |
| Changeable hawk eagle | *Spizaetus cirrhatus* |
| Rufous bellied eagle | *Hieraaetus kienerii* |
| Ospery | *Pandion haliaetus* |
| Swamp partridge | *Francolinus gularis* |

| Name of Birds | Scientific Name |
|---|---|
| Jungle bush quails | *Perdicula asiatica* |
| Manipur buss quail | *Perdicula manipurensis* |
| Red jungle fowl | *Gallus gallus* |
| Lapwing | *Vanellus vanellus* |
| Common sandpiper | *Actitis hypoleucos* |
| Green imperial pigeon | *Ducula aenea* |
| Turtle dove | *Streptopelia turtur* |
| Indian ring dove or Eurasian collard dove | *Streptopelia decaocto* |
| Red coller dove | *Streptopelia tranquebarica* |
| Spotted dove | *Streptopelia chinensis* |
| Alexandrine parakeet | *Psittacula eupatria* |
| Blossom headed parakeet | *Psittacula roseata* |
| Slaty headed parakeet | *Psittacula himalayana* |
| Jecobin Cuckoo | *Clamator jacobinus* |
| Rufous bellied or Burmese plaitive cuckoo | *Cacomantis merulinus* |
| Asian Koel | *Eudynamys scolopacea* |
| Barn owl | *Tyto alba* |
| African grass owl | *Tyto capensis* |
| Jungle owlet | *Glaucidium radiatum* |
| Jungle nightjar | *Caprimulgus indicus* |
| Chestnut headed bee eater | *Merops leschenaulti* |
| Blue tailed bee eater | *Merops philippinus* |
| Blue beared bee eater | *Nyctyornis athertoni* |
| Assam Black naped woodpecker | *Picus canus gyldenstolpei* |
| Indian golden backed woodpecker | *Dinopium benghalense* |
| Common Flameback | *Dinopium javanense* |
| Golden oriole | *Oriolus oriolus (kundoo)* |
| Indian blackheaded oriole | *Oriolus xanthornus* |
| Black drongo or King crow | *Dicrurus adsimilis albirictus* |
| Lesser racket tail Drongo | *Dicrurus remifer* |
| Grey headed starling | *Sturnus malabaricus* |
| Common starling | *Sturnus vulgaris poltaratskyi* |
| Pied myna | *Sturnus contra* |
| Jungle myna | *Acridotheres fuscatus* |
| Hill myna | *Gracula religiosa* |
| House crow | *Corvus splendens* |
| Red whiskered bulbul | *Pycnonotus jocosus* |
| White checked bulbul | *Pycnonotus leucogenys* |
| Red vented bulbul | *Pycnonotus cafer bengalensis* |

| Local Name of Reptiles | Scientific Name |
|---|---|
| Ajagar | *Indian Rock Python* |
| Mossua Gom | *Rat snake* |
| Bak Raj | *Copper head trinket* |
| Roja Feti | *King Cobra* |
| Feti | *Monocled Cobra* |
| Dhora | *Checkred Keelback* |
| Karxola | *Common Green whip snake* |
| Gui Xap | *Water Monitor Lizard* |
| Keko Xap | *Common Tokey Gecko* |
| Tespia | *Oriented garden Lizard* |
| Bamuni Xap | *Buff striped Keelback* |

| Local Name of Fishes | Scientific Name |
|---|---|
| Darikana | *Common rosbora* |
| Moaa | *Indian Carplet* |
| Katia xingora | *Dwarf Tengra* |

| | |
|---|---|
| Xingi | *Stinging cat fish* |
| Magur | *Air breathing cat fish* |
| Goroi | *Green snake head fish* |
| Seng | *Smooth brassed snake head* |
| Kuchia | *Fesh water Ecl* |
| Kawoi | *Climbing perch* |
| Sengeli | *Ceylon snakehead* |

| Name of Butterfly | Scientific Name |
|---|---|
| Plain tiger | *Danaus chrysippus (Linnaeus)* |
| Common Mormon | *Papilio polytes (Cramer)* |
| Indian cabbage white | *Pieris canidia (Sparrman)* |
| Yellow jezebel | *Delias agostina* |
| Chocolate albatross | *Appias lyncida* |
| Three spot grass yellow | *Eurema blanda silhetana* |
| Comon hedge blue | *Acytolepis puspa* |
| Common grass yellow | *Eurema hecabe (Linnaeus)* |
| Dark cerulean | *Jamides bochus (Cramer)* |
| The great duffer | *Discophora timora* |
| Common duffer | *Discophora sondaica* |
| Common evening brown | *Melanitis leda ismene (Cramer)* |
| Common bushbrown | *Mycalesis perseus (Fabricius)* |
| Drakbrand bushbrown | *Mycalesis mineus (Linnaeus)* |
| Common five-ring | *Ypthima baldus (Fabricius)* |
| Tabby | *Psedergolis wedah (Horsfield)* |
| Lemon pansy | *Precis lemonias (Linnaeus)* |
| Grey pensy | *Precis Atlites(Linnaeus)* |
| Common sailor | *Neptis hylas (Linnaeus)* |
| Sullied sailor | *Neptis soma* |
| Glassy tiger | *Danaus algae (Stoll)* |
| Common tiger | *Danaus genutia (Cramer)* |
| Pale grass blue | *Pseudozizeeria maha (Horsfield)* |
| Common earl | *Tanaecia julii* |
| Angled Castor | *Ariadne ariadne (Linnaeus)* |
| Common Castor | *Ariadne merione (Cramer)* |
| Yerburis sailor | *Neptis yerbury* |
| Blue admiral | *Kaniska canace* |
| Zebra Blue | *Tarucus plinius* |
| Yellow Orange Tip | *Ixias pyrene (Linnaeus)* |
| Lime butterfly | *Papilio demoleus (Linnaeus)* |
| Blue Mormon | *Papilio polymnestor* |

# VOLUME 1
# PART I

# SUMMARY OF FACTS ON WHICH PROPOSALS ARE MADE

# CHAPTER 1

# THE TRACT DEALT WITH

## 1.1 Name and Situation

This Working Plan covers five Reserve Forest's of Sonitpur East Forest Division. The reserved forests covered by this Working Plan lie within the geographical limits of Latitude 26°37'48.50" N and 27° 1'27.44"N, and longitude 93°42'25.24"E and 92°53'20.73"E. The major portion of the forests are situated on the Northern part of the district, i.e. along the interstate boundary between Assam and Arunachal Pradesh. A brief Description of Division Boundary is given in the table below.

**Table 1.1: Details of the divisional boundary**

| Direction | Boundary |
|---|---|
| North | Inter State boundary of Assam and Arunachal Pradesh |
| South | Northernbank of River Brahmaputra from confluence of Jia Bhorali River in west to River Sessa in east across Gohpur |
| East | River Sessa in Gohpur (District boundary of Lakhimpur) |
| West | Jia Bhorali River |

Prior to 1993, Sonitpur East Forest Division was part of the erstwhile Darrang East Division. The ertswhile Darrang Division consisted of Darrang District and a small part of Kamrup district flanked by Sessa river in the East and Dhansiri river in the West. In the year 1971, Darrang Division was reconstituted along with the creation of the present Lakhimpur Division. Later, vide Government Notification No. FRE. 8/81/19 dated 16/02/1981 the Darrang Division was further bifurcated into Darrang West Division (situated on the western part of river Bhorali) headquartered at Tezpur and the Darrang East Division (situated on the eastern part of Jia Bhorali river) with its headquarter in Biswanath Chariali. The Darrang East Division was renamed as Sonitpur East Division on 31$^{st}$ December 1993) (Fig 1 ).

These forests are covered in Survey of India Toposheet No. 83 (B14, F5, F6, F9, F1, F2,F9 ) on 1:50,000 scale The maps prepared with geographical coordinates recorded at the site are maintained by the GIS Cell (REWP), Guwahati for reference purposes. Table 1.2 below shows the administrative set up of Sonitpur East Forest Division. The Range, Compartment and RF maps of Sonitpur East Forest Division are given in appendices.( ANNEXURE I( RANGE MAPS, DIVISION MAPS, COMPARTMENT MAPS, RF MAPS))

Fig 1. Admistrative Map of Sonitpur East Division

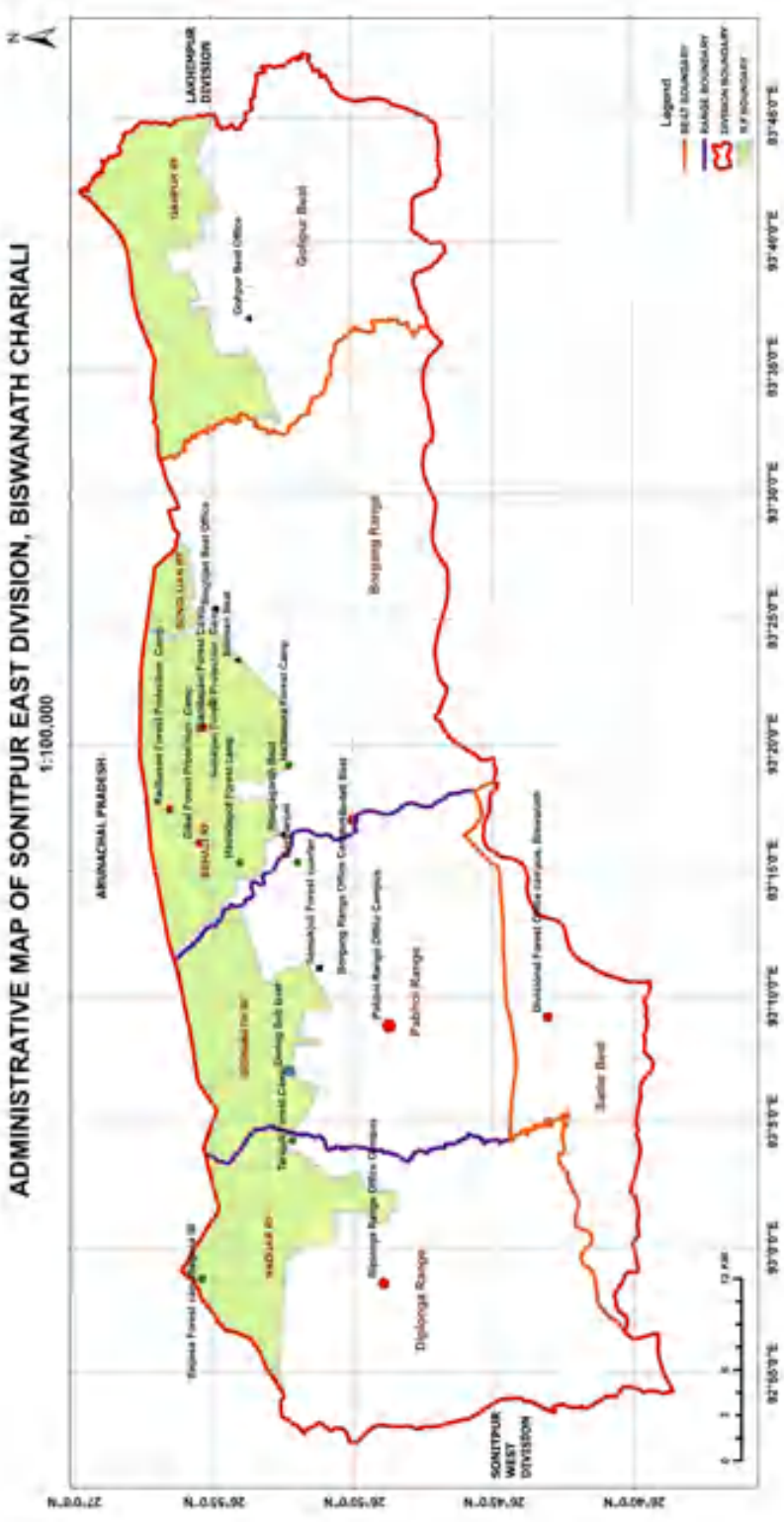


Fig 1a. Range Map of Sonitpur East Division

**Table 1.2: Administrative setup of the Sonitpur East Forest Division**

| Circle | Division | Range | RF Name | Block | Compartments | Area (in ha) |
|---|---|---|---|---|---|---|
| Northern Assam Circle | Sonitpur East | Borgang Range | Behali RF | Borgang | 26 | 14,673 |
| | | | Behali RF | Behali | | |
| | | | Behali RF | Buroi | | |
| | | | Singlijan RF | Singlijan | 1 | 1,594.93 |
| | | Diplonga Range | Naduar RF | Khari | 21 | 9808.81 |
| | | | Naduar RF | Hatipati | | |
| | | Pabhoi Range | Biswanath RF | Biswanath | 17 | 9824.45 |
| | | | Biswanath RF | Derring | | |
| | | | Biswanath RF | Borgang | | |
| | | Gohpur Beat | Gohpur RF | Gohpur West | 15 | 12168.49 |
| | | | Gohpur RF | Gohpur East | | |
| **Total** | | | | | | **48069.67** |

The compartments were made based on natural boundary, RF boundary, river banks, forest roads and at few places straight lines. The GPS coordinates of all compartments are as Annexed as ANNEXURE –II and the Compartment Map is annexed as ANNEXURE III

According to the 2011 census Sonitpur district has a population of 19,25,975 people. The district has a population density of 365 inhabitants per square kilometre. Its population growth rate over the decade 2001-2011 was 15.67%.Sonitpur has a sex ratio of 946 females for every 1000 males, and a literacy rate of 69.96%.

## 1.2 Configuration of the Ground

The ground topography is generally flat with hillocks along the northern edge of the Division. The terrain, in general has a moderate slope from North to South. The RFs are traversed by numerous streams, which are mainly perennial in nature, though there are many small streams that are seasonal. The rivers generally flow from north to south and finally drain into the Brahmaputra river. The tract gradually narrows down from west to East. There is absence of any hill or hillock in the valley towards the East of Bhorali river as compared to the western part.

## 1.3 Geology, Rock and Soil

The low hills along the northern edge of the main forest belt extending from the series of mountain chains forming the Himalayas have risen out of the bed of ancient sea resulting from the movement of the Eurasian and Indian tectonic plates. The entire Division comprises alluvial deposit of clay and sand in varying proportions ranging from coarse water borne stone to fine silt. The soil in the hilly slopes is usually deep sandy loam with occasional boulders on the surface.

The Division has a typical ''Bhabar'' formation, which is easily noticeable towards the foothills. The sub-soil comprises coarse water borne gravels and boulders. Surface stones and boulders superimposed by sandy loam at varying depths with layers of humus. Surface stones and boulders are occasional near the foothills. Most of the small streams in this track are seasonal in nature in their upper reaches. However, the lower reaches of the streams are perennial. Some regions in Naduar RF and Biswanath RF have dry and porous soil formation despite the heavy rainfall. Towards south of the Bharali region is the Terai region which is characterized by moist soil, due to high water table.

Soil along the ridges is coarse due to weathering and erosion. There are entrapped pockets of good loam in between boulders. The middle and lower slopes including the foothills are composed of deep red loam except for places subjected to heavy erosion, such as parts of the southern slope. The tea plantations, which occupy the central belt of land in between the hills and the Brahmaputra river consist mainly of friable red loam.

## 1.4 Climate

Moderate temperature, high humidity and frequent showers and thunderstorms characterize the climate. The temperature in the Division is moderate through the year. Figure 1.1 shows the pattern of average temperature in the Division from 2007 to 2016. The Division receives maximum precipitation between the months of April and September. Figure 1.2 shows the average rainfall pattern in the Division from 2007 to 2016. (Refer Annexure I for details)

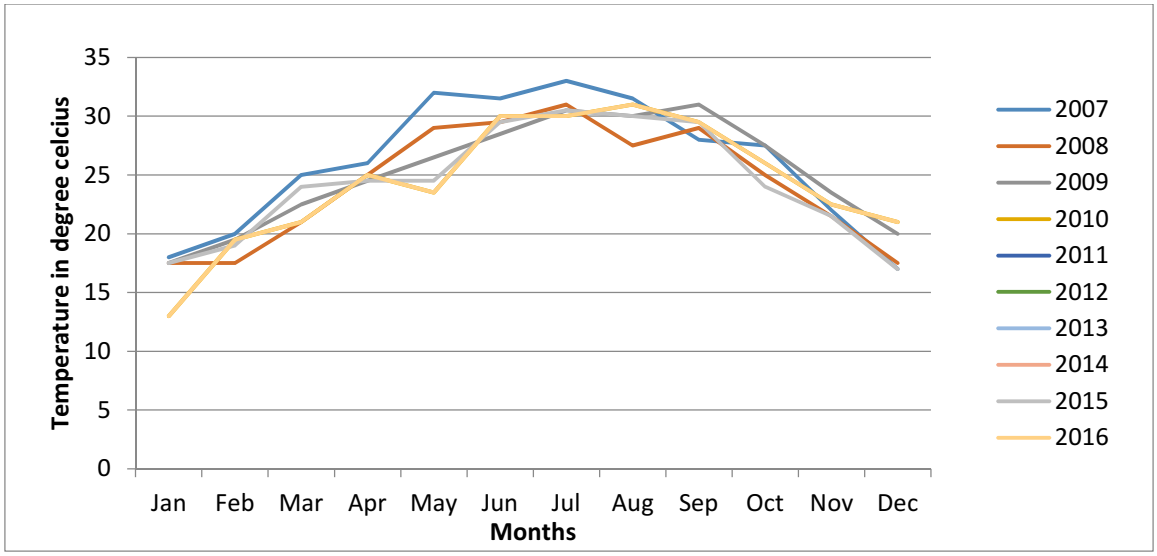



**Figure 1.1: Month wise average temperature in (degree celcius) from 2007 to 2016 of Sonitpur East Forest Division**

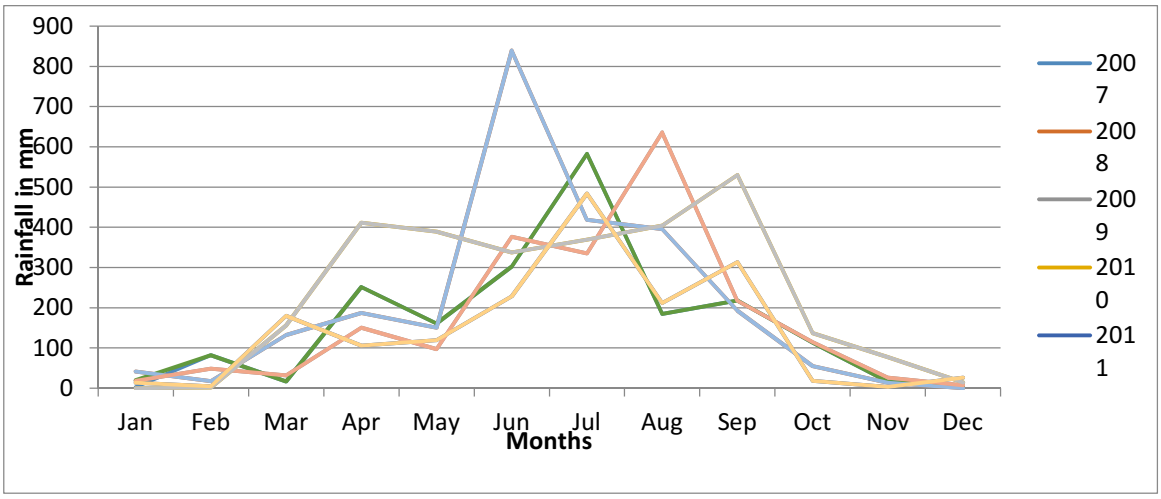



**Figure 1.2: Mean Monthly rainfall in mm from 2007 to 2016 of Sonitpur East Division**

# CHAPTER 2

# MAINTENANCE / INCREASE IN THE EXTENT OF TREE COVER

## 2.1 Area of Forest under Different Legal Classes

List of Reserved Forests under Sonitpur East Forest Division covered by this Working Plan is furnished below in Table 2.1.

**Table2.1: List of Reserve Forests and relevant notifications**

| **Gohpur RF** | | | | | |
|---|---|---|---|---|---|
| **Sl. No.** | **Constitution/ Addition/ Deforestation** | **Area (Ha.)** | **Area after Addition/deletion** | **Notification No.** | **Date of Notification** |
| 1 | Constitution | 13,309.591 | 13,309.591 | 4063R | 10.09.1915 |
| 2 | Addition | | | No. 2898F | 29.02.1920 |
| **Biswanath RF** | | | | | |
| 1. | Constitution | 10,561.005 | -- | 4032R | 13.08.1917 |
| | | | | AFR.110/51/4 | 31.05.1951 |
| **Behali RF** | | | | | |
| 1. | Constitution | 14,016.6 | -- | 4031R | 13.08.1917 |
| | | | | 4031R 29/2 G.J | 18.05.1939 |
| **Nadaur RF** | | | | | |
| 1 | Constitution | 28,141.335 | 8,141.335 | No. 5 | 17.10.1878 |
| 2 | 1st Addition | | | 5321R | 23.11.1904 |
| | 2nd Addition | | | 5255R | 02.11.1917 |
| | 3rd Addition | | | 1500R | 24.05.1933 |
| | 4th Addition | | | For/sett/ 438/66 | 29.01.1968 |
| 3 | Transfer | 2,00,000 | | | 06.09.1985 |
| **Singlijan RF** | | | | | |
| 1 | Constitution | 1,400.00 | -- | FRS/230/07/22 | 17.11.1987 |

Total productive forest area excluding encroachment, blank, wetland and diversion is 16,276.0 ha. The area of reserved forests (as per working plan compilation) falling under the jurisdiction of different ranges are indicated in Table 2.2.

**Table 2.2: Details of forest area under various RFs**

| **Sl. No.** | **Name of RFs** | **Area as per Government notification (in Ha.)** |
|---|---|---|
| 1 | Behali reserve forest | 14,016.6 |
| 2 | Biswanath reserve forest | 10,561 |
| 3. | Gahpur reserve forest | 13,309.59 |
| 3 | Naduar reserve forest | 8,141.33 |
| 4 | Singlijan reserve forest | 1,400 |
| **Total area** | | 47,428.52 |

**Note**: For all the calculation the digitized polygon area haven been take into consideration.

Compartmentwise area (Ha.) and perimeter (m) is provided in ANNEXURE Iva, IVb, IVc, IVd and IVf .

Total 47.239 Ha area was divererted under Forest Conservation Act 1980 in the Division as in Table 2.2a.

Table 2.2a. Forest area diverted under forest conservation act 1980 in the division.

| Sl No. | Name of the Project | Name RF | Area Diverted |
|---|---|---|---|
| 1 | NHIDCL 4 lanning of existing NH for a part of Gohpur-Holengi Stret ch | Gohpur RF | 23.457 Ha |
| 2 | Power Transmission Line by NER –II | Gohpur RF | 23.782 Ha |

## 2.2 Forest Area under Different Working Circle / Management Plan

**Table 2.4: Statement of areas under various ranges with head quarters as per working plan**

| Sl.No. | Name of the working circle/overlapping circle | Name of the RFs (Compartment nos.) | Allotted area under the working circle (ha) |
|---|---|---|---|
| 1. | Joint Forest Management Working Circle | Behali RF :SER3C 26, SER3C 24, SER3C 22, SER3C , SER3C 18. SER3C 21, SER3C 8<br>Biswanath RF : SER2C 8,<br>Naduar RF : SER 1C 6 SER 1C,4 SER 1C,3, SER 1C 19, SER 1C 18<br>Singlijan RF: SER 4C 1,<br>Gohpur RF : SER 5C 1 SER 5C,5, SER 5C 1 | 760 Ha |
| 2. | Plantation and Improvement Working Circle | Behali RF: SER3C2, SER3C3, SER3C5, SER3C6, SER3C7, SER3C8, SER3C10, SER3C11, SER3C13, SER3C18, SER3C15, SER3C16, SER3C13<br>Biswanath RF: SER2C1, SER2C11, SER2C12, SER2C16, SER2C17, SER2C4 | 2100 Ha for Improvement and<br>1845 Ha for Plantation |
| 3. | Non Timber Forest Produce and Bamboo (Overlapping) Working Circle | NTFP(Behali RF :SER3C 26, SER3C 24, SER3C 22, SER3C , SER3C 18. SER3C 21, SER3C 8<br>Biswanath RF : SER2C 8,<br>Naduar RF : SER 1C 6 SER 1C,4 SER 1C,3, SER 1C 19, SER 1C 18<br>Singlijan RF: SER 4C 1,<br>Gohpur RF : SER 5C 1 SER 5C,5, SER 5C 1)<br>Bamboo<br>(Biswanath RF: SER2C10, SER2C 1, SER2C 4, SER2C 5, SER2C 8, SER2C 11, SER2C 12, SER2C 13, SER2C 16, SER2C 17, SER2C 3 Naduar RF: SERC21, SER1C14) | NTFP 760 Ha<br>Bamboo 850 Ha |

| Sl.No. | Name of the working circle/overlapping circle | Name of the RFs (Compartment nos.) | Allotted area under the working circle (ha) |
|---|---|---|---|
| 4 | Community and Forest Rights Working Circle (Overlapping ) | Biswanath RF: SER2C1, SER2C10, SER2C11, SER2C12, SER2C13, SER2C14, SER2C15, SER2C16, SER2C17, SER2C2, SER2C3, SER2C4,SER2C5, SER2C6.,SER2C7, SER2C8, SER2C9, Gohpur RF: SER5C1, SER5C10, SER5C11, SER5C12,SER5C13,SER5C14, SER5C15,SER5C2, SER5C3, SER5C4, SER5C5,,SER5C6,SER5C7,SER5C8,SER5C9, Naduar RF: SER1C1, SER1C10, SER1C11, SER1C12, SER1C13, SER1C14, SER1C15, SER1C16, SER1C17, SER1C18, SER1C19, SER1C2, SER1C20, SER1C21, SER1C3, SER1C4, SER1C5, SER1C6, SER1C7, SER1C8, SER1C9 | 21717 Ha |
| 4. | Forest Protection Working Circle (Overlapping Circle) | All Compartments of All the Reserve Forests under Sonitpur East Division other than those areas under encroachment and control of Arunachal Pradesh | Entire Forest Division area |
| 5. | Wildlife Management and Biodiversity conservation (overlapping) working circle. | All Compartments of All the Reserve Forests under Sonitpur East Division other than those areas under encroachment and control of Arunachal Pradesh | Entire Forest Division Area |

**Figure 2.1: Map showing allocation of forest areas in each compartment under different working circles.**

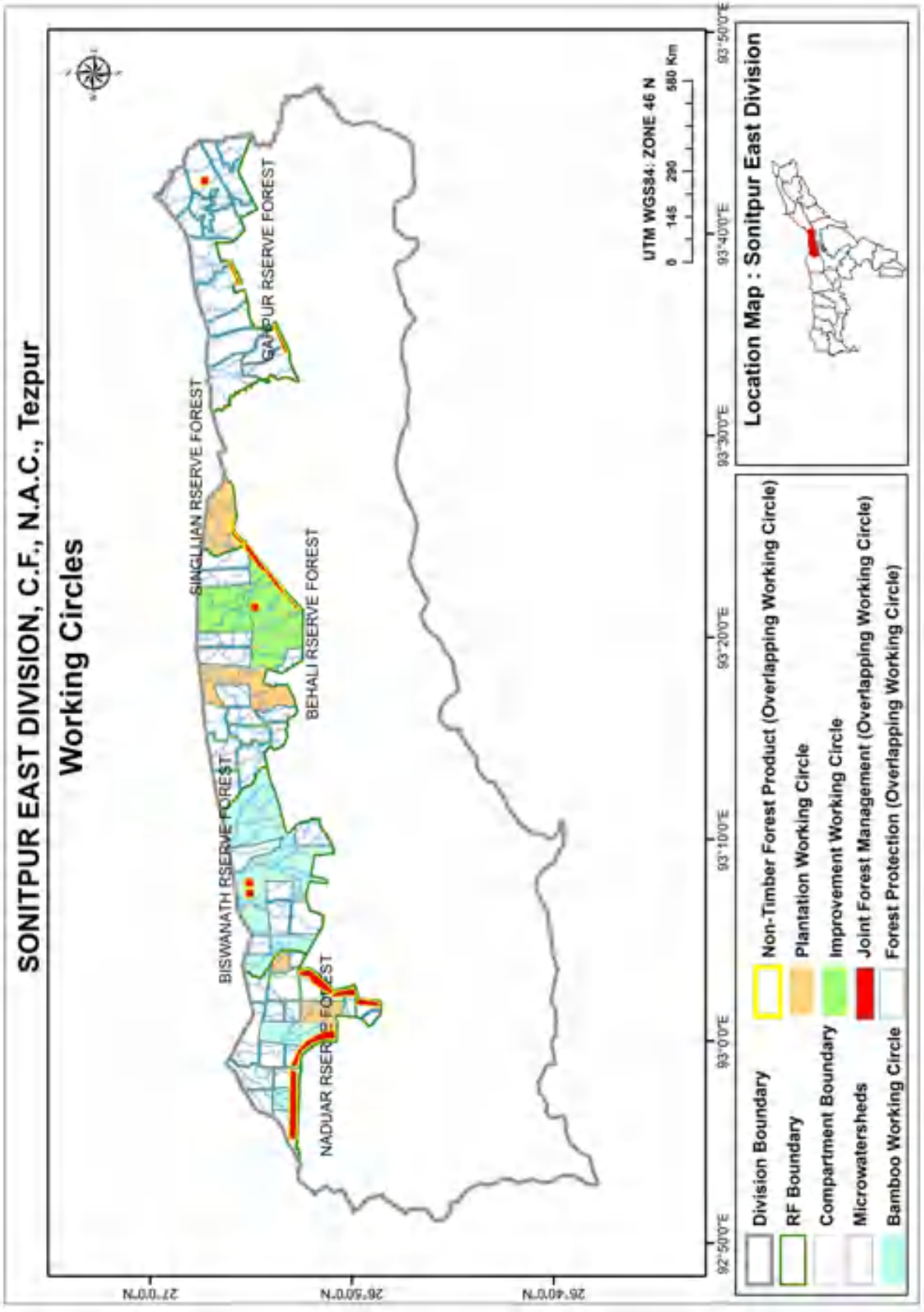
## 2.3 Percentage of Forest with Secured Boundaries

The RFs run along the foothills in the east-west direction. The northern boundary is formed by the interstate boundary between Arunachal Pradesh and Assam, which was surveyed by Survey of India in 1972-74 and boundary pillars were fixed. The southern boundary of almost all the reserve forests are found bounded by the Tea gardens, revenue villages or by existing cart tracts or roads. No effective measures have been taken to demarcate the southern boundary by departmental boundary pillars. Total length of boundary of Reserved Forests of the Division is 253.675 km. Details of length of natural and artificial boundaries of all RFs in the Division is provided in Table 2.5.

**Table 2.5: Length of boundaries of RFs in Sonitpur Division, Assam**

| Sl. No. | Name of RF | Artificial Boundary (in km) | Natural Boundary (in km) | Total Boundary (in km) |
|---|---|---|---|---|
| 1 | Biswanath RF | 40.975 | 10.9 | 51.875 |
| 2 | Behali RF | 49.175 | 10.6 | 59.775 |
| 3 | Gohpur RF | 51.4 | 21.1 | 72.5 |
| 4 | Naduar RF | 37.325 | 15.1 | 52.425 |
| 5 | Singlijan RF | 12.4 | 4.7 | 17.1 |

**Fig 2.1. Map of Various Working Circles under Sonitpur East Division** ,



2.4 Land Use, Land Use Change and Forestry (LULCF)

LULUCF relates to the management relating to the measurement, estimation, assessment of uncertainties, monitoring and reporting of net carbon stock changes and anthropogenic greenhouse gas emissions by sources and removals by sinks in land use, land-use change and forestry sector. This is a study on land use to elaborate methods to estimate, measure, monitor, and report changes in carbon stocks and anthropogenic greenhouse gas emissions by sources and removals by sinks resulting from land use, land-use change and forestry activities and develop practicable methodologies to factor out direct human-induced changes in carbon stocks and greenhouse gas emissions by sources and removals due to indirect human induced and natural effects (such as those from fertilizers and nitrogen deposition), and effects due to past practices in forests. The land use and land use change in forests was assessed and compared among two assessment base years of 2005-2006 and 2015-2016. The analysis of the data reveals that the area under agricultural land and built up areas has shown maximum landuse change when compared to the base year i.e. 2005-2006, while the area under waterbodies has increased (refer table. 2.6). Figure 2.2 shows the graphical representation of the land use change in the division. According to a study the spatial distribution of different forest types from 1994 to 2001 shows that forest cover in Sonitpur is undergoing massive reduction with time. The district may be devoid of its forest cover in another 10 to 15 years if such a high rate of deforestation goes unchecked. This will of course lead to immense biodiversity loss. The increasing insurgency problem and constant increase in human and cattle population are to be blamed for this[1].*(**1** Assessment of large-scale deforestation in Sonitpur district of Assam, Shalini Srivastava, T. P. Singh, Harnam Singh, S. P. S. Kushwaha* and P. S. Roy, Indian Institute of Remote Sensing, Dehradun 248 001, India CURRENT SCIENCE, VOL. 82, NO. 12, 25 JUNE 2002 1479)*

Owing to increase in population, urbanization and industrialization, there is an ever-increasing demand of land to cater the requirements. As a result, significant area under forest has been transformed to build up areas for both rural and urban settlements. Due to an increase in agricultural practices, the area along the forest fringe has also witnessed major shift. Due to anthropogenic pressure, the areas under forests have also significantly deteriorated. Figure 2.6 shows the extent of changes (Hectares) in LULC detected between 2005-2006 and 2015-2016 at Sonitpur East Forest Division. Figures 2.3a and 2.3b are presented to compare the changes in the LULC in the division, and the statistics in the form of LULC change matrix of the division is provided in table 2.7a and reserve forest wise LULCF is shown in table 2.7b.

## Table 2.6: Land use change in Sonitpur East division (2005-2006 to 2015-2016).

| LULC Class | Area 2005-2006 (Ha.) | Area 2015-2016 (Ha.) | Net change in land use |
|---|---|---|---|
| Agriculture Cropland | 1,04,529.8 | 99,083.28 | -5446.53 |
| Agriculture Plantation(Tea garden) | 19,855.08 | 19,638.44 | -216.64 |
| Built-Up | 233.12 | 3,400.46 | 3167.34 |
| Forest-Evergreen/Semi evergreen | 12,090.15 | 11,578.59 | -511.56 |
| Forest-Scrub Forest | 625.96 | 1,916.57 | 1290.61 |
| Forest-Tree Clad Area | 46,406.75 | 47,377.27 | 970.51 |
| Grassland & Grazing land | 8,166.98 | 8,101.08 | -65.90 |
| Wastelands | 0 | 194.28 | 194.28 |
| Waterbodies_Lake/Pond | 19.75 | 15.66 | -4.09 |
| Waterbodies_River/Stream | 7,439.95 | 8,286.46 | 846.51 |
| Wetlands-Inland-Natural | 2,018.73 | 1,794.204 | -224.53 |
| **Total** | **2,01,386.3** | **2,01,386.3** | |

Summary of changes that occurred during last plan period in the RFs as summarized in Table 2.7b indicated that there has been an increase in built up area in all the RFs excepting Gohpur RF. In all the RFs there has been a decrease in agricultural cropland, these are converted to plantations and flood inundated silt deposited wasteland in Gophur RF and Sengelijan RF, plantation and built ups in Biswanath RF, and scrublands in Behali RF. Forest tree clad areas have increased in all the RFs. Grasslands have reduced in Behali RF, Naduar RF and Gohpur RF. Wetlands (inland) have reduced in Behali RF, Gohpur RF and Naduar RF. Wasteland have increased in Behali RF and Biswanath RF.

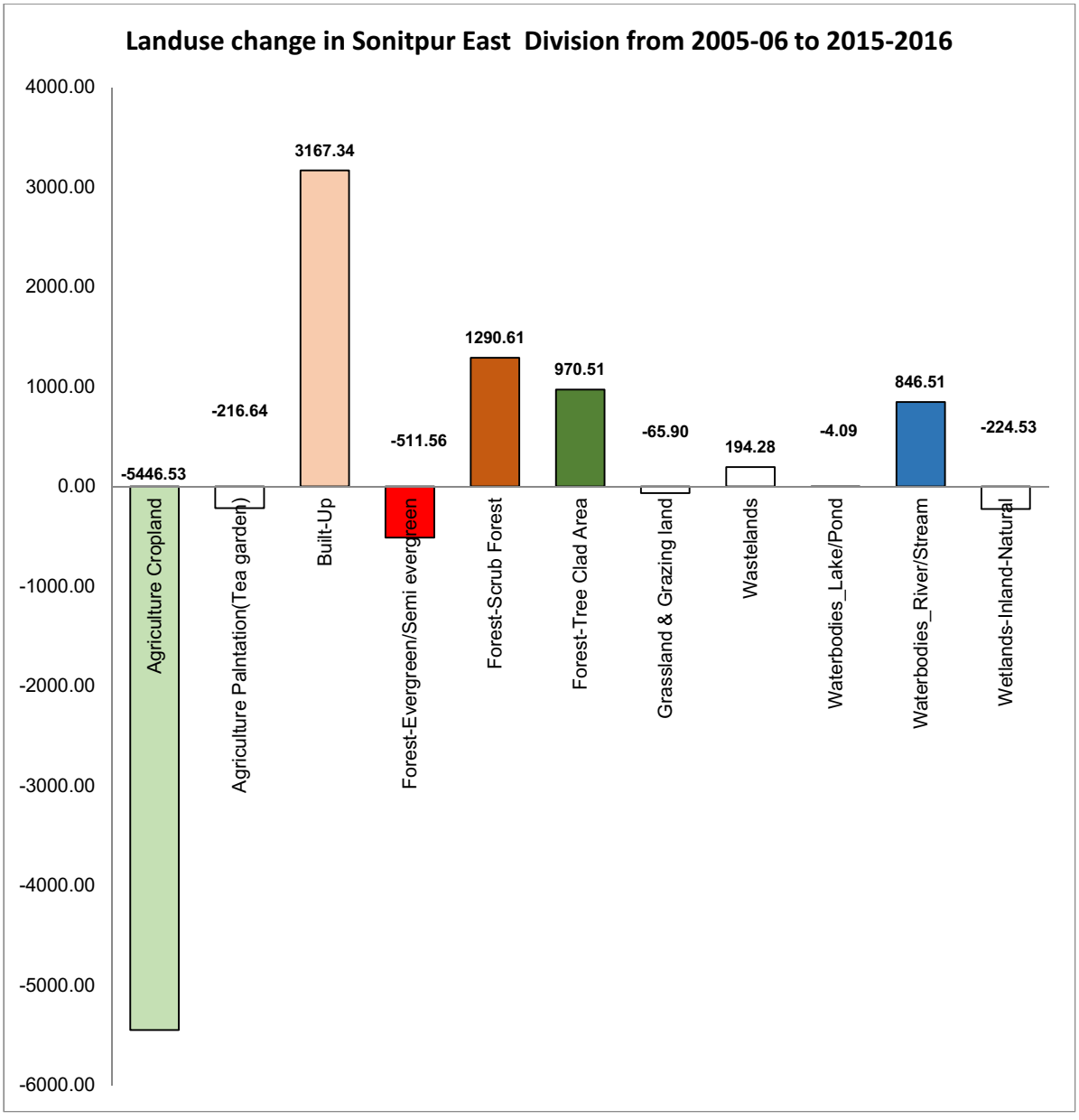
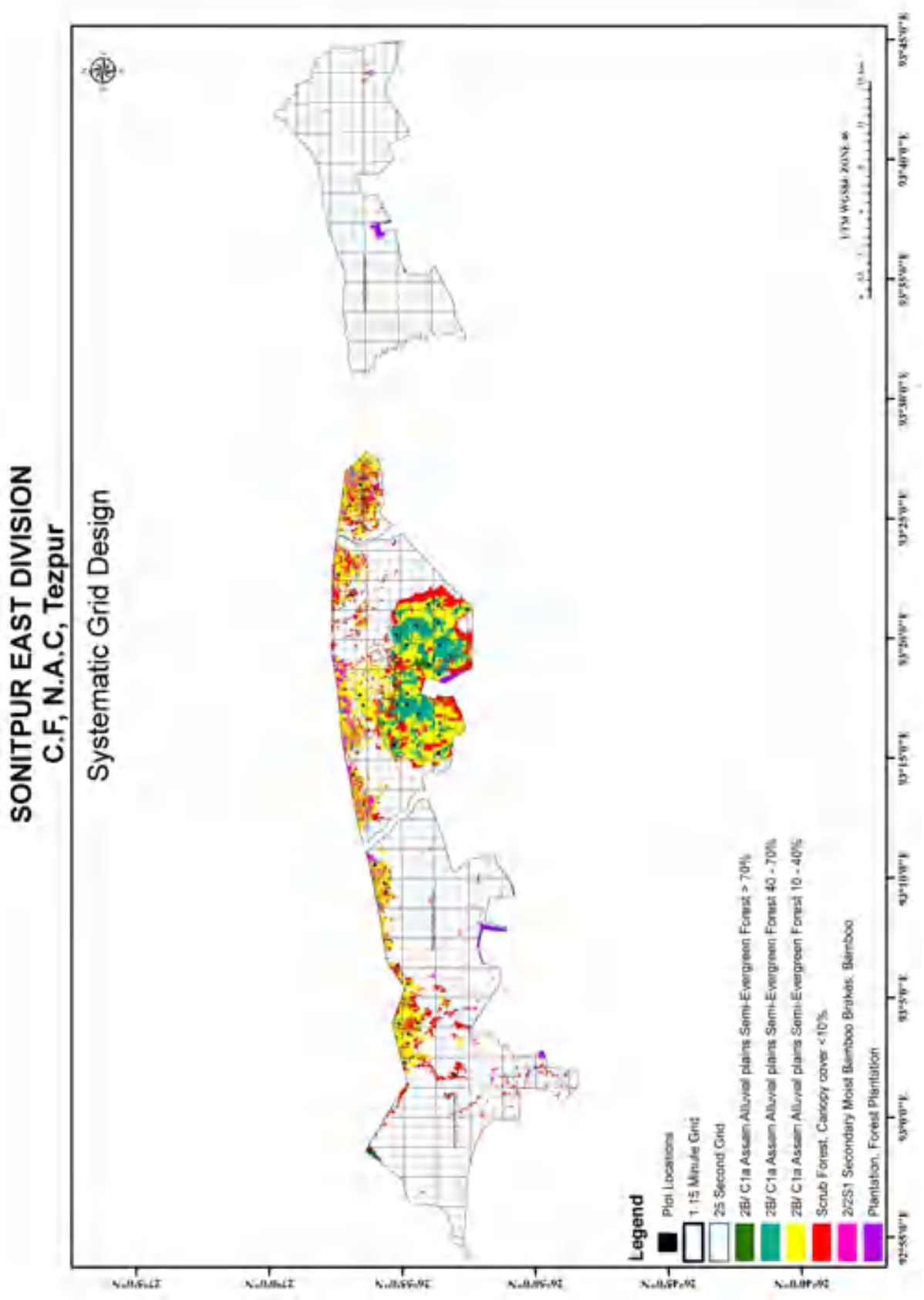



**Figure 2.2: Graph showing LULC (Ha.) in between 2005-2006 and 2015-2016 at Sonitpur East Forest Division**


SONITPUR EAST DIVISION
C.F, N.A.C, Tezpur
Systematic Grid Design
Legend
Plot Locations
1.15 Minute Grid
25 Second Grid
2B/ C1a Assam Alluvial plains Semi-Evergreen Forest > 70%
2B/ C1a Assam Alluvial plains Semi-Evergreen Forest 40 - 70%
2B/ C1a Assam Alluvial plains Semi-Evergreen Forest 10 - 40%
Scrub Forest, Canopy cover <10%
2G2S1 Secondary Moist Bamboo Brakes, Bamboo
Plantation, Forest Plantation

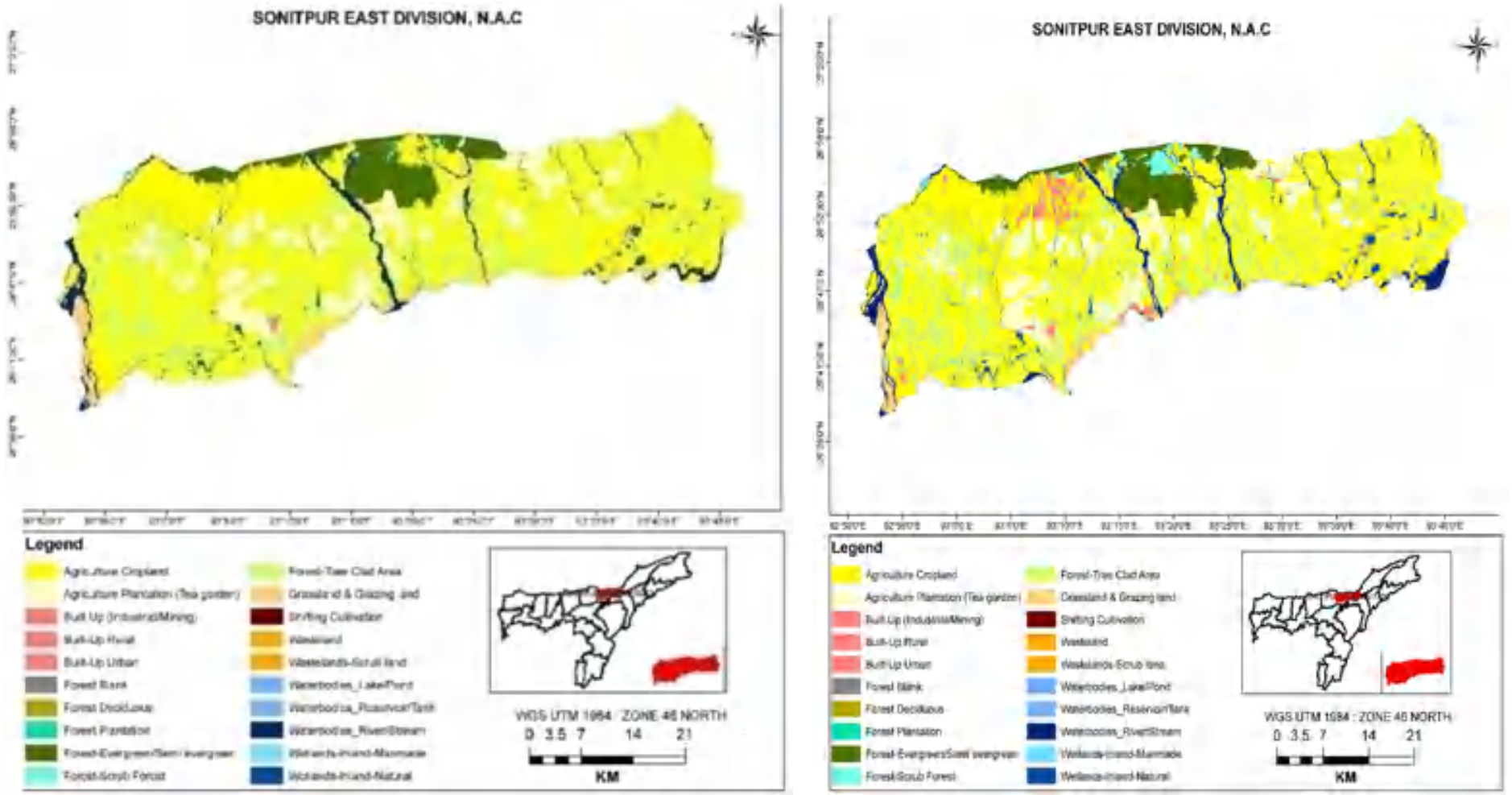



**Figure 2.3a and 2.3b: Land Use Land Cover Map of Sonitpur East Forest Division in 2005-2006 and 2015-2016**

**Table 2.7a: Land Use Land Cover Change Matrix of Sonitpur East Forest Division**

| **LULC Change Area in Ha** | **2015-2016** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005-2006 | Agriculture Cropland | Agriculture Palntation( Tea garden) | Built-Up | Forest-Evergreen /Semi evergreen | Forest-Scrub Forest | Forest-Tree Clad Area | Grassland & Grazing land | Wastelands | Waterbodies _Lake/Pond | Waterbodies_ River/Stream | Wetlands-Inland-Natural | Grand Total |
| Agriculture Cropland | 94541.37 | 526.1386 | 2571.56 | 42.01685 | 739.0133 | 4045.537 | 488.1871 | 2.917471 | 0.189466 | 1488.355 | 84.52759 | 104529.8 |
| Agriculture Plantation (Tea garden) | 496.0949 | 18810.23 | 210.6278 | 2.520469 | | 276.7955 | 14.09365 | | | 44.44122 | 0.279983 | 19855.08 |
| Built-Up | 0.218956 | 0.168196 | 231.4292 | | | 1.304883 | | | | | | 233.1212 |
| Forest-Evergreen/Semi evergreen | 35.79191 | 1.281497 | 2.349193 | 11385.04 | 596.5982 | 14.12585 | 28.45644 | 0.139648 | | 26.05768 | 0.311767 | 12090.15 |
| Forest-Scrub Forest | 2.338025 | | | 69.51702 | 508.819 | 26.73134 | 4.050469 | 0.286335 | | 14.21994 | | 625.9621 |
| Forest-Tree Clad Area | 2825.057 | 172.7713 | 380.2938 | 10.05602 | 1.082913 | 42558.07 | 73.21236 | 21.73059 | 3.551981 | 298.2683 | 62.65978 | 46406.75 |
| Grassland & Grazing land | 510.1718 | 74.28228 | 1.022675 | 0.99564 | 1.760395 | 218.7659 | 6271.601 | 34.74264 | | 1047.366 | 6.273365 | 8166.981 |
| Waterbodies_Lake/Pond | 0.750587 | | | | | 1.269839 | | | 11.91975 | | 5.807234 | 19.74741 |
| Waterbodies_River/Stream | 503.8876 | 53.01885 | 3.175614 | 67.34905 | 13.07985 | 184.2236 | 1183.196 | 101.2638 | | 5325.78 | 4.977349 | 7439.952 |
| Wetlands-Inland-Natural | 167.5964 | 0.555306 | | 1.09774 | 56.21496 | 50.44448 | 38.28052 | 33.2045 | | 41.97011 | 1629.367 | 2018.731 |
| **Grand Total** | **99083.28** | **19638.44** | **3400.458** | **11578.59** | **1916.569** | **47377.27** | **8101.077** | **194.285** | **15.66119** | **8286.459** | **1794.204** | **201386.3** |

**Table 2.7b: Reserve forest wise LULUCF (Ha.) of Sonitpur East division (2005-2006 to 2015-2016).**

| LULC class / Year | Behali RF | | | Biswanath RF | | | Gohpur RF | | | Naduar RF | | | Sengelijan RF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2005 | 2016 | Net change | 2005 | 2016 | Net change | 2005 | 2016 | Net change | 2005 | 2016 | Net change | 2005 | 2016 | Net change |
| Agriculture cropland | 4,237.0 | 3,010.2 | -1,226.8 | 7,774.2 | 5,512.5 | -2,261.7 | 8,011.4 | 7,896.5 | -114.9 | 8,139.2 | 8,138.3 | -0.8 | 94.2 | 76.8 | -17.4 |
| Tea plantations | 77.2 | 64.1 | -13.1 | 83.4 | 84.6 | 1.2 | 176.5 | 197.9 | 21.4 | 182.8 | 7.5 | -175.3 | 51.4 | 52.2 | 0.8 |
| Forest (semi evergreen) | 8,582.6 | 8,137.4 | -445.2 | 1,422.5 | 1,333.7 | -88.8 | | | 0.0 | 485.6 | 496.7 | 11.1 | 1,256.8 | 1,264.2 | 7.5 |
| Forest (scrub) | 497.5 | 1,725.2 | 1,227.7 | | 98.0 | 98.0 | | | 0.0 | 91.9 | 93.4 | 1.5 | 4.9 | | -4.9 |
| Forest (tree clad) | 365.5 | 901.4 | 535.9 | 191.9 | 280.7 | 88.8 | 3,216.9 | 3,101.2 | -115.7 | 520.0 | 682.3 | 162.3 | 75.3 | 78.3 | 3.0 |
| Grassland / grazing land | 309.0 | 191.9 | -117.1 | 2.9 | 46.6 | 43.8 | 120.0 | 102.9 | -17.1 | 0.1 | 0.0 | -0.1 | 0.6 | | -0.6 |
| River / Streams | 483.2 | 557.0 | 73.8 | 315.9 | 272.0 | -43.9 | 291.2 | 529.1 | 237.8 | 143.6 | 70.3 | -73.3 | 47.8 | 59.5 | 11.7 |
| Wetlands (inland) | 167.5 | 38.5 | -129.0 | | | 0.0 | 21.4 | 9.9 | -11.5 | 22.2 | 5.9 | -16.3 | | | 0.0 |
| Builtups | | 18.6 | 18.6 | | 2,153.9 | 2,153.9 | | | 0.0 | | 90.9 | 90.9 | | | 0.0 |
| Wasteland | | 75.2 | 75.2 | | 8.7 | 8.7 | | | 0.0 | | | 0.0 | | | 0.0 |

### 2.4.1 Status of Encroachments

Reserve Forest lands are susceptible to both stray and organized encroachments. A detailed study of the encroachment problem, immediate follow up action and consolidation of the notified boundaries of all Reserve Forests in the Division, is the call of the hour. Table 2.8 shows the status of encroachment under different RFs in the Division. Map showing the encroached areas is shown in Figure 2.4.

**Table 2.8: Area encroached in Sonitpur East Forest Division, Assam**

| RF Name | RF Area (Ha) | Encroachment Area (Ha) | Agricultural Area (Ha) | Built Up Area (Ha) | Forest Plantation (Ha) |
|---|---|---|---|---|---|
| Behali RF | 14,763 | 3,987.4 | 3,623.7 | 363.7 | 54.5 |
| Biswanath RF | 9,824.5 | 6,521.1 | 5,994.9 | 526.2 | 93.5 |
| Gohpur RF | 12,168.5 | 11,310.0 | 8,674.6 | 2,635.5 | 89.4 |
| Naduar RF | 9,808.8 | 7,382.4 | 6,455.6 | 926.9 | 28.6 |
| Sengelijan | 1,594.9 | 212.4 | 190.0 | 22.0 | 1.0 |
| **Total** | **48,069.7** | **29,413.2** | **24,938.7** | **4,474.2** | **267.0** |

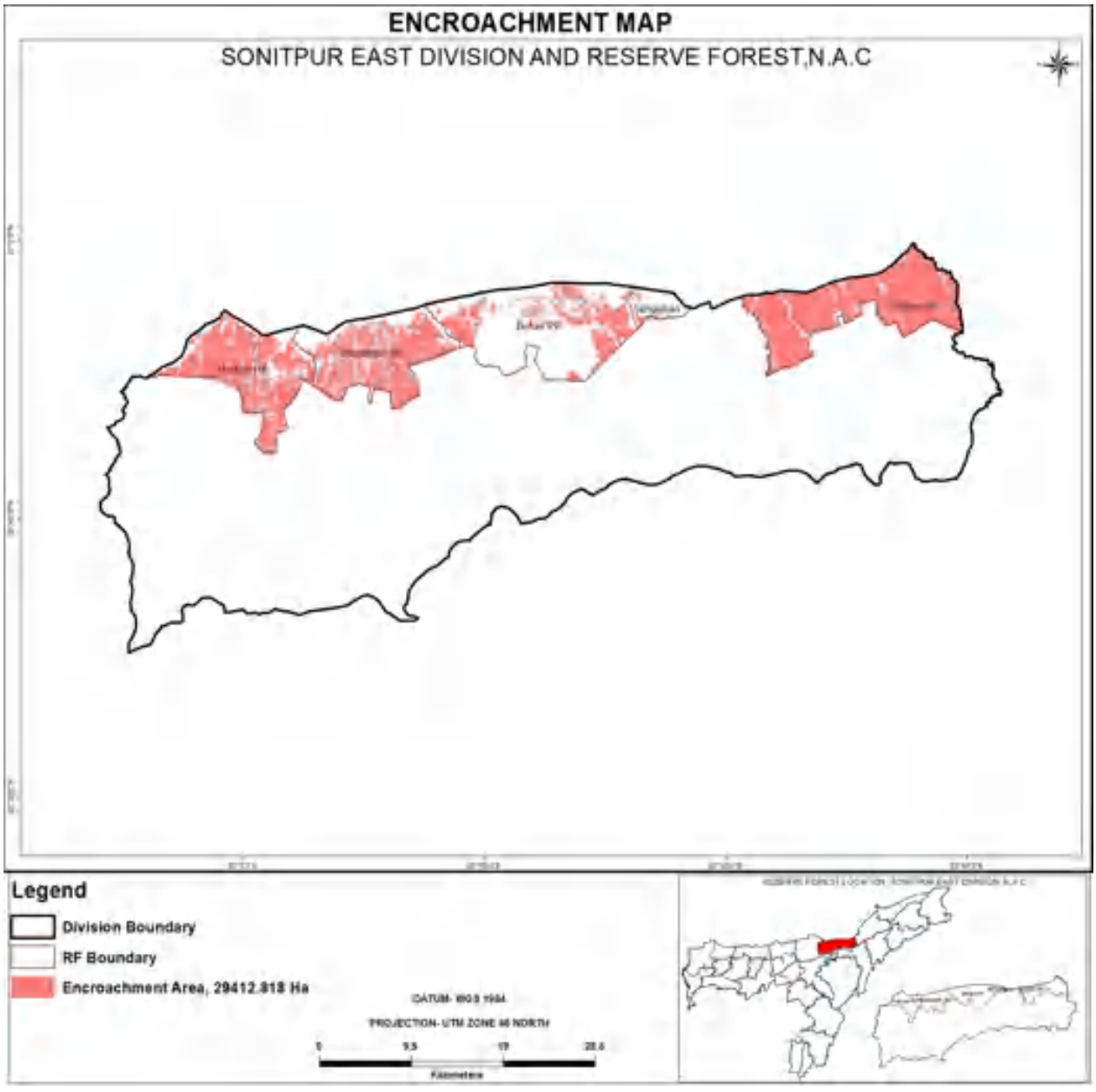



**Figure 2.4: Encroachment Map of Sonitpur East Division.**

Encroachment is one of the main causes of depletion of valuable forests in Assam. The encroachment of forest land is mainly for the following reasons –

- Rehabilitation of flood and erosion affected people in the forest land for settlement in the past as well as aggressive and organized group encroachment under compulsion of such vagaries.
- Heavy biotic pressures on the Reserved Forests due to high growth rate in population.
- Inter-state boundary disputes with the neighbouring State of Arunachal Pradesh.
- Government of Assam shall endeavor to identify pre-1980 encroachers who were allowed to enter the forest area by any competent authority, with a view to finding a solution to their land related problems.
- The encroachers who belong to the ethnic communities of Assam and who have traditionally and characteristically dependent on the forests would be motivated to join the forest protection activities as economic stakeholders. Providing sustainable livelihood support to the people who live in the fringe villages would be a major thrust activity of the forest department so that fringe villagers would work as real protectors of forests.
- Action Plan would be formulated for demarcation and consolidation of reserved forest boundaries by permanent measures.
- The Government of Assam in Forest Department shall also take necessary steps to convert the Forest Villages to Revenue Villages as per the guidelines of the Ministry of Environment and Forests, Govt. of India.

### 2.4.1.1. Interstate Boundary Dispute and Encroachment by Govt. Authorities of Arunachal Pradesh

**Interstate Boundary Dispute and Encroachment by State of Arunachal Pradesh:** State of Arunachal Pradesh has been encroaching in this Reserved Forest. The approximate area of encroachment is 6717 ha. I state that almost 67% (4467 ha, approximately) of the Behali Reserved Forest have been encroached by the State of Arunachal Pradesh, its instrumentalities thereof and the Arunachal Pradesh people under the aegis and patronage of Government of Arunachal Pradesh. The major Encroachments have been as follows:

**Behali Reserve Forests**

#### A. Chronology of Incident of state sponsored Encroachment

1. Established L.P. School, Forest Beat Office and Water supply scheme in Behali R.F. during 1988.
2. Engaged tractor for cultivation by Arunachal Pradesh Govt. and seized by Assam forest dept on 12-9-90.
3. Arunachal Pradesh govt. Established 3 Nos. schools and 2 Nos. of churches at Tarasoo, Bormai and Pampela in 1991.

4. Arunachal Pradesh govt constructed guide bund in the Western bank of Buroi river in Behali R.F. during 1991.
5. Road from Balijan to Tarasoo encroached village in Behali R.F. was constructed by Arunachal Pradesh during 1992.
6. Constructed electrical transmission line within Behali R.F. in Dikal, Tarasoo-Chawldhuwa, Radhasoo- Natun Basti, Bormai- Pampela by Arunachal Pradesh Govt. Power Dept.
7. Constructed Road inside Singlijan R.F. and one bridge on Buroi River in between Kachajuli and Pampela inside Singlijan R.F. and Behali R.F. in early part of 1994.
8. One Battalion camp was established at Bagijuli and Tarasoo by Arunachal Pradesh Govt. in 1994.
9. Arunachal Pradesh Govt. established Polling station at Tarasoo and Dikal in Behali R.F.
10. School building was set up in Bogijuli area in Behali R.F. by Arunachal Pradesh Govt. in Feb/2001.
11. Inaugurated Revenue Circle Office of Arunachal Pradesh at Tarasoo during March/2001 in Behali R.F.
12. Set up Girls Hostel at Tarasoo in Behali R.F. in 2002.
13. Established communication by plying APSTC bus at Tarasoo in Behali R.F. during 2003.
14. Obstruction given to the members of JFMC, Thandapani by the Police and local public of Tarasoo, Arunachal Pradesh in Behali R.F. during July 2004,in doing plantation as per schemes of NAEB, Delhi.
15. Iron electric post was erected by APSEB in transmission line during Nov/04.
16. Declaration of Tarasoo as Revenue Circle and posting of regular Circle Officer at Tarasoo(inside Behali RF ) in 2013.

B. Govt of Arunachal Pradesh devised ingenious and devious ways to harass Govt officials of Assam for execution of their bonafide duty within their respective jurisdiction by registering cases:

Forest officials of Sonitpur East Division were harassed by the Govt. of Arunachal Pradesh by registering false cases for legitimate discharge of their bonafide duties, as shown below:

| Case no. | Registered with | Against Officer | Fall out of eviction drives |
|---|---|---|---|
| **17/2008**: u/s 353/365/ 380/427/447/506 /34 IPC | Balijan PS, Arunachal Pradesh | *Praneshwar Das*, Range Officer, Borgang. | Eviction drive at Singlijan RF |
| **12/2013**: u/s 295/447 /95 IPC | Seijossa PS, Arunachal Pradesh | *Sh Anirrudha Dey* DFO, Sonitpur East Divisio*n*. | Eviction at Dikalmukh in Behali RF |

| | | | |
|---|---|---|---|
| **8/2014**: u/s 447/427 IPC | Balijan PS, Arunachal Pradesh, Filed by Tacha Kaso | *Ranjan Baruah*, Range Officer, Borgang. | Arrest of Arunachal Pradeshi encroacher in Naharjan area |
| **7/2015:** U/s 447/341/506 IPC | Balijan PS, Arunachal Pradesh on 22.02.2015 | *DFO, Sonitpur East division, Biswanath and Chariali.* | For clearing the Dikal Tiniali and Chaluldhowa forest road blockade created by miscreants from Arunachal Pradesh inside Behali RF. |

In all such cases mentioned above, officer concerned had to evade arrest from Arunachal Pradesh Police due to issue of non-bailable warrant from ADC court and approach Hon'ble Gauhati High Court for Anticipatory bail on ***personal basis***. This has become a major deterrent where Officers are subjected to harassment, mental agony, and social stigma for legitimate discharge of their lawful duties. Officers had to run from pillar to post to evade arrest and subsequent legal implications.

This is deliberately done by authorities of Arunachal Pradesh to break the morale of the field officers and to deter them from discharging their lawful and law-bound duties.

C. **Armed retaliation from Arunachal Pradesh encroachers against Forest Department personnel**

| Eviction Drives in Behali RF in dated | Resistance provided by | Fall Out of eviction drive |
|---|---|---|
| 09/01/2014, 4 huts belonging to Arunachal Pradeshi encroachers were ejected by Assam Forest Department inside notified boundaries of Behali RF. | Indian Reserve Battalion of Arunachal Pradesh Police objected and stopped Forest personnel | On 10/1/2014, Thandapani Forest camp was attacked by Arunachal Pradeshi Miscreants/ultra. One staff ***Shri Somnath Sharma, Timber Depot Chowkidar sustained bullet injuries***. 10/1/2014 DC and SP papumpare visited the site of ejection and ***assured financial grant*** for reconstruction of huts Statement by ***Nabam Rebia MLA***, and State Planning and development parliamentary Secretary, Govt of Arnuanchal Pradesh issued statement as enclosed in Paper cutting(Assam Tribune dated Jan 11, 2014) |

Other important incidents:

1. **On 29/1/2014**, 15 persons of Assam origin were Killed inside Behali RF by Arunachal Pradesh origin people later on claimed by NLCT ( National liberation Council of Taniland). On April 29/4 News Item Issued in Daily Newspaper "ARUNACHAL PRADESH FRONT" (as enclosed)
2. **On 5/7/2014** at 4.30 am 3 persons were injured in Naharjan in a suspected shoot out by Militants from Arunachal Pradesh origin.

Thus, encroachment in Behali RF is not a case of simple encroachment but state sponsored act.

(a). Concern over progressing encroachment by Govt machinery of Arunachal Pradesh in the form of Govt establishments in utter disregard to sanctity of notified Reserve Forest.

(b). Heavy deployment of Armed police personnel including IRBN battalions inside Behali RF by the Govt. of Arunachal Pradesh whose sole objective is to protect the encroachers inside Behali RF and to organize further encroachment.

(c). Pro- Arunachal Pradesh Government militia NLCT (National Liberation Council of Taniland) playing active role in conducting attacks as unconstitutional authority.

(d). There is major probability of armed attack on teams conducting eviction drive. The recent incidents such as attack on Thandapani Forest Camp inside Behali RF and killing of 15 members inside Behali RF both in January 2014 strongly point out the possibility of armed attack. Reportedly massive piling of arms (both legal and illegal) has taken place all along the encroached areas inside Behali RF, seen as preparation for another armed attack is a cause for concern.

**Singlijan RF**

Singlijan Reserved Forest runs along the same line and the length of the Singlijan Reserved Forest – Arunachal Pradesh boundary is 6.60 km. approx. The boundary between the Singlijan Reserved Forest and the State of Arunachal Pradesh is described in Notification No. FRS 230/87/22 dated. 17/11/1987 is as under:

Since 1987, State of Arunachal Pradesh has been encroaching in this Reserved Forest. The approximately 21% (289 ha) of the Singlijan Reserved Forest have been encroached by the State of Arunachal Pradesh, its instrumentalities thereof and the Arunachal Pradesh people under the aegis and patronage of Government of Aruanchal. The major Encroachments have been as follows:-

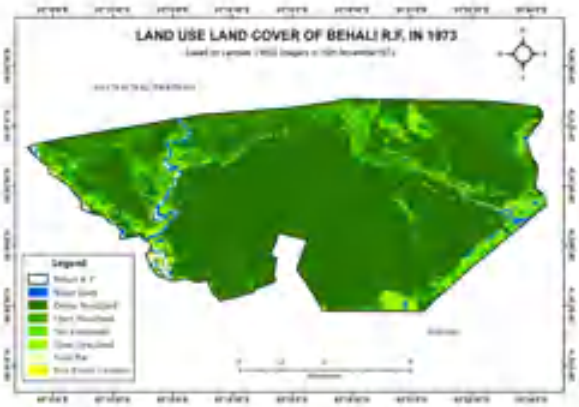
1. Illegal construction of guide bandh in the Western part of Buroi river at Dullongmukh in1991.
2. Illegal construction of road inside the R.F. by A.P. Govt. in 1992.
3. One hanging bridge was constructed over Buroi river in between Kachajuli and Pampella by A.P. Govt. in 1994.

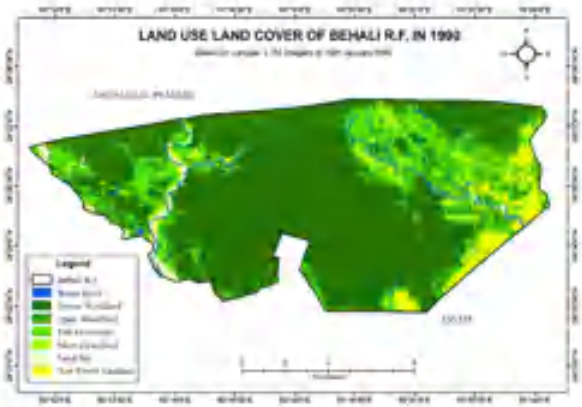
4. Constructed electrical transmission line within Singlijan R.F. upto Behali R.F. during the early part of 1994 by A.P. Govt. Power Dept.
5. Killing of 3 Nos. wild elephant by way of exacting illegal electrical transmission line on 25-3-03 at Panipota in Singlijan R.F. Now the matter has been taken up with the concerning authority of Arunachal Pradesh Govt. and the Dist. Civil administration for withdrawal.
6. Engaged tractor for cultivation at Dullong Mukh in Singlijan R.F. by Arunachal Pradesh Govt. and seized by Assam Forest staff on 12-9-90 and later released.
7. One JCB (Excavator) bearing Regd no AR 01 D5350 was intercepted and seized from Singlijan RF on 28/1/2012 involved in breaking of forest land. Offence was drawn and confiscation proceedings are in progress.

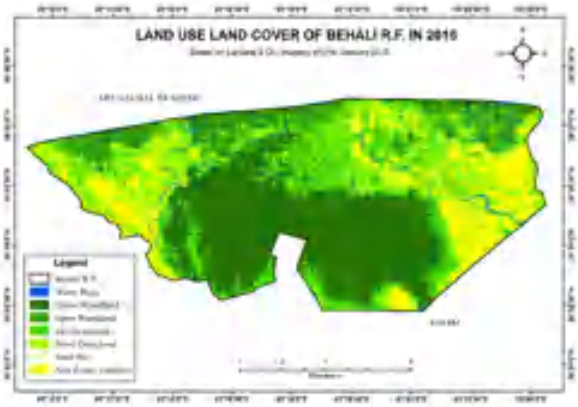
The entire matter of Boundary dispute has been subjudice under Civil Suit 1/98 in Hon Supreme Court of India.

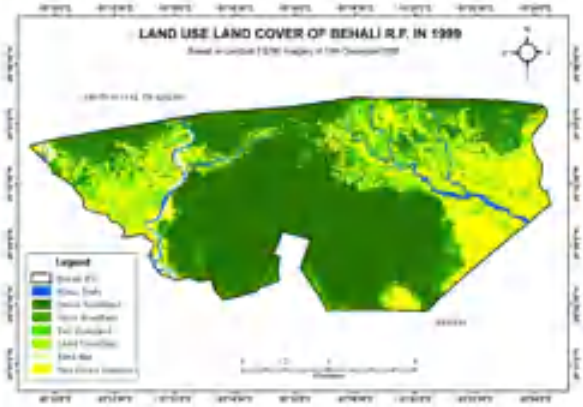
# LAND USE LAND COVER CHANGE ASSESSMENT OF BEHALI R.F., ASSAM FOR THE TEMPORAL PERIODS OF 1973, 1990, 1999, 2000 & 2015

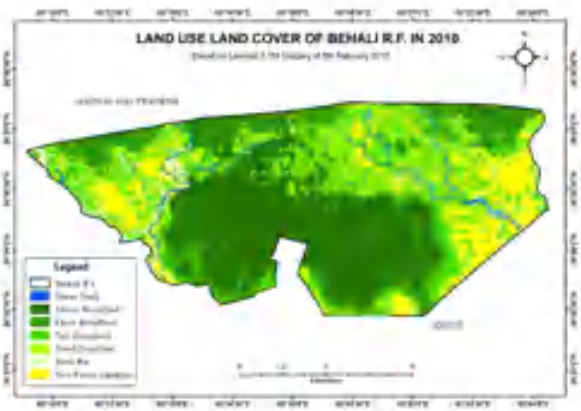
Based on Landsat Imageries



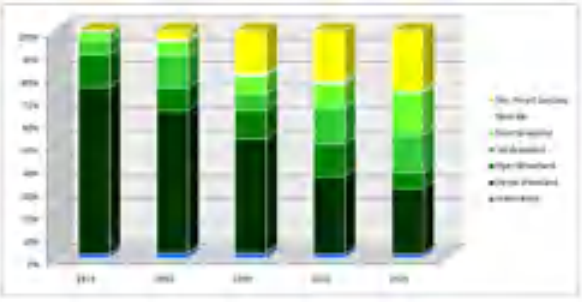




Temporal Land Change Statistics for Behali RF, Assam



**2.4.1.1.Forest Conservation Act 1980 violation in Behali Reserve Forest and action taken thereof:**

Notice served under section 9(1) of Forest Conservation Rules 2003 for Violation of Forest Conservation Act 1980 against following officials of Government of Arunachal Pradesh

- Commissioner, Department PWD, Joint Secretary Cabinet
  Government of Arunachal Pradesh
- Department of Education & Library
  Government of Arunachal Pradesh
- Secretary, Department Power and Hydro Power
  Government of Arunachal Pradesh
- Secretary , Department of Health & Family Welfare Government of Arunachal
- Principal Secretary Department of Home
  Government of Arunachal Pradesh,
- Secretary, General Adminstration
  Government of Arunachal Pradesh

*Violation of Forest Conservation Act 1980 Section 2 by following Departments/Govt Authorities(AP)*

| Longitude | Latitude | Violation of Section 2, FC Act 1980 | Department | Observation |
|---|---|---|---|---|
| 93 24 16.69 | 26 57 33.58 | Road Construction from Balijan to Tarasoo 15Km | By APPWD | Lies 0.2Km to North of Behali RF |
| 93 24 76.69 | 26 57 33.58 | Road Construction from Balijan to Tarasoo 15Km | | Lies 0.45Km to North of Singlijan RF |
| 93 23 54.93 | 26 57 4.08 | Road Construction from Balijan to Tarasoo 15Km | | Falls inside Behali RF Left bank of Tarsho Nala |
| 93 23 46.09 | 26 56 30.0 | Road Construction from Balijan to Tarasoo 15Km | | Falls inside Behali RF Left bank of Tarsho Nala |
| 93 23 46.42 | 26 56 38.0 | Road Construction from Balijan to Tarasoo 15Km | | Falls inside Behali RF Left bank of Tarsho Nala |
| 93 22 75.34 | 26 56 14.60 | Road Construction from Balijan to Tarasoo 15Km | | Falls inside Behali RF Left bank of Tarsho Nala |
| 93 21 27.97 | 26 56 38.53 | Road Construction from Balijan to Tarasoo 15Km | | Falls inside Behali RF Left bank of Tarsho Nala |
| 93 20 35.33 | 26 55 46.34 | Tarasoo Secondary School Building | Dept of Education | Falls inside Behali RF Right bank of Tarsho Nala |
| 93 20 46.39 | 26 55 46.24 | Dikalmukh Primary School | | Falls inside Behali RF |

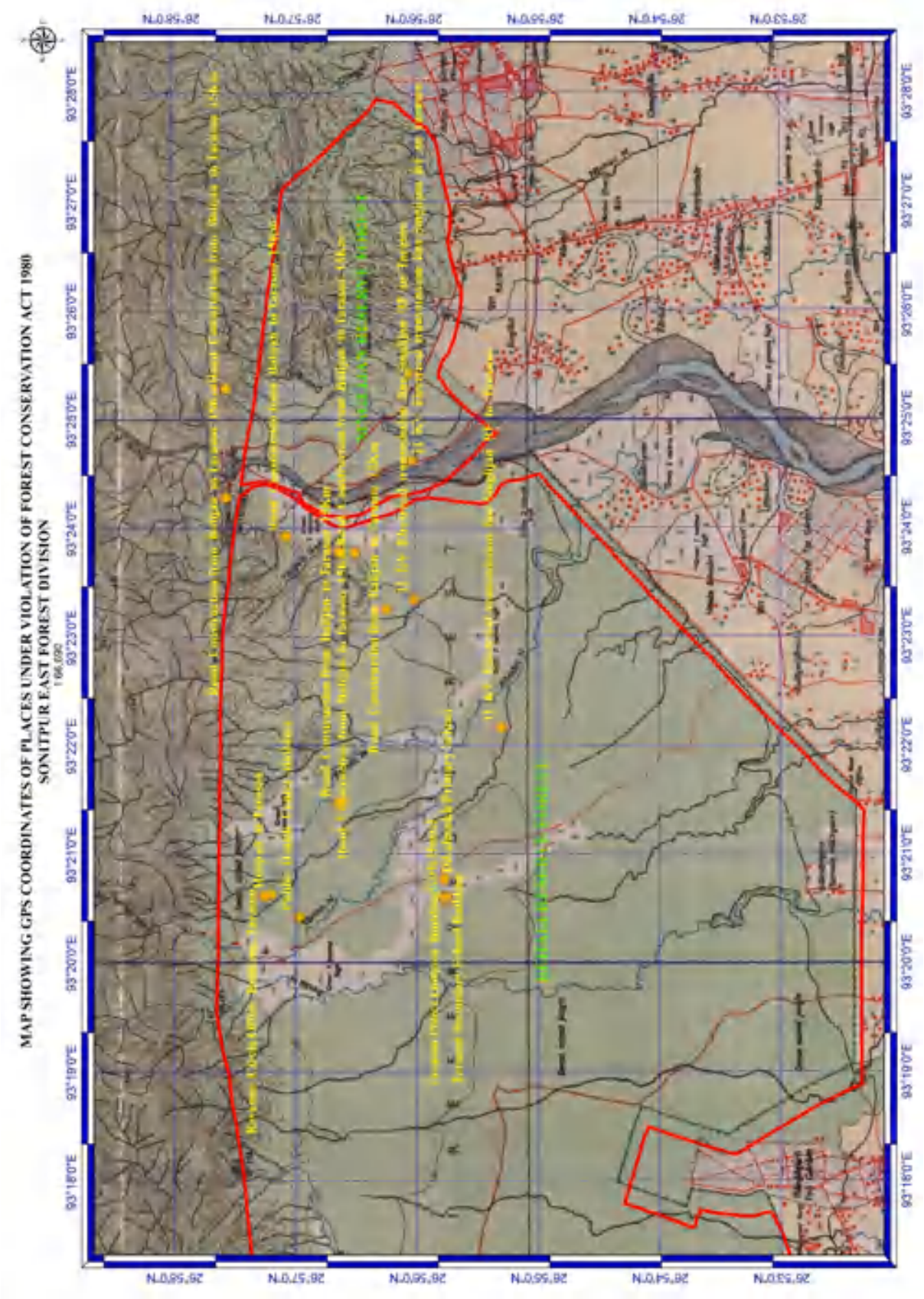
| | | | | |
|---|---|---|---|---|
| | | | | Right bank of Tarsho Nala |
| 93 20 36.47 | 26 55 46.24 | Girls Hostel | | Falls inside Behali RF Right bank of Tarsho Nala |
| 93 25 25.26 | 26 56 03.23 | 11 KV Electrical transmission line Singlijan RF to Tarasoo | Deptt. Of Power | Falls in Singlijan RF Left bank of Buroi River |
| 93 24 37.16 | 26 56 1.57 | 11 KV Electrical transmission line Singlijan RF to Tarasoo | | Falls in Singlijan RF Left bank of Buroi River |
| 93 23 20.67 | 26 56 00.45 | 11 KV Electrical transmission line Singlijan RF to Tarasoo | | Falls inside Behali RF Left bank of Tarsho Nala |
| 93 20 36.41 | 26 55 46.24 | 11 KV Electrical transmission line Singlijan RF to Tarasoo | | Falls inside Behali RF Left bank of Tarsho Nala |
| 93 22 9.76 | 26 55 17.78 | 11 KV Electrical transmission line Singlijan RF to Tarasoo | | Falls inside Behali RF Left bank of Tarsho Nala |
| 93 20 25.70 | 26 56 58.08 | Public Health Center Building | Dept of Health | Falls inside Behali RF Left bank of Tarsho Nala |
| 93 20 36.49 | 26 55 45.24 | Tarasoo Police Outpost Building | Dept of Home | Falls inside Behali RF Left bank of Tarsho Nala |
| 93 20 38.15 | 26 57 11.91 | Helipad at Tarasoo | | Falls inside Behali RF Left bank of Tarsho Nala |
| 93 20 37 .17 | 26 57 15.30 | Revenue Circle Office Building, Tarasoo | Dept of Gen. Adminstration | Falls inside Behali RF Left bank of Tarsho Nala |

Notice served vide no. B/FSE/FCACT/2015/2788 Dt 27/07/2015, B/FSE/FCACT/2015/2790 Dt 27/07/2015, B/FSE/FCACT/2015/2792 Dt 27/07/2015, B/FSE/FCACT/2015/2794 Dt 27/07/2015, B/FSE/FCACT/2015/2796 Dt 27/07/2015 and B/FSE/FCACT/2015/2799 Dt 27/07/2015.

**FOREST OFFENCES REGISTERED AGAINST OFFENDERS FROM ARUNACHAL PRADESH**

1. State Vs Teg Bahadur Karki CR-59/2015 in Des SDJM Court Biswanath chariali. Sub Inspector Arunachal Pradesh Police was found to be supervising clearing of forest.
2. BG /7 of 2011-12 Dt 29/01/2012 JCB-Excavator Siezed in Singlijan RF for illegal breaking of forest land.
3. BG/01 of 2014-15, Illegal Transportation of Timbers in Singlijan RF

**Fig 2.5. Toposheet showing Behali RF and Violation of FC Act 1980 by Govt of Arunachal Pradesh**



**FIR FILED AGAINST ARUNACHAL AGROSON PRATIROD SAMITY ATTEMPTS OF ENCROACHMENT AND ARUNACHAL PRADESH**

1. Range Officer, Borgang Range letter No. BG/77/ 2011/895-896 dt 10/11/2011. (Filed at Behali Police Station, Behali)
2. Divisional Forest Officer, Sonitpur East Division letter No B/FSE/G-43/ FIR/1533 dt 7/4/2012. (Filed at Behali Police Station, Behali)
3. Range Officer, Borgang Range letter No. BG/19/2013/1044-45 dt 05/12/2013 (Filed at Borgang Police Outpost, Borgang).
4. Divisional Forest Officer, Sonitpur East Division letter No B/FSE/G-43/FIR/345 dt 1/2/2014. (Filed at Borgang Police Outpost, Borgang)
5. ITIRENARY

**FIR REGISTERED WITH BEHALI PS**

1. Behali PS, FIR 03/14 of dt 10/01/2014 Shooting of Forest staff in Thanpani forest camp by Arunachali miscreants.
2. Behali PS, FIR 08/14 of 30/1/2014, Killing of 15 persons in Behali RF by Arunachali Miscreants.
3. Behali PS, FIR 15/14 of 04/05/2014, Killing of 15 persons in Behali RF by Arunachali Miscreants.
4. Behali PS, FIR 43/15 of 08/04/2015 Firing incident and injury of 3 person in Behali RF by Arunachali Miscreants.
5. Behali PS, FIR 128/14 Dt 5/7/2014, Blank firing by APIRBn personnel on duty forest and border magistrate in behali RF
6. Behali PS, FIR 68/2015 Dt. 5/6/2015, 3rd June 2015, Killing of Kolai Orang inside Behali RF

**Role of Arunachal Agrason Prathirodh Samity(AAPS)**:

'Arunachal Agrason Prathirodh Samiti' is led by one Sri Vivek Das of CPI-ML party, contesting candidate from Behali constituency during last Legislative Assembly Elections. In the guise of protecting Assam's territory, Sri Vivek Das and his associates are organizing encroachments inside Behali RF from time to time. During October-November 2011, Sri Vivek Das and his associates have mobilized huge crowd of around 500 people and attempted to encroach Behali RF areas. The Forest, Civil & Police authorities have played a co-ordinated role and through series of efforts ensured that the encroachers have left the Behali RF. But it certainly had diverted much of time and resources hitherto available for routine administrative matters. Sri Vivek Das and his associates have again repeated the same during October-November 2013. This encroachment of areas inside Behali RF was ejected repeatedly but every time the encroachers have fled away and re-gathered at some other area inside Behali RF. After recent ejection drive conducted by the forest department on 13.12.2003 and 07.01.2014, the encroachers gathered again at Chawldhowa area of Behali RF and another ejection drive was scheduled on 01/02/2014. This encroachment conspired by the 'Arunachal Agrason Prathirodh Samiti' by mobilizing people from various areas has ultimately resulted in unfortunate and avoidable death of 15 people of assamese origin during armed attack by miscreants suspected to be

belonging to Arunachal Pradesh on 29.01.2014. In more than one way, the illegal encroachment conspired by the 'Arunachal Agrason Prathirodh Samiti' has put the lives of many persons in danger and it is liable to be prosecuted against for all its illegal & criminal activities which has resulted in the said death of 15 people besides flaring up of inter-state border clash.

Arunachal Agrason Prathirodh Samiti is an illegal organization which is unlawfully extracting money from individuals by making false promises of distribution of land belonging to Behali RF. This is a clear cut violation of the law of the land. Once a crowd of 500 to 1000 people determinedly enter forest areas, it will be very difficult to summarily eject them out of RF area. Behali RF like any other Reserved Forest, has a porous boundary and it is next to impossible to plug all the entries in to the forest. It is only the fear/respect for law that prevents a law-abiding citizen from committing such ecological crimes. In this instance, Sri Vivek Das and his associates are habitual offenders and are perpetrating these crimes on a regular basis without any deterrence for their selfish interest. Reliable sources informed that there is every possibility of encroachment attempt inside Behali RF in the coming winter season by Arunachal Agrason Prathirodh Samiti led by Sri Vivek Das and his associates.

Several FIRs were filed by forest department from time to time vide:

1. Range Officer, Borgang Range letter No. BG/77/ 2011/895-896 dt 10/11/2011. (Filed at Behali Police Station, Behali)
2. Divisional Forest Officer, Sonitpur East Division letter No B/FSE/G-43/ FIR/1533 dt 7/4/2012. (Filed at Behali Police Station, Behali)
3. Range Officer, Borgang Range letter No. BG/19/2013/1044-45 dt 05/12/2013 (Filed at Borgang Police Outpost, Borgang).
4. Divisional Forest Officer, Sonitpur East Division letter No B/FSE/G-43/FIR/345 dt 1/2/2014. (Filed at Borgang Police Outpost, Borgang)

All the above FIRs were filed complaining about the illegal activities of Arunachal Agrason Prathirodh Samiti led by Sri Vivek Das and his associates. Specific information and names were also provided in the FIRs. Seizure of documents such as registers maintained by the 'Arunachal Agrason Prathirodh Samiti' for the purpose of illegal land distribution and illegal identity cards issued to the encroachers by 'Arunachal Agrason Prathirodh Samiti' establish their nefarious design. The same were handed over to the police authorities by the forest authorities as evidence with some FIRs. If these known defaulters are not taken to task, it may encourage them to further continue with their illegal and dangerous activities without any deterrence.

**A. Action taken by the Assam Forest Department**:

Account of ejection operations conducted:

a. 2011-12: 8 eviction operations conducted and 433 Ha were cleared, 31 hutments demolished (Arunachali encroachers).
b. 2012-13: 5 eviction operations conducted and 65 ha cleared, 10 hutments demolished.
c. 2013-14: 15 evictions operations conducted 107 Ha cleared and 165 hutments demolished.

d. 2014-15: No eviction operation conducted after 22/2/2015.

**B. Action taken by forest department in recent times**:

**a.** Creation of FPCs: Constt of Naharjan FPC started on 3/4/2014 and completed on 25/6/2014**(82 Days)**, Construction of Dhikal FPC started on1/4/2014 and completed on3/7/2014**(62 Days).**

b. Repairing of road from Hati Depot tiniali to Dikal Tiniali(4.5km): Rs 15 lakhs spent from APFBC and work started on 21/8/2014 and completed within 30/9/2014**(39days).**

c. Deployment of AFPF and armed personnel: Only Two(2) sections are under this Division. One section at Hathidepot and another at Bedeti Beat. 1 section of 1st AFPF was withdrawn recently.

d. In pursuance of directions issued by Hon'ble Chief Secretary Assam, Radhasoo Forest Protection Camp was established on 28th June 2015 at Latitude 26° 56'35.8''N, 98 ° 17' 27.70''E in Behali RF.

The following Bamboo and Tarza mat structures were erected for accommodation of staff/officers and Armed Police personnel

1. 60 X 25 sqft dimensions Barrack- 3 nos : For accommodation of 3 Platoons of armed Police personnel from 24 IRBn and 12 APBn
2. 25 X 45 sqft dimension Barrack- 2 nos: For accommodating Forest Staff and One section of AFPF
3. 25 X 45 sqft Dimension 3 Kitchen Sheds for three(3) Langars
4. 3 nos of sand bag LMG post constructed.
5. 1 watch tower in northern side erected.
6. 130ft deep 6 inches boring and installation of 1 submersible pump (1.5HP) for water supply
7. 5KVA Kirloskar Genset chota chilli installed
8. 13 ceiling fans and 15 nos of 15watt CFL bulbs and Mobile phone recharging points made.
9. Temporary Toilets 10 nos were established.

**Patrolling of Behali RF.**

Naharjan FPC, Dikal FPC and Radhasoo FPC has been regularly conducting patrolling duties. The patrolling duty schedule, mandate and routes are ear marked in order to prevent any new encroachment.

### 3.3.2 Illicit felling of trees in -forest and smuggling of timber

- The Forest Department with involvement of people would endeavour to meet the basic demands of people from the factory sector by providing legal and bonafide avenues so that illegalities do not thrive.
- Protection mechanism would be strengthened by involving local people through village level Joint Forest Management Committees. These Committees would be empowered and provide special incentives to prevent forest offences.
- Forest officers would be well equipped to prevent/ detect/ investigate forest offences with all logistic support.
- For tackling the crimes and criminals of forest offences, forest officers would be provided with adequate legal powers.
- The Assam Forest Protection Force (AFPF), would be modernized with proper training and arms.
- Steps would be taken for establishment of Special Courts at the district level for quick disposal of forest offence cases. The proposal for establishment of Green Bench in Gauhati High Court would also be pursued for swifter and judicious disposal of environment related cases.

## 2.5 Threats to the Forests

Threats to forests of Sonitpur East Forest Division are listed below –

- **Human pressures and encroachments:** The encroachers not only damage the crops than damage the soil for making the same unfit for useful forest crop but fit for agricultural crop which effects the natural climates environment.Out of total 47,428 ha of RF area 37595 ha is under encroachment. Encroachment in terms of percentage is 79.26%. Only 52.4% of Behali RF is free from encroachment.
- **Grazing:** Animals from the villages located near the southern boundary of the RFs are found to graze in forest lands. This includes animals from both revenue and forest villages. Intensive grazing affects the regenerative capacity of forests. Grazing increase erosion in hilly areas thus affecting water retention potential
- **Erosion:** Heavy erosion is observed across the Division during the monsoon season.
- **Wind and Hailstorm:** Heavy rainfall during the monsoon season is marked by heavy storms that damage trees.
- **Climbers:** *Vitis catifolia, Zanthoxylum hamiltonious, Millettia caudafa* and *Dioscorea* are commonly found in the Division.They inhibit crown development by infesting the crown of

the trees and affect normal increment and seed production. They are frequent observed in the top and middle canopies.

- **Epiphytes Parasites and Fungus:** Sporadic occurences of epiphytic on trees such as *Ficus spp.* is observed. Species of *Loranthus* are found occasionally infesting valuable trees such as Gomari, Bonsum, Gonsorai etc. There is sporadic instance of Sal (*Shorea robusta*) trees being infested by the fungus *Polyporus shorea*, resulting in occasional death of such trees.
- .**Animals:** The quantum of damage from wildlife is insignificant due to the reduction in number of animals in the Division.

## 2.6 Distribution of Different Forest Types

The forests that have been dealt with in this Working Plan have been classified into the following Forest Types (or approximating to) as per Champion and Seth's revised classification of Forest Types of India:

- **Assam Alluvial Plains Semi-Evergreen Forest** (Approximates to type2B/C1A) - The extent of area covered by this type is very limited in Sonitpur East Division.
- **Secondary Moist Bamboo Brakes** (Type 2/2SI) - Large tracts of bamboo brakes occur along the Moist Mixed Deciduous Forests in the hilly area. They occur in damp locations especially along the perennial streams and nalas.

Figure 2.5 and 2.6 presents the distribution of different forest types and canopy cover of 2B/C1a respectively in the Division. Table 2.9a and 2.9b shows area under different forest types and canopy cover of 2b/C1a in the division.

**Table 2.9a: Area under different forest types of Sonitpur East division**

| Forest types | Area (Ha.) |
|---|---|
| Assam Alluvial plains Semi Evergreen Forest (2B/C1a) | 7,709.17 |
| Secondary Moist Bamboo Brakes (2/2S1) | 650.87 |

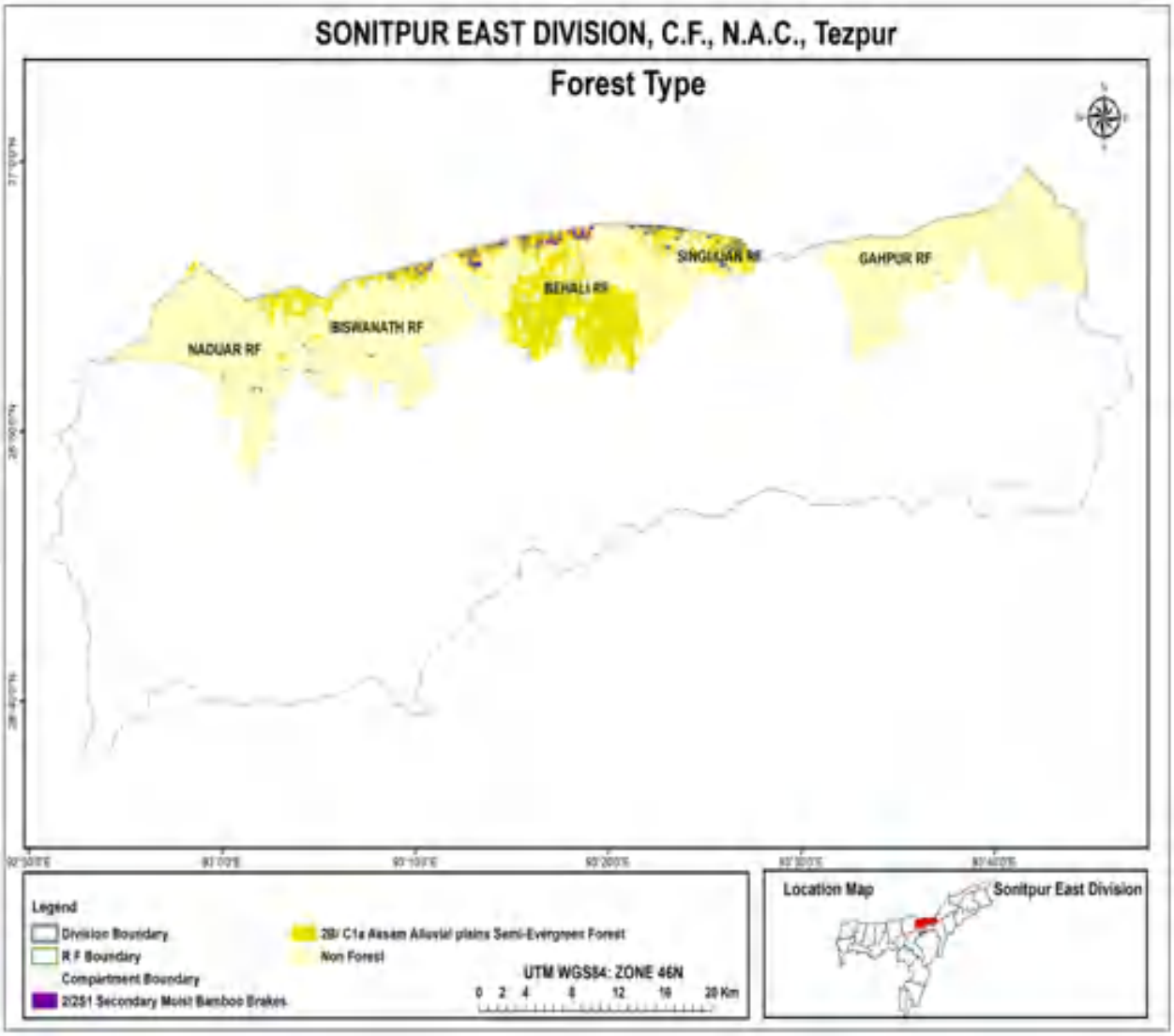



**Figure 2.5 Forest Type Map of Sonitpur East Forest Division**

**Table 2.9b: Area under different canopy cover of forest type 2B/C1a of Sonitpur East division**

| Canopy cover | Area (Ha.) |
|---|---|
| Open forest *(canopy cover 10% - 40%)* | 5,756.11 |
| Moderately dense foest *(canopy cover 40% - 70%)* | 1,843.84 |
| Very dense forest *(canopy cover > 70%)* | 109.22 |

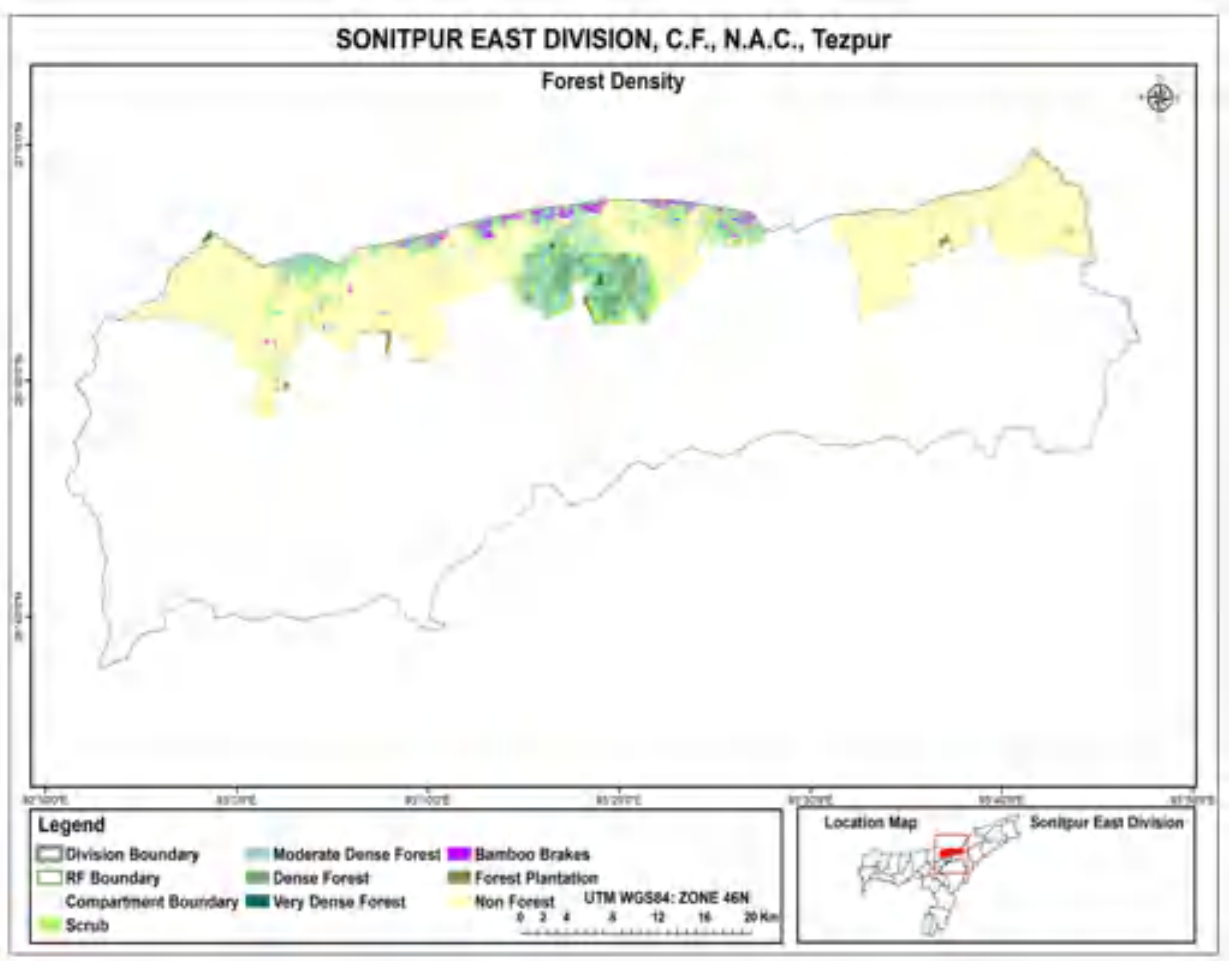



**Figure 2.6: Forest Density Map of Sonitpur East Forest Division**

## 2.7 Tree Cover Outside Forest Area

Though most of the forest area is concentrated inside the notified areas of Sonitpur East Forest Division, a sizable number of trees are observed outside these forest areas. There are large number of homegrown species found in the revenue areas of these districts. These are grown by people in rural areas over their land as habitual socio-cultural practices by planting fruit bearing trees like Mango (*Mangifera indica*), Jamun (*Syzygium cumini*), Jackfruit (*Artocarpus* spp), Jalpai *(Elaeocarpus serratus*), Amlakhi (*Phyllanthus emblica*) , Silikha (*Terminalia chebula*), etc. along with patches of Bamboos.

Trees outside forest (TOF) are include all the trees growing outside recorded forest area in the Division. A large part of the demand of the people in terms of timber, fuelwood, and resources is being met from outside forest areas and therefore assessment of TOF becomes imperative in this working plan. IRS P-6 LISS IV (5.8m) satellite images were geometrically rectified with the help of Survey of India toposheets on 1:50,000 scale. Mapping of TOF areas was carried out by digitizing the green-wash area by taking them as proxy forest areas and masking them out. Map showing the tree outside forest areas of Sonitpur East Division is shown in the figure 2.7. The total area of tree outside forest in the Division is 18,402.4 ha. Details of TOF areas with the coordinates is provided in Annexure II.

The methodology adopted by Forest Survey of India (FSI) is adopted for mapping ToF areas. The multispectral data of Sentinel 2 with spatial resolution of 10m and swath of 290 km has been used for classification of the selected grids. The sentinel satellite data is downloaded and geo-rectified with the help of Survey of India (SOI) open series map topo-sheets on 1:50,000 scale. The image is then classified into settlement, waterbodies, tree patches, agriculture and other land cover cases. This classification enables the interpreter to distinguish between tree patches and other classes. The classified image is visually analysed for editing and refinement. Since the minimum mapable area is 0.1 Ha, pixels are clumped and cluster of pixels having area less than 0.1 Ha are eliminated. After editing the classified image, the final classified map is generated having all ToF areas.

Details of TOF areas with the coordinates is provided in ANNEXURE V.

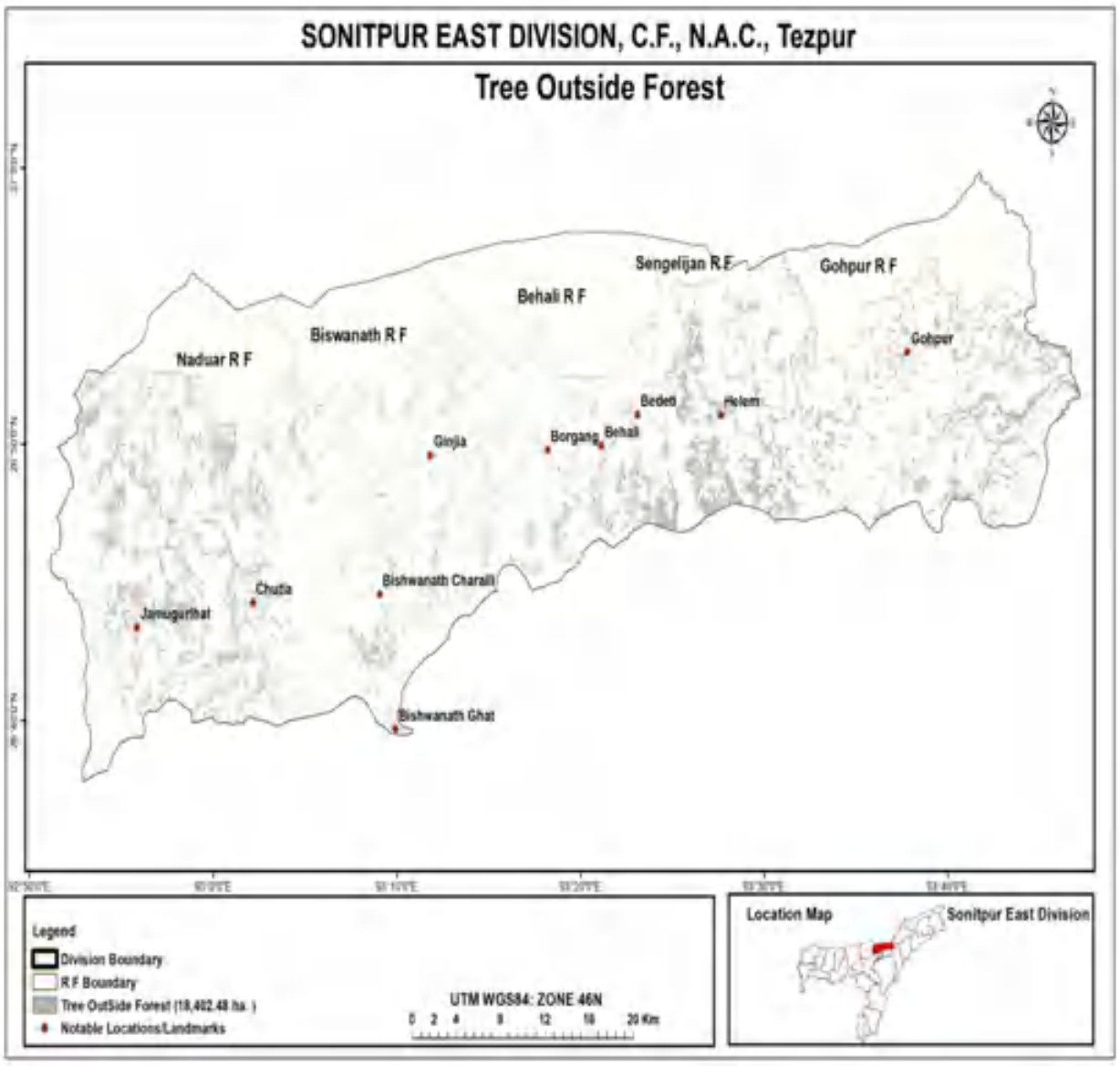
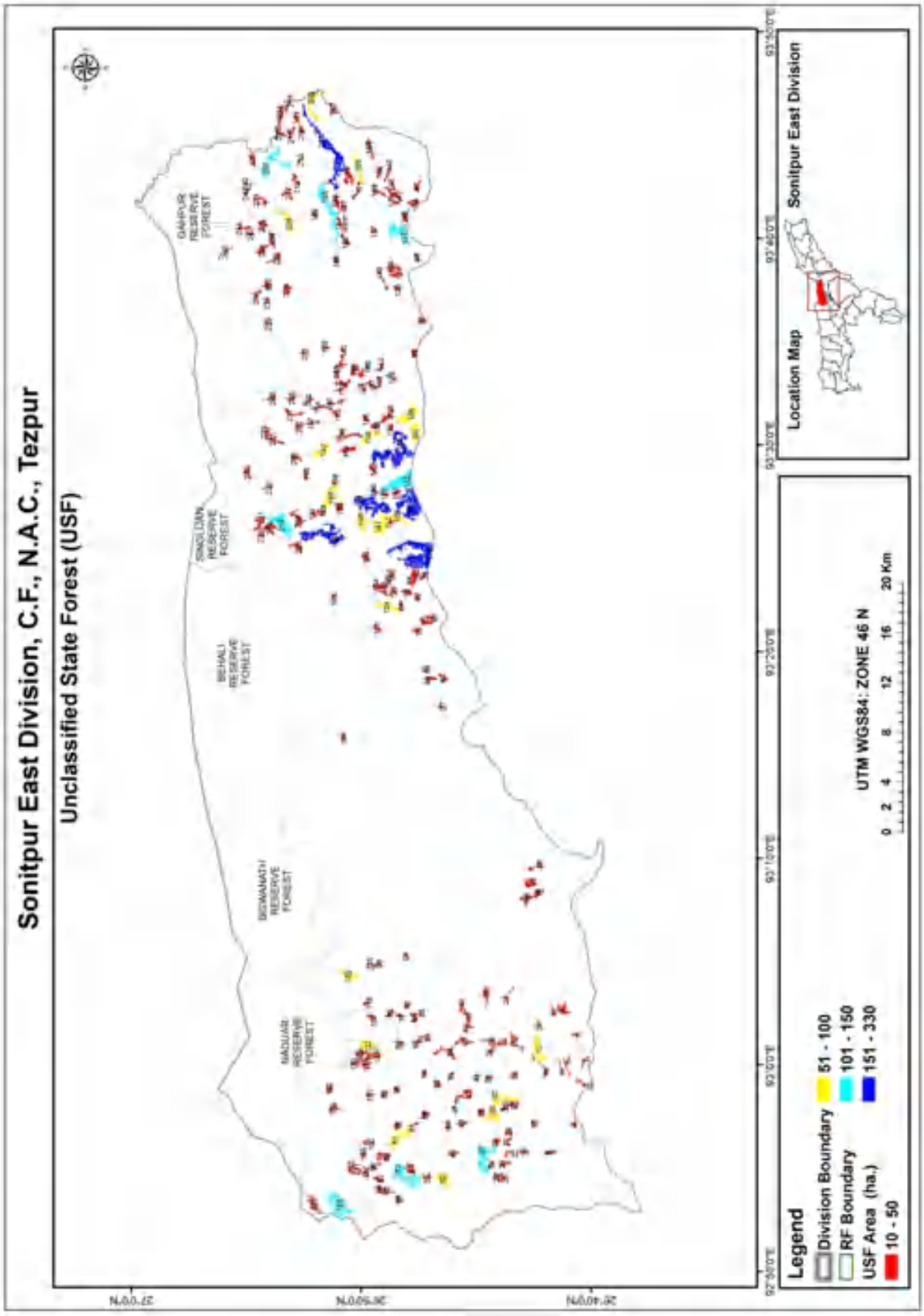



**Figure 2.7: Map of trees outside forest of Sonitpur East Forest Division**

### 2.7.1. Unclassified State Forest (USF)

Unclassified State Forest (USF) area are those patches in the jurisdiction of the forest Divisions but outside the reserve forest boundary with natural forests. Such forest patches after matching with SOI toposheets were delineated. The USF delineated comprises 385.55 hectares i.e. 2.1% of the total TOF area in the division. This is carried out to help better management of USF in initiating the principles of buffer forests with the primary focus on maintenance of ecosystem flows especially for the Behali and Singlijan areas. Refer Fig. 2.8 for the extension of USF in the division. Details of USF areas and coordinates are shown in the ANNEXURE VI.

**Figure 2.8: Unclassified State Forest land in Sonitpur East Forest Division**



# CHAPTER 3

# MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY

## 3.1 Forest Composition and Distribution

Predominant forest types and species composition in the Reserve Forests of Sonitpur East Forest Division are described below –

- **Biswanath Reserved Forests:** A strip along the northern areas of the RF has semi-evergreen forests. In the remaining areas, the encroachers have planted different tree species in the open forest lands of the RFs during the last two decades. The species, which were planted by the encroachers, were mostly Teak, Gomari, Khokan and Ghoraneem apart from some cash crop like Arecanut and coconut etc.
- **Behali Reserved Forests:** This RF has 'Evergreen' and Semi-Evergreen' formation. Some important species like Panchopa, Bola, Amari etc. are observed in this RF.
- **Gohpur Reserved Forests:** The RF is entirely under encroachement since 1972.Species such as Gomari, Ghoraneem, neem (*Azadiracta indica*) etc. have been planted by encroachers.
- **Naduar Reserved Forests:** The entire RF is under encroachment. Encroachers have planted several spp. like Gomari, Ghoraneem, neem etc. in their homesteads.
- **Singlijan Reserved Forests:** This RF has good formations in the central portion. The eastern sections have degraded forest cover with sporadic Bamboo forest as predominant vegetation.

Species composition details is provided in Annexure VII.

## 3.2 Plant Species Diversity

Based on the vegetation survey, forest inventory and compartment descriptions, a summary of diversity of species based on density, frequency, and dominance is presented in Table 3.1. The most abundant species in the Division is *Delinia indica* L. followed by *Mesua ferrea* L, and *Aglaia hiernii* King. Some of the other frequently found species in the Division include *Lagerstroemia speciosa (L.), Pers., Tetrameles nudiflora R. Br.*, *Bauhinia purpurea* L., *Bombax ceiba* L., *Magnolia insignis* Wall., *Stereospermum chelonoides* (L.f.) DC, *Sterculia villosa* Roxb. and others.

**Table 3.1: Density and frequency distribution of floral species**

| *Species* | Relative Density | Relative Frequency | Relative Dominance | IVI |
|---|---|---|---|---|
| *Aglaia hiernii* King | 4.7 | 5.4 | 4.7 | 14.8 |
| *Ailanthus integrifolia subsp. calycina* (Pierre) Nooteboom | 1.5 | 2.3 | 1.6 | 5.4 |
| *Albizia lucidior* (Steud.)I.C.Nielsen | 1.5 | 2.1 | 1.6 | 5.2 |
| *Albizia procera* (Roxb.)Benth. | 0.7 | 1.3 | 0.7 | 2.7 |
| *Altingia excelsa* Noronha | 0.3 | 0.5 | 0.3 | 1.1 |
| *Artocarpus chaplasha* Roxb. | 0.6 | 0.8 | 1.2 | 2.5 |
| *Baccaurea ramiflora* Lour. | 0.6 | 0.8 | 0.3 | 1.6 |
| *Bauhinia purpurea* L. | 5.6 | 4.6 | 2.9 | 13.1 |
| *Beilschmiedia assamica* Meisn. | 0.1 | 0.3 | 0.0 | 0.4 |
| *Bischofia javanica* Blume | 0.6 | 0.8 | 0.5 | 1.8 |
| *Bombax ceiba* L. | 2.8 | 4.1 | 6.2 | 13.0 |
| *Canarium bengalense* Roxb. | 2.2 | 2.1 | 2.1 | 6.4 |
| *Cassia fistula* L. | 0.1 | 0.3 | 0.2 | 0.6 |
| *Castanopsis indica* (Roxb. ex Lindl.) A.DC. | 3.6 | 3.3 | 2.4 | 9.3 |
| *Celtis tetrandra* Roxb. | 0.1 | 0.3 | 0.2 | 0.6 |
| *Chukrasia tabularis* A. Juss. | 1.8 | 2.3 | 1.8 | 5.9 |
| *Cinnamomum glaucescens* (Nees) Hand.-Mazz. | 1.5 | 1.8 | 1.4 | 4.7 |
| *Dalbergia assamica* Benth. | 0.1 | 0.3 | 0.1 | 0.5 |
| *Dillenia indica* L. | 7.9 | 8.5 | 9.8 | 26.2 |
| *Dillenia pentagyna* Roxb. | 0.3 | 0.3 | 0.2 | 0.8 |
| *Dillenia scabrella* (D.Don) Roxb.ex Wall. | 0.4 | 0.8 | 0.5 | 1.7 |
| *Duabanga grandiflora* (DC.) Walp. | 2.4 | 1.8 | 1.5 | 5.7 |
| *Dysoxylum excelsum* Blume | 0.7 | 0.8 | 0.7 | 2.2 |
| *Ficus hispida* L.f. | 0.6 | 0.8 | 0.8 | 2.2 |
| *Garcinia xanthochymus* Hook.f. ex T.Anderson | 0.1 | 0.3 | 0.0 | 0.4 |
| *Gmelina arborea* Roxb. | 2.8 | 3.3 | 2.5 | 8.6 |
| *Khasiaclunea oligocephala* (Havil.) Ridsdale | 0.4 | 0.8 | 0.5 | 1.7 |
| *Knema linifolia* (Roxb.) Warb | 0.3 | 0.5 | 0.1 | 0.9 |
| *Kydia calycina* Roxb. | 2.1 | 3.1 | 1.7 | 6.9 |
| *Lagerstroemia speciosa* (L.) Pers. | 7.5 | 1.5 | 5.4 | 14.5 |
| *Lannea coromandelica* (Houtt.) Merr. | 2.2 | 2.6 | 2.5 | 7.3 |
| *Litsea monopetala* (Roxb.) Pers. | 0.6 | 1.0 | 0.4 | 1.9 |
| *Magnolia champaca* (L.) Baill. ex Pierre | 0.4 | 0.8 | 0.4 | 1.5 |
| *Magnolia griffithii* Hook.f. & Thomson | 1.0 | 1.3 | 1.7 | 3.9 |
| *Magnolia insignis* Wall. | 5.3 | 0.3 | 7.4 | 12.9 |
| *Magnolia kingii* (Dandy) Figlar | 0.6 | 0.5 | 0.6 | 1.7 |
| *Magnolia pterocarpa* Roxb. | 3.3 | 3.3 | 2.5 | 9.2 |
| *Mallotus nudiflorus* (L.) Kulju & Welzen | 1.3 | 1.8 | 1.5 | 4.5 |
| *Mangifera indica* L. | 0.3 | 0.3 | 0.3 | 0.8 |
| *Mansonia dipikae* Purkayastha | 0.6 | 0.8 | 0.2 | 1.6 |
| *Mesua ferrea* L. | 5.6 | 4.4 | 7.1 | 17.1 |
| *Michelia oblonga* Wall. ex Hook.f. & Thomson | 1.8 | 2.3 | 2.4 | 6.5 |
| *Misc* | 0.1 | 0.3 | 0.3 | 0.7 |
| *Morus macroura* Miq. | 2.6 | 1.8 | 1.2 | 5.6 |
| *Neolamarckia cadamba* (Roxb.) Bosser | 0.4 | 0.8 | 0.8 | 2.0 |
| *Oroxylum indicum* (L.) Kurz | 0.3 | 0.5 | 0.1 | 0.9 |
| *Phoebe goalparensis* Hutch | 0.3 | 0.5 | 0.3 | 1.1 |
| *Premna bengalensis* C.B.Clarke | 0.4 | 0.8 | 0.1 | 1.3 |
| *Pterospermum acerifolium* (L.) Willd. | 2.6 | 2.8 | 2.0 | 7.4 |
| *Sapindus rarak* DC. | 0.4 | 0.5 | 0.2 | 1.1 |
| *Sapium eugeniaefolium* Buch-Ham. | 0.4 | 0.8 | 0.2 | 1.4 |
| *Sterculia villosa* Roxb. | 3.2 | 3.6 | 3.3 | 10.1 |
| *Stereospermum chelonoides* (L.f.) DC | 3.9 | 3.3 | 3.7 | 10.9 |
| *Terminalia bellirica* (Gaertn.) Roxb. | 1.3 | 1.0 | 0.6 | 2.9 |
| *Terminalia chebula* Retz. | 1.1 | 2.1 | 1.2 | 4.4 |
| *Terminalia myriocarpa* Van Heurck & Müll. Arg. | 0.6 | 1.0 | 0.6 | 2.1 |
| *Tetrameles nudiflora* R. Br. | 4.7 | 3.8 | 4.6 | 13.2 |
| *Toona ciliata* M.Roem. | 0.6 | 1.0 | 0.8 | 2.3 |
| *Ziziphus funiculosa* Buch.-Ham. ex Wall. | 0.4 | 0.8 | 0.3 | 1.5 |

## 3.3 Status of Biodiversity Conservation in Forests

The biodiversity of forests is declining rapidly due to land use change, climate change, invasive species, overexploitation, and pollution. These are due to the adverse affects from various drivers. Encroachment, illegal felling for culturable land have posed threat to the forest floral as well as faunal biodiversity.

The Assam Forest Policy 2004 is aimed at maintenance of environmental stability through preservation and where necessary, restoration of ecological balance that has been adversely disturbed by serious depletion of forests in the State.

The principle aim of this policy is to ensure progressive sustainable development of the forests of Assam, to meet the twin objectives of environmental stability and ecological balance together with improved livelihood support system for the people.

The following are some of the action plans the Policy aims to work on to ensure sustainable development of Assam forests.

### 3.3.1 Encroachments

Gohpur Reserve Forest was encroached in late 1970s. Encroachment in Naduar RF and Biswanath RF started way back in 1983 in Tarajuli, Bhimajuli, Derring, Samukjuli, Bharalijuli areas by indigenous people like Bodo, Karbi, Adivashi, Nepali, Meshing etc.

Eviction attempts in past recorded as below, which were largely unsuccessful.

| Year of Eviction | No of ejection | No of House demolished | No of Person arrested | Area Cleared in Ha |
|---|---|---|---|---|
| 1994 | 1 | 0 | 0 | 50 |
| 1995 | 1 | 0 | 0 | 10 |
| 1996 | 9 | 413 | 0 | 1000 |
| 1997 | 7 | 464 | 65 | 540 |
| 1998 | 3 | 336 | 0 | 200 |
| 1999 | 4 | 550 | 0 | 210 |
| 2000 | 3 | 582 | 0 | |
| 2002 | 2 | 509 | 0 | 338 |
| 2003 | 9 | 832 | 0 | 500 |
| 2005 | 1 | 4 | 0 | 25 |

Forest Rights Act 2006 could not be implemented because of ***Hon'ble Gauhati High Court Order in Writ Petition (C) No. 8403/08 and Writ Petition (C) No. 3340/08***. Thus all residents of Biswanath RF, Naduar RF and Gohpur RF are encroachers and occupying illegally without any rights thereof. All name of settlement are self styled villages and not recognised or notified.

Encroachment is one of the main causes of depletion of valuable forests in Assam. The encroachment of forest land is mainly for the following reasons –

- The encroachment of reserve forests in Sonitpur East Divison is purely for Political reason rather than economic reason.
- Rehabilitation of flood and erosion affected people in the forest land for settlement in the past as well as aggressive and organized group encroachment under compulsion of such vagaries.
- Heavy biotic pressures on the Reserved Forests due to high growth rate in population.
- Inter-state boundary disputes with the neighbouring State of Arunachal Pradesh is another major reason.
- Government of Assam shall endeavor to identify pre-1980 encroachers who were allowed to enter the forest area by any competent authority, with a view to finding a solution to their land related problems.

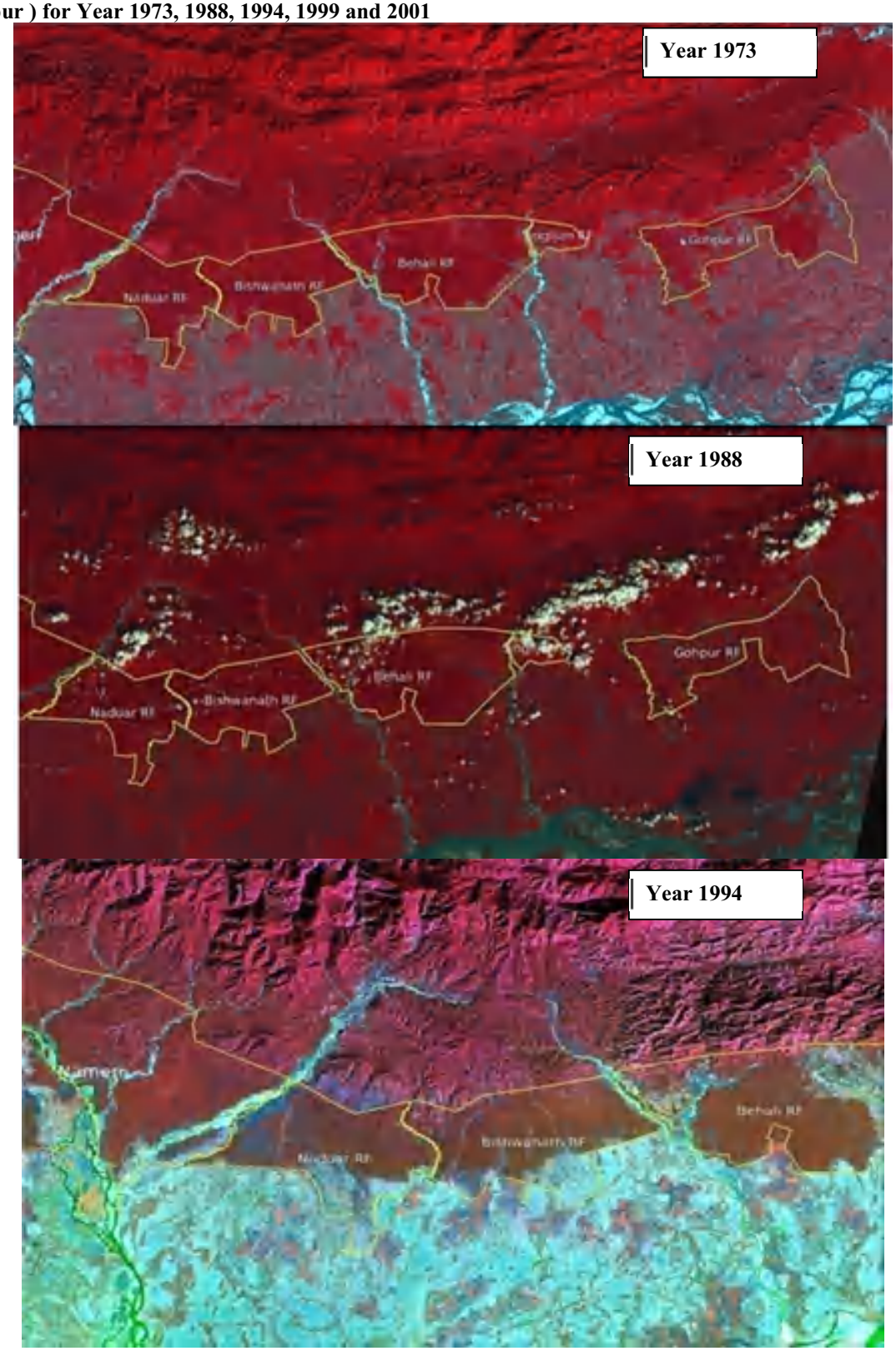
The encroachers who belong to the ethnic communities of Assam and who have traditionally and characteristically dependent on the forests would be motivated to join the forest protection activities as economic stakeholders. Providing sustainable livelihood support to the people who live in the fringe villages would be a major thrust activity of the forest department so that fringe villagers would work as real protectors of forests.

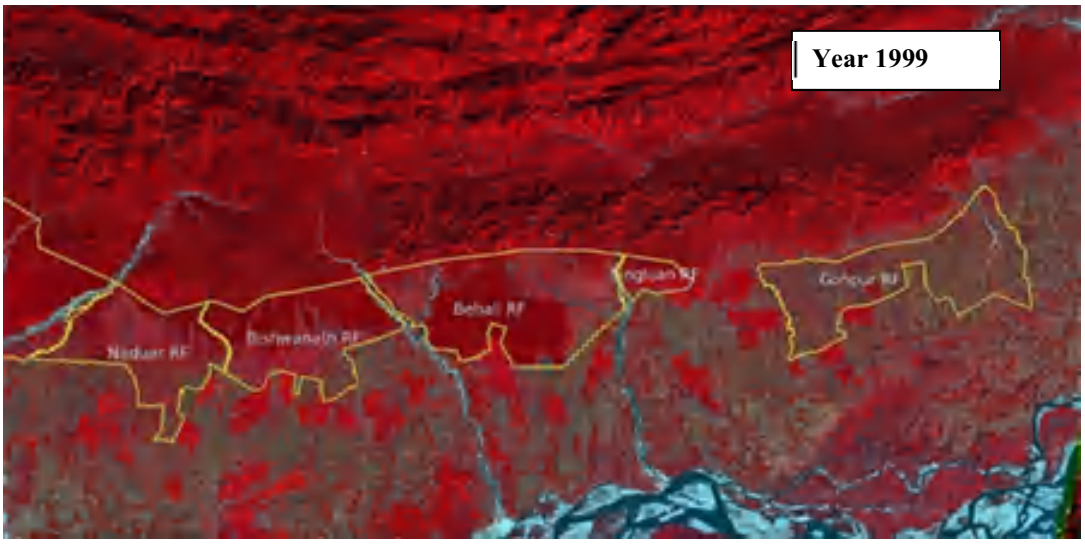
The present plan aims at formulation of action plan for demarcation and consolidation of reserved forest boundaries by permanent measures.

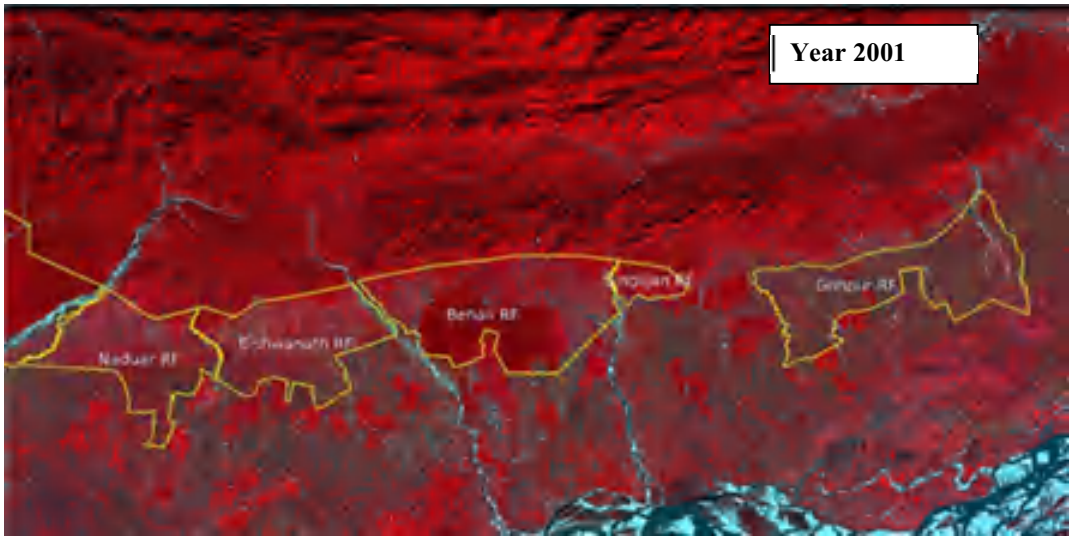
| RF Name | RF Area (Ha) | | Encroachment Area (Ha) | | Agricultural Area (Ha) | Built Up Area (Ha) | Forest Plantation (Ha) |
|---|---|---|---|---|---|---|---|
| | RF (Ha) as per Satellite images | RF(Ha) as per Govt Notification | Encroachment Area (Ha) as per Satellite images | Encroachment Area (Ha) as per Office record | | | |
| **Behali** | 14,763 | 14016 | 3,987.4 | 6663 | 3,623.7 | 363.7 | 54.5 |
| **Biswanath** | 9,824.5 | 10561 | 6,521.1 | 9274 | 5,994.9 | 526.2 | 93.5 |
| **Gohpur** | 12,168.5 | 13310 | 11,310.0 | 13310 | 8,674.6 | 2,635.5 | 89.4 |
| **Naduar** | 9,808.8 | 8141 | 7,382.4 | 8041 | 6,455.6 | 926.9 | 28.6 |
| **Singlijan** | 1,594.9 | 1400 | 212.4 | 284 | 190.0 | 22.0 | 1.0 |
| **Total** | 48,069.7 | 47428 | 29,413.2 | 37572 | 24,938.7 | 4,474.2 | 267.0 |

All Government Notifications are more 45-100 year old. Nearly, All RF areas area having area at least one river boundary. All such rivers originating from Eastern Himalaya region and having history of changing course year by year. Because of this, there is difference between Notification RF area and Satellite image based RF area. Also, in satellite images, there is possibility that area controlled by Encroachers is having Tree Cover and therefore not counted as encroached area. Therefore the encroachment is under-estimated by satellite images. Therefore it is pertinent that a thorough survey needs to be done. The same has been proposed for in later chapters

**Fig 2.9. FCC of Reserve Forests under Sonitpur East Division( Naduar, Biswanath, Behali, Singlijan and Gohpur ) for Year 1973, 1988, 1994, 1999 and 2001**






Study of the FCC for 1973 to 2001 shows that Gohpur RF was deforested way back in 1973 itself. Massive deforestation took place in Gohpur RF and it continued till 1999. Deforestation and encroachment of Biswanath RF started from early part of 1990s and by 1994 substantial part of the RFs were under encroachment.

### 3.3.2 Illicit felling of trees in forests and smuggling of timber

- The Forest Department, with involvement of people, would endeavour to meet the basic demands of people from the factory sector by providing legal and bonafide avenues so that illegalities do not thrive.
- Protection mechanism would be strengthened by involving local people through village level Joint Forest Management Committees. These Committees would be empowered and provide special incentives to prevent forest offences.
- Forest officers would be well equipped to prevent/ detect / investigate forest offences with all logistic support.

- For tackling the crimes and criminals of forest offences, forest officers would be provided with adequate legal powers.
- The Assam Forest Protection Force (AFPF) would be modernized with proper training and arms.
- Steps would be taken for establishment of Special Courts at the district level for quick disposal of forest offence cases. The proposal for establishment of Green Bench in Gauhati High Court would also be pursued for swifter and judicious disposal of environment related cases.

### 3.3.3 Bamboo and cane management

- Conversion of bamboo diversity, germplasm, sustainable management and use of dedicated bamboo forest and promoting bamboo cultivation in homesteads are the key-trust areas of Bamboo Policy of Assam.
- To enhance the productivity in bamboo sector, improved planting stock would be developed through application and extension of modern techniques both within the Forest Department and to the communities.
- Forward and backward linkages between bamboo growers and bamboo enterprise, industry and craft centers should be established to boost bamboo trade, industry and marketing within and outside the State.
- Harvesting of bamboo for paper mills would be properly monitored and silvicultural practices would be strictly followed. Such industries would be asked to procure atleast half of their requirement from village communities, which will encourage them to grow more bamboo and help their economic upliftment. For all industrial uses, the pricing would be done judiciously.
- Appropriate interventions and association with NGOs working in the sector for introducing modern technology catering to the current market requirements and imparting necessary training to the local people of the State for optimum utilization of the returns from this invaluable resource of Assam.
- Canes are now in a very dwindling state in Assam because of large-scale conversion of cane bearing areas or cane brakes to paddy fields outside the forest. The most important species of cane (rattans) available in RFs are- (1) Jati/Hill Jati (*Calamus tenuis*); (2) Tita/Rangi (*Calamus leptospadix*); (3) Raidang(*Calamus flagellum*); (4) Oyahing; (5) Lejai (*Calamus floribundus*); (6) Jeng (*Calamus erectus*); (7) Golla (*Daemonorops jenkinsiannus*); (8) Huka (*Calamus latifolieus*); (9) Sundi (*Calamus guruba*).
- Joint Forest Management Committees are to be involved in propagation and expansion of cane plantations in suitable areas- With proper value addition and market linkages canes would be transformed as the most important raw materials for the cottage industries specialized in handicraft and furniture.

### 3.3.4 Non-Timber Forest Products (NTFPs)

- Rich flora of Assam yields various NTFPs. Endeavour shall be made to conserve and increase productivity of forests with regard to these NTFPs. Screening of Non-Conventional NTFP shall be carried out.
- Government of Assam shall enact suitable policies endowing ownership rights of Minor Forest Produce to the JFMCs taking following points into consideration.
- Minor Forest Produce (MFP), now more appropriately rephrased as Non Timber Forest Produce (NTFP) covers species which can be harvested on nondestructive basis and shall not include minerals and wild animals or their derivatives.
- Protected Areas, Biosphere Reserves and the refractory areas in high hills would not be used for harvesting NTFP as it would contravene the provisions of The Wildlife (Protection) Act, 1972.
- Rights of ownership of NTFPs, to JFMCs may be exercised in a regulated manner with advice of Forest Department so that germplasm is not subjected to irreparable damage and the usufructs are available on a sustainable basis. JFMCs especially the women would be encouraged to take up cultivation of selected NTFPs for commercial use, leaving the resource base in the Reserve Forests intact for conservation purposes.

### 3.3.5 Wildlife conservation

- Protected Area Network (P.A.N) including National Parks, Wildlife Sanctuaries, Conservation Reserves and Community Reserves would be enlarged to at least 5 percent of the geographical area of the State. Special management plans will be drawn up for protection and habitat restoration.
- State would persistently strive to improve the status of wildlife by augmenting vigilance mechanism both through Govt. functionaries and cooperation of communities to curb poaching and illegal traffic of wildlife and wildlife products.
- Action Plan for protection and management of wildlife in multiple use areas shall be drawn up. NGOs, National and State Institutes will be called upon to associate in the sphere of wildlife education, interpretation and generation of public support for ensuring better protection and management of protected areas.
- Action plan for identification, classification and listing of endangered and threatened species of plants and animals will be drawn up with an aim for their rehabilitation, development and preservation. Herbarium may be established at suitable sites for taxonomic studies
- Research and monitoring activities would be geared up to keep pace with global efforts to meet site specific requirements of wildlife management. High priority to ethno-biological research involving plants and animals as well as their derivatives would be ensured and endeavour would be made for identification of useful species.

- Studies on ecological risks in the important wildlife habitat including the PAs be made mandatory after a period of 3 - 5 years. Knowledge of the ecological sensitivity of the habitats can save resources or accelerate the expenditure of the limited resources towards critical areas.
- Eco-development works will be encouraged around the protected areas to reduce dependency of the people on forests and forest products and generate a friendly attitude among the communities on appreciation of the need for preservation, protection and conservation of the protected areas in general and the flora and fauna in particular.
- Man-animal conflict resolution mechanism will be evolved through innovative preventive measures, education, more effective compensation schemes, insurance schemes and so on.
- Ensuring viability of small sized protected areas through compatible buffer zones and dispersal corridors. This would call for adjustment in forestry operations to take care of the bio-diversity. Man-animal conflicts shall be resolved through appropriate measures in the tension zones.

### 3.3.6 Afforestation, social forestry and farm forestry

- A massive need based and time bound programme of afforestation and tree planting with particular emphasis on small timber, fuel-wood and fodder development would be initiated on all degraded and denuded lands in the State, whether forest or non-forest land.
- To encourage planting of trees along sides of roads, embankments, railway lines, rivers, streams, canals and other fallow lands under State/ Corporate, Institutional or private ownership. Green belts would be raised in urban/industrial areas to check population and improve the micro-climate with the assistance of NGOs, private, educational institutions and corporate sector.
- Village and community lands or any other such lands not required for other productive uses, would be taken up for development of tree crops and fodder resources. Technical guidance necessary for initiating such programmes would be provided. The revenue generated through such programmes shall deposited to the respective JFMCs, where the lands are vested in them; in all other cases, such revenue would be shared with the local communities in order to provide an incentive to them. The vesting, in individuals, particularly from the weaker sections (e.g. landless labour, small and marginal farmers, schedule castes, schedule tribes and women) in general, certain ownership rights over trees in these areas, would be considered subject to appropriate regulation, beneficiaries being entitled to usufruct and in turn be responsible for their protection and maintenance.
- Laws relating to harvesting of trees from private lands would be reviewed with a view to encourage the growers to undertake such plantations with more zeal.

- Suitable market linkages shall be developed for disposal of the non-wood forest products (N-WEPs) at remunerative prices, which would act as an incentive to tribal and other rural folk in taking positive interest in growing such crops.

### 3.3.6.1. Agar (*Aquillaria Agallocha* Roxb) Plantation for Agroforestry and farm Forestry

Botanists call it *Aquillaria Agallocha* Roxb., manufacturers call it *Agaru*, traders call it profit, the poor call it survival, the common man simply calls it *agar*. Sanchi plant or agar tree yields two products having commercial viability – agar oil or Agar attar and Agaru. Agar oil or attar as we call it locally is the essential oil extracted by distilling the agar dust while the Agaru or agarwood is the heavily oleoresin impregnated solid chips of wood obtained and processed from the fungus infected part of the trees.

It has long been an olfactory prize for discerning noses. Agar oil, is highly valued and universally prized as 'Otto of Roses". Agar, though little known, in Assam and the North –East is a highly sought after commodity, and the premiums it commands today in the international markets has dramatically transformed the lives of families and economies of areas where its trade exists or where it is procured. One such area that has reaped and flourished from this wonderful resource is the Hojai Sub-division of Nagaon district.(1)

There are approximately two thousand numbers of Agar wood oil distillation units functioning in Hojai Sub-Division and the trade is flourishing since last 50-60 years in this region. Apart from its deep-rooted cultural, historical and socio-economic links with this region, the agar oil trade is providing employment to around 20,000 people of this locality either directly or indirectly.

**NATURE'S VALUE ADDITION**

**A**gar oil and agaru or agarwood are the most exalted perfumery raw material obtained from the infected wood of agar tree. The infection of fungi occurs when stem injured or is bored by a larvae of a stem borer mainly *Zeuzera conferta* Walker. It is seen that the larvae of *Z. conferta* bore the standing tree trunk of *A. agallocha* Roxb. and make tunnels inside the tree trunks. Fungus enters the plant through this vertical hollow sometimes-zigzag tunnel inside the stem, which serves the initial sites of infections. Later on infections spread on all sides slowly and gradually and ultimately a larger wood volume gets infected. More insect infestation in the infected area, more is the chances to form agar wood in 7-8 years time after infection. Agarwood formation is the resinification of accumulated oleoresin due to the action of microorganisms.

Infections may also occur due to mechanical or natural injuries on the stem but it is very much localized. Due to infections oleoresins are accumulated in the infected wood and later become odoriferous. At the initial stage infections appear as brown streaks in the tissue. Accumulation of oleoresins goes on increasing with the increase of infection rate as well as aging of infection. As more of oleoresins are deposited the intensity of colour of the infected wood increases and finally it

becomes black due to increase in concentration. For agaru formation the hollow tunneling inside the trunk/stem of the living tree seems to be necessary.(2)

The fungal infection takes long time to mature and trees about 50 years old have the highest concentration (2.5 - 5.0 kg/tree). Sometimes all the tissues under the bark of the tree may be found synthesizing oil and also agarwood. True agarwood is heavier than water.

If the infection starts at a young age say at the age of 5 – 6 years, then a total 10 years age may be sufficient to get commercial agarwood or agaru in a plant. Without infection century old tree may not bear a microscopic piece of agarwood. Based on the intensity of attack the trees can be grouped as healthy, slightly attacked, moderately attacked and severely attacked trees. In a natural population about 25 to 30% of the trees may get infected and thus productive.(2)

**CULTURAL TREATMENT TO AUGMENT OIL FORMATION**

Formation of agarwood can be initiated by the creation of open wound on the trunk of agar tree. It is a common practice now a day to apply mechanical injuries in the stem, branches at regular intervals for early infection. This is done just before breaking the dormancy i.e. before spring by giving a deep slanting cut with a sharp *Dao* (a multipurpose heavy knife) *or* Axe. These injuries are to provide ready infection sites and also to push the tree to undergo a stress condition, which helps in spreading of infection. This practice yields better result where there is already built up microbial population in soil and also the climate is warm and humid. These cut injuries serve the initial sites of fungal infection.

The '*Dum type'* product obtained out of this treatment for oil extraction is locally known as "*Ghap mal".* A 20 years old tree that may produce only 5-10 kg of '*Dum*' without any treatment (which is due to natural injuries and mostly obtained at the junctures of broken branches) when treated by mechanical injuries is found to yield more than 30 kg in about 2 years.

**AGAR PROCESSING**

Two types of commercial products are obtained from a harvested agar tree (a) agaru or agarwood that is used as incense and (b) Essential oil or agar oil or agar attar. Agaru is 0btained from older trees while oil is distilled from old as well as younger trees. After felling a tree, the leaves and smaller branches are removed. Then the tree is cut into logs (pieces of 2-2.5 ft.). Thereafter, the logs are splitted to separate out the infected and non-infected woods. The agarwood of any grade if detected is first separated out with the help of indigenous tools like hacksaw blade and '*Batali*' and graded them based on the oleoresin impregnation, colour density, specific gravity and finally the odour. These are then dried, cleaned by removing the white woody portions as far as practicable, polished and graded for marketing.(2)

Agar oil is obtained by steam distillation of harvested wood chips or coarse powder in special type of distillation unit. Distillation is continued for 5-10 days or more using firewood as the energy source.

**DEPENDENCE OF THE AGAR OIL INDUSTRY ON THE FOREST RESOURCES**.

The raw materials required for the said industry are mainly raw agar wood and firewood.

At present there is hardly any agar tree (Aquilaria agalocha) available in the reserve forests of this State. Major agar wood traders are using agar wood imported from countries such as Thailand, Singapore, Malaysia, Indonesia etc. as raw material for agar oil extraction with proper licence and other documents. Some of the petty businessmen of this trade are using immature agar wood brought from agar trees from Pattaland from Golaghat, Sibsagar districts. Hence there is absolutely no dependence on the forest resources of the state in general, for meeting the industry's agar wood requirement.

However, the said industry is heavily dependent on reserve forests for its firewood requirement. The industry requires an approximate quantity of 100 stack cubic meters per day and the requirement is made up largely by way of illegal removal of firewood from reserve forests areas. This is the point where the department is facing a clash of interest with the agar industry that involves many socio-economic issues coming in the way of functioning of the forest department vis-à-vis Agar industry.

Illegal removal of round firewood from rich natural forests is a greater problem than other kinds of illegalities. This removal would not only gradually wipe out the natural forests but also permanently impair the regenerative capacity of these forests in future. Indiscriminate felling of naturally grown trees in all age-classes would also lead to complete destruction of the forests.

**AGAR IN AGRO-FORESTRY**

Agar tree is suitable for growing on field boundaries and for dividing whole plot into sub-plots. Not only this, agar tree is also grown on borders of gardens, school compounds, office compounds, parks and residential sites. The good capacity for pollarding and coppicing has made it suitable to fit in agro-forestry. The canopy of Agar tree is such that it allows sunshine penetration partly. Thus, it can be planted in field boundaries, bunds etc., without affecting the field crops. Besides, agar tree has been successfully grown for strip planting along banks of ponds, tanks, canals and roads. In hilly areas / *tillas* as in Barak valley it can be planted on poor soils on hill slopes, *tilla* tops. They help in reducing soil erosion and land sliding caused by rushing water during rainy season. Agar tree could successfully be introduced in Social Forestry and also in afforestation programme. (2)

**AGAR IN TEA GARDEN**

Tea growing situation is also ideal for agar tree. The increasing demand of agarwood, it is being introducing as shade tree in tea plantation particularly in Upper Assam with success. Agar tree

is evergreen and with spreading canopy it allows partial penetration of sunshine through it. Regular looping of branches above tea bushes is necessary. (2)

**ECONOMICS PER HECTARE**

| Heads of Expenditure | 1st year | 2nd year | 3rd year | 4th year | 5th year | 6th - 8th year | 9th -15th year |
|---|---|---|---|---|---|---|---|
| Cost of fencing & Maintenance L.S. | 15000 | - | - | - | - | - | - |
| Land preparation | 5000 | - | - | - | - | - | - |
| Pit (30x30x30 cm) making 1700xRs.2/pit | 3400 | - | - | - | - | - | - |
| Cost of saplings 1700 @ Rs.5.00 | 8500 | - | - | - | - | - | - |
| Planting cost @ Rs. 2.00/plant | 3400 | - | - | - | - | - | - |
| Compost | 9000 | 8000 | 8000 | 8000 | 8000 | - | - |
| Fertilizers | - | 5000 | 6000 | 8000 | 9000 | | |
| Application cost Rs.2.00/plant | 3400 | 3400 | 3400 | 3400 | 3400 | - | - |
| After care/year | 5000 | 5000 | 5000 | 5000 | 6000 | 20,000 | 30,000 |
| Inoculation @ Rs. 100/tree x 1500 trees | - | - | - | - | - | 1,50,000 | 50,000 |
| Misc. exp. | 1300 | 1600 | 1600 | 1600 | 1600 | 3000 | 7000 |
| **Total** | **54,000** | **23,000** | **24,000** | **26,000** | **28,000** | **1,73,000** | **87,000** |

**Expenditure**

Upto 8th year = Rs. 3,28,000

Next 7 years = Rs. 87,000

Total = Rs. 4,15,000

**ANTICIPATED YIELD AND INCOME**

Assuming 1500 Nos. trees at 8th year out of the total, we may harvest about 40 % of the selected trees i.e. 600 with a view to thin out the population for remaining 900 trees for further growth and development and also to generate an interim income. The final harvesting (900 Nos. trees) would be done at 15th year.

| S.No. | Period | Expenditure (Rs.) | Yield (assumptions) | | Returns (Rs.) |
|---|---|---|---|---|---|
| | | | Dum/ Boya (Low quality Distillable wood) | Kalagachi/batali (agarwood) | |
| 1 | Till 8th year | 3,28,000 | 20 kg/tree from 600 trees @ Rs. 10/kg | - | 1,20,000 |
| 2 | 9th -15th year | 87,000 | 50 kg/tree from 900 trees @ Rs. 50/kg | 0.5 kg/tree from 500 trees @ Rs.2,000/kg | 32,50,000 |
| **Total** | | **4,15,000** | | | **33,70,000** |

**Net returns:**

(Rs.33, 70,000 – Rs. 4,15,000) = Rs. 29,55,000

From an established plantation, thus a net income of Rs.30 lakhs after 15 years may be generated giving an average of Rs. 2 lakh /year/ha.

Intercropping in the early stages of growth can generate extra income. Vegetables/pulses or aromatic crops like Patchouli (*Pogostemon cablin*), Sugandhmantri may be cultivated as short season/short term intercrops during first three to five years of plantation. In the later stages shade loving medicinal plants like Sarpagandha (*Rouwolfia serpentina),* long pepper *(Piper longum)* may also be grown for another few years depending on plant population and land type.

For agar unit to run, another necessary raw material is the firewood. This firewood could be raised simultaneously with agar plantation. A minimum of 2-stack cft of firewood is required to run a distillation unit for a day. 20 kg of agar dum/boya are distilled in a unit for 5 days. Therefore, for distillation of 20 kg of agar wood around 40-stack cft of firewood is required. From 1 ha plantation, 57,000 kg of distillable wood is harvested. This will require 1,14,000 stack cft (equivalent to 3,250 stack cu.m.) firewood during distillation. One ha of firewood plantation (in 2mX2m spacing) is required to supply this much of firewood. Therefore, for every ha of agar plantation raised, equivalent area of firewood plantation for firewood has to be raised.

SWOT analysis of agarwood plantations:

| | |
|---|---|
| **S**trength | • Availability of skilled & unskilled labours in plenty<br>• Traditional technical knowledge of agar-oil extraction<br>• Appreciation of agarwood and its use throughout the world |
| **W**eakness | • Indiscriminate, destructive and unscientific harvest of agar tree<br>• Habitat specificity and endemism of agar tree<br>• No concrete policy decision by the Government |
| **O**pportunity | • Improved conservation & sustainable management of highly endangered agar.<br>• The labour intensive system will generate employment opportunities, especially in rural and forest areas in turn resulting in rural development.<br>• Promote block plantation in urban/social/ agro- forestry<br>• Increased utilization of valuable species i.e., agar through domestication and planting<br>• Promotion of reforestation and afforestation activities, especially on marginal or unused land |
| **T**hreats | • Concern about the loss of precious plant species<br>• Pressure on forests for huge quantity of firewood needed for distillation of agarwood<br>• Endangering the survival of the decline in local know-how of distillation |

Finally, there is a need for more work to ensure that benefits from prospecting the world of agar for new perfumes are fairly and equitable distributed, as required by the Convention on Biological Diversity. In doing so, it is vital that undue restrictions are not imposed on trade of agarwood or else there is a danger that more damage will be done to the causes of conservation of wild agarwood and sustainable development than benefits received.

### 3.3.7 Production of biomass

- For the vast majority of the people in the State, the foremost need of forests is for fuel wood, timber, fodder and fibre. The issue of enhanced production and sustainable resource utilization would therefore be prioritized to meet the needs of the rural people.
- The microplans dovetailed with working plan prescriptions would guide the production of the biomass. Fuelwood plantations and agroforestry would be encouraged on community lands. Necessary steps to promote efficient conversion and utilization of timber would be promoted for maximization of resources use.
- Promotion of alternative sources of domestic energy would be taken up to reduce pressure on the forests. Use of non-conventional sources of energy would also be encouraged in a big way.

### 3.3.8 Wood-based industry

Following a scientific sustainable Forest Management Model, the Govt. of Assam would like to encourage wood-based industries wherever possible. Establishment of forest based industries and supply of raw materials would be as follows:

- All wood based industries would be located within approved industrial estates.
- The wood based industries would be encouraged to raise their own captive plantations or alternately try to procure raw materials from JFM community forests or private plantations.
- Government would encourage import of wood for the wood based industries with suitable fiscal incentives.
- Forest based industries would be encouraged to raise their own plantations for the raw materials needed for meeting their requirements or support individuals/communities to grow the raw materials with inputs including credit, technical advice, harvesting and transport services. Farmers, particularly, small and marginal farmers would be motivated to grow on marginal/ degraded land available with them, wood species required for industries. The industries would undertake purchase of the outturn after a fixed number of years at a minimum prefixed price capable of attracting growers.
- The prescribed annual harvest from the State Forests as per the microplan and Working Plan/ Management Plan prescription shall first serve the bonafide domestic requirements of the fringe dwellers. The surplus only shall be made available to the industry.
- Forest based industries must not only provide employment to the local people on priority but also involve them fully in raising trees and raw materials.

### 3.3.9 Ecotourism

Creating conductive atmosphere and facilitate for development of Eco- Tourism in the division is considered a major thrust under the new forest policy of Assam. Ecotourism that utilizes the forest scenic spots as well as the opportunities provided by the Protected Areas for wildlife viewing are to be seen as a community based conservation activity. This activity would in addition be promoted as a revenue generating mechanism to benefit the rural communities through their active involvement along with employment opportunities in various sectors, like tour operator guide, hotel and restaurant, boating sites, bio-mass based crafts and enterprises etc.

Consistent with the National Eco-Tourism Policy and Guidelines (1998), the National Policy for Tourism, 2002 and the National Wildlife Action Plan (2002-2016), the following steps will be taken on priority for development of Eco-Tourism in the State –

- Set up an Assam State Ecotourism Board/Authority/ Corporation that will plan, regulate, and fund tourism activities in different parts of the state especially in Protected Areas and Scenic spots in Reserve Forests and outside.
- Develop tourism management plan in selected areas in the division.
- Put in place the stringent standards of waste disposal energy and water consumption, construction plans and materials used therein.
- Develop impact assessment techniques and standards to evaluate negative impacts of tourism on soil, water resources, vegetation, animal life, sanitation or waste disposal, and cultural environment.
- Conduct orientation programme for tour operators and take up study of carrying capacity for most visited PAs.
- Forest Development Agencies (ED. As) constituted in Wildlife areas, which is the cor-ederation of Eco-Development Committees would be the implementing agency with State Tourism Development Corporation/ Tourism Department/Forest Department of the state assuring supportive and supervisory roles.
- The Forest Department would expand and revamp its own facilities for the development of Eco-Tourism all over Assam.

### 3.3.10 Forest extension

Forest conservation programmes need active support and co-operation of the people. It is therefore, essential to inculcate in the people an awareness of the value of the trees, forests and wild life and their contribution towards not only a healthy environment but also towards their poverty alleviation. This may be achieved through involvement of educational institutions, right from the primary stage. Study of forests and environment would be included in school curricula. Teachers would be given orientation training on environmental protection and its impact on social life. Raising of fruit and other useful trees by the students on institutional land, their own homestead land and nearby degraded areas would be encouraged. State awards would be declared to felicitate the institutions

doing best work in the sphere. Award of credits would be given to the students showing special interest in matters related to forestry and environment. Modalities would be worked out in consultation with the authorities of education department.

### 3.3.11 Forestry education

Study of forestry science has been considered as a part of environment study Government would endeavor recruiting forestry professionals of academic and professional excellence. Government would consider sponsoring larger number of forestry personal for attending specialized and orientation training for developing better management skills.

Institutes of Forestry Education of the State shall be upgraded and strengthened to take up multi-disciplinary short and medium term courses including on the job training in addition to regular programme.

### 3.3.12 Forestry research

With the increasing realization of the importance of forests for environmental health, energy and employment, emphasis is warranted on scientific forestry research necessitating adequate strengthening of the research base as well as new priority formulation. Some broad priority areas of research and development needing special attention are –

- Increasing the productivity of timber and other forest produce per unit area per unit time through modern scientific and technological inputs.
- Re-vegetation of barren/marginal/waste/mined lands and watershed areas.
- Effective conservation and management of existing forest resources (mainly, natural forest eco-systems).
- Research related to social forestry and agroforestry for rural/ tribal development.
- Development of substitutes to replace wood and wood products.
- Research related to wildlife management in parks, sanctuaries, biosphere reserves as well as wildlife outside protected areas. Research priorities are to be identified as system level, community level and species level.
- Discovery of new indigenous species with hitherto unknown utility status.
- Research on marketing N.T.F.P.
- Research on processing and scope of developing cottage industry with N.T.F.P. for marketing value added products.
- Research related to tribal-forest interface including development of site specific viable models of rehabilitation of shifting cultivation lands.
- For the above purposes linkage with universities and other institutions would be established.

## 3.4 Status of Species Prone to Over Exploitation

The biodiversity of forests is declining rapidly due to a number of factors such as land use change, climate change, invasive species, overexploitation and pollution. Encroachment and illegal felling for culturable land is posing a great threat to the forest floral as well as faunal biodiversity.Under the present system, Khokhan, Holong, Bola etc are prone to over exploitation. Due to high demand for timber these important forest tree species are over exploited. For harvesting bamboo and rattan silvicultural practices are followed and are properly monitored.

## 3.5 Conservation of Genetic Resources

The conservation of genetic resources is not yet documented in the Division. However, preservation plots, sample plots, medicinal plants conservation areas, community conservation areas, etc.; genetic diversity with the help of research organizations will be documented and monitored through research studies as far as possible especially for NTFPs including MAPs during the tenure of this workin plan. Some research findings published in peer revied joiurnals are as below:

[1]Behali reserve forest (BRF), the only left pristine forest within whole of the Biswanath district is a patch of semi-evergreen forest in the foothills of Eastern Himalaya. The checklist of its fauna has been published recently and gets updated each year (Sarma et al. 2009; Upadhaya 2016-17), and the native flora has been partially complete (Borah et al. 2020). The floristic diversity is exceptionally rich with diverse forms of life, and endemism is one of the highest among the neighbouring regions, showed by the presence of *Aristolochia assamica* (Borah et al. 2019a) and *Chlorophytum assamicum* (Borah et al. 2019b) discovered recently, and so far endemic to Behali Reserve Forest. Apart from that, many plants have also been rediscovered after gaps of more than 100 years: *Citrus indica, Tupistra stoliczana, Strobilanthes paniculiformis*, etc. (Borah et al. 2018; Borah et al. under press). Apart from the rich biodiversity, BRF has been facing tremendous pressure from the bordering regions, and in this rate of exploitation the forest will not survive for more 20 years. Efforts should be put up by the scientists and forest officials in support with the local fringe communities to gather important data, restore the degraded patches and monitor the long term changes to follow effective conservation.

[2]During the floristic and phytosociological surveys of Behali Reserve Forest (BRF) a patch of *Citrus indica* was encountered in a moist tract of primary forest. The patch covers only 20 m2 area and there are seven plants, of which three are with only flowers, two with fruits and flower-buds, one sapling and one old plant of which the main stem was cut-off and new shoots (coppices) are coming out from base. To record the presence of any other population within the BRF, an additional 10 km2 area were surveyed and the information collected from forest-dependent people of the nearby villages were analysed but no more plant was detected. Another wild species, *Citrus medica* is known to have distribution all over the country (Singh & Chadha 1993) in warmer regions. This species is also found in BRF. Vavilov (1950) have noticed the occurrence of Citron (*C. medica*) in wild, as well as in cultivation during his visit to North-east India. It has also a good distribution in the BRF, but restricted towards south in deciduous open scrubs, or along the river-banks, whereas, *C. indica* is restricted only in the northern part of the forest at the geographical location 26° 53' 25" N and 93° 15' 80" E .

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## 3.6 Fauna and Their Habitats

Most of the Reserve forests are located in the northern most part of the Sonitpur East Division. While the northern parts of most of the Reserved forests are away from the human habitation, the southern parts are merging with the habitation except in Behali RF.

The Sonitpur Kameng Elephant Sanctuary extends from all along reserve forests of interstate border of Assam and Arunachal Pradesh. However, due to large scale encroachment all Reserve Forests were wiped out except for Behali RF.

Due to this reason the major wildlife of this region has been wiped out or have moved to the adjacent forest belonging to Arunachal Pradesh. But elephants are still common in almost all the reserve forests. The Behali reserved forest is still rich in wildlife. Some of the wild animals existing in the accessible areas are elephant, leopard, Leopard cat, common and capped langur, Porcupines, Wild boar, barking deer, Monitor lizard, squirrel etc.

The avian fauna is rather rich and varied and some of the birds existing in the forests are Robin, thrush, Cuckoo, Shirk, Warbler, Myana, Sparrow, whistling tail, Wagtail, Sun bird, Bulbul , Bushchat, Flycatcher, wood pecker Barbet, Hawk, Cuckoo, Parrot, Parakeet, Bee eater, Owl, King fisher, Kites, Vulture, Onail, Teal, Stork, Heron spot-bill, Shovalle, Sand-piper Bedjungle fowl, Bedtwile dove, Rock pigeon, common green pigeon, Nightjar, Blue Jay, Koel Weaver bird, Pheasant, Hornbill, Flower-pecker etc. Preservation of the *juli* land i.e the wet miscellaneous formation are felt essential to save wild animals and birds.

**Mammals**: Due to large scale deforestation and encroachment, only Behali RF has considerable population of wild mammals. Most commonly found mammals are listed in Table V. Elephant census conducted regularly and as per last census conducted during 2011 the population was 108. In pursuance of guidelines of Project Elephant Govt of India and vide notification no. FRW-44/2002/46 Dated 7/3/2003 the entire Sonitpur East Division is included in Sonitpur Elephant Reserve. Last Tiger Census was conducted in 2014, signs were found but mostly tigers were recorded in Nameri Tiger Reserve.

## 3.7 Threats and Challenges to Wildlife:

Habitat fragmentation due to encroachment is major threat. Poaching is second most important threat. Specially, in northern part of Behali RF. Soil erosion due to flash flood is a major threat to faunal population. Even with the decreasing forest cover wild animals are still present in this Division.Further, many species of birds, amphibians and reptiles are also found. Destruction of forests, forest fragmentation, severe biotic interference due to urbanization and agricultural practices and lack of awareness among the masses about the forest areas and its biodiversity has badly affecttted the habitat of wildlife. With the shrinking habitat for wildlife and loss of grass and fodder in the forest areas, the animals tend to come out the forest area and raid the cultivated areas during the night hours for finding green pastures. In the winter season elephants in herds come out and cause considerable damage to paddy crops. This results in man-animal conflict, as the farmers lose their crops and labour. In the conflict some time one side or both sides suffer causality.

## 3.8 Protection and Management of Fauna

### 3.8.1 Wild elephant deaths

The man-elephant conflict is an important issue in the Sonitpur East Forest Division for over two decades. Total number of deaths of wild elephants is 46. Details provided in Annexure VIII.

### 3.8.2 Persons killed by wild elephants

During last 11 years, 86 persons lost their lives in wild elephant attacks. Maximum number of persons were killed during 2011, when 15 people lost their lives. Year wise details of persons killed by to wild elephant are provided in Table 3.10a. Total current outstanding payment as compensation is `50,31,392 w.e.f. 2006 to 2015. It is important that all outstanding payments, dues should be cleared as soon as possible, so that goodwill is generated amongst the people.

| **Person killed by wild elephant & wild animal** | | **Person injured by wild elephnat & wild animal** | | **House damage** | | **Crop damage (Bigha)** | | **Livestocks damage** | | **Total amount In Rs** |
|---|---|---|---|---|---|---|---|---|---|---|
| No | **Amount (in Rs.)** | **No** | **Amount (in Rs.)** | **No** | **Amount (in Rs.)** | **No** | **Amount (in Rs.)** | **No** | **Amount (in Rs.)** | |
| 12 | 10,20,000 | 21 | 89,508 | 331 No house & other property | 14,18,815 | 3,764.28 | 24,90,069 | 8 | 13,000 | 50,31,392 |

**Table 3.9 Abstract of Outstanding Ex-gratia, Compensation payment (2006 to 2015) in Sonitpur East Forest Division, Assam till 2015 .**

Funds received by Sonitpur East Forest Division for Mitigation of Human Elephant Conflict are from centrally sponsored Schemes like Project Elephant, Other wildlife areas etc for the years 2010-11 to 2014-15 for mitigation of human elephant conflict are furnished in Table 3.10.

**Table 3.10: Details of funds received for mitigation of Human Wildlife Conflict between 2010-11 and 2014-15 in Sonitpur East Forest Division, Assam**

| Year | Scheme | Fund Allotted (in Rs.) | Fund for Ex-gratia Compensation (in Rs.) |
|---|---|---|---|
| 2018-19 | CSS Project Elephant | 1570000 | Nil |
| 2017-18 | CSS Project Elephant | 1624062 | 958862 |
| 2016-17 | Corpus Fund | 4830265 | 4343785 |
| 2015-16 | Nil | | |
| 2014-15 | CSS Project Elephant | 1,00,000 | 35,000 |
| | State Plan other Wildlife area | 3,83,000 | - |
| 2013-14 | CSS Project Elephant | 2,53,000 | 3,83,000 |
| | CSS Man - Elephant Conflict | 65,50,000 | - |
| | State Plan other Wildlife area | 1,30,000 | - |
| 2012-13 | CSS Project Elephant | 9,35,000 | 14,69,500 |

| | | | |
|---|---|---|---|
| | State Plan other Wildlife area | 6,08,000 | - |
| 2011-12 | CSS Project Elephant | 21,72,000 | - |
| | State Plan other Wildlife area | 36,73,000 | 24,00,000 |
| 2010-11 | CSS Project Elephant | 6,41,000 | 4,74,000 |
| | State Plan other Wildlife area | 4,47,000 | - |

## Table 3.10a. Details of Fund disbursed as Ex- Gratia and Compensation w.e.f., 2005-06 to 2018-19 (Person Killed and injured by Elephant)

| S. No | Year | Person killed | | Person injured | |
|---|---|---|---|---|---|
| | | No. | Amount paid | No. | Amount paid |
| 1 | 2005-06 | 2 | 80,000.00 | 0 | - |
| 2 | 2006-07 | 17 | 680,000.00 | 5 | 5,000.00 |
| 3 | 2007-08 | 3 | 120,000.00 | 0 | - |
| 4 | 2008-09 | 7 | 280,000.00 | 1 | 20,000.00 |
| 5 | 2009-10 | 0 | - | 0 | - |
| 6 | 2010-11 | 6 | 240,000.00 | 0 | - |
| 7 | 2011-12 | 17 | 1,700,000.00 | 1 | 20,000.00 |
| 8 | 2012-13 | 8 | 560,000.00 | 1 | 5,000.00 |
| 9 | 2013-14 | 2 | 200,000.00 | 7 | 18,000.00 |
| 10 | 2014-15 | 0 | - | 4 | 32,511.00 |
| 11 | 2015-16 | 0 | - | 0 | - |
| 12 | 2016-17 | 15 | 1,320,000.00 | 21 | 90,020.00 |
| 13 | 2017-18 | 9 | 2700000 | 9 | 147179 |
| 14 | 2018-19 | 0 | - | 0 | - |
| **Total** | | **86** | **7,880,000.00** | **49** | **337,710.00** |

## Table 3.10c. Sum Total Fund disbursed as exgratia and compensation w.e.f., 2005-06 to 2018-19

| | Year | Total Amount in Rs paid for exgratia and compensation |
|---|---|---|
| 1 | 2005-06 | **80,000.00** |
| 2 | 2006-07 | **685,000.00** |
| 3 | 2007-08 | **120,000.00** |
| 4 | 2008-09 | **371,000.00** |
| 5 | 2009-10 | **-** |
| 6 | 2010-11 | **434,000.00** |
| 7 | 2011-12 | **1,850,180.00** |
| 8 | 2012-13 | **668,500.00** |
| 9 | 2013-14 | **218,000.00** |
| 10 | 2014-15 | **271,330.00** |
| 11 | 2015-16 | **-** |
| 12 | 2016-17 | **4,343,785.00** |
| 13 | 2017-18 | **5,367,729.00** |
| 14 | 2018-19 | **-** |
| **Total** | | **14,409,524.00** |

## Table 3.10b. Details of Fund disbursed as Ex-gratia and Compensation w.e.f., 2005-06 to 2018-19 ( House damage, crop damage and livestock killed by Elephant)

| S. No | Year | House damaged | | Crop damaged | | Live stock killed | |
|---|---|---|---|---|---|---|---|
| | | No. | Amount paid | In Bigha. | Amount paid | No. | Amount paid |
| 1 | 2005-06 | 0 | - | 0.00 | - | 0 | 0 |
| 2 | 2006-07 | 0 | - | 0.00 | - | 0 | 0 |
| 3 | 2007-08 | 0 | - | 0.00 | - | 0 | 0 |
| 4 | 2008-09 | 26 | 71,000.00 | 0.00 | - | 0 | 0 |
| 5 | 2009-10 | 0 | - | 0.00 | - | 0 | 0 |
| 6 | 2010-11 | 46 | 194,000.00 | 0.00 | - | 0 | 0 |
| 7 | 2011-12 | 47 | 128,180.00 | 1.50 | 2,000 | 0 | 0 |
| 8 | 2012-13 | 37 | 103,500.00 | 0.00 | - | 0 | 0 |
| 9 | 2013-14 | 0 | - | 0.00 | - | 0 | 0 |
| 10 | 2014-15 | 60 | 142,830.00 | 97.50 | 93,500 | 1 | 2489 |
| 11 | 2015-16 | 0 | - | 0.00 | - | 0 | 0 |
| 12 | 2016-17 | 242 | 1,337,815.00 | 2224.00 | 1,595,950.00 | 0 | 0 |
| 13 | 2017-18 | 132 | 1177750 | 1845.9 | 1342800 | 0 | 0 |
| **14** | **2018-19** | **0** | **-** | **0** | **-** | **0** | **-** |
| **Total** | | **590** | **3,155,075.00** | **4168.90** | **3,034,250.00** | **1** | **2489** |

### 3.8.3 Physical assault on forest staff during wild elephant anti depredation duty

Due to heavy destruction of crops, property and loss of human life due to elephant depredation, there is strong discontentment amongst people against forest department. The matter gets more aggravated due to huge back log in payment of ex-gratia, compensation etc. People start losing patience during harvesting season when crops are indiscriminately destroyed by elephants along the entire migration and crop foraging route.Some instances of physically assault on forest staff are –

- On 21/1/2011, Physical Assault on forest staff at village Khokanbasti, Bordekorai, Diplonga Range.
- On 25/7/2011, Mob attack on Forest and Police team on elephant depredation duty at village Rampur, Behali PS, Borgang Range.
- On 11/11/2012, Staff on elephant depredation duty were severely injured in a mob attack that they were hospitalized, at Bholaguri Tea Estate at Gohpur Beat.
- On 23/9/2014, Borgang Range staff were assaulted at Jhalukbari.

- On 18/9/2014, During elephant depredation duty one civilian person was hit by stray bullet and he succumbed to injuries. Later there was massive unrest and Helem Revenue Circle Officer's vehicle was damaged.
- Details of 38 elephant anti-depredation drives conducted in the division is shown in Annexure X.

### 3.8.4 Elephant migration route

Short migration pattern of elephant in Gohpur area forms the area affected due to depredation.

- **Route 1**: A stretch of 10-12 km from Singlijan RF (Paniputa area), Buroi Tea Estate, Brahmajan Tea Estate, Jorabari to Bholaguri Tea estate
- **Route 2**: A stretch of 10-12 km from Singlijan RF (Paniputa area), Buroi Tea Estate, Brahmajan Tea Estate, Kekuri Basti to Bholaguri Tea estate.

With the onset of winter, wild elephant on course of their short ranging migration gives birth to 1-2 infants in Brahmajan Tea Estate and Bholaguri Tea Estate and Rodhala Pothar.Other affected areas are migration routes are –

- Diplonga range: Northern boundary of Panpur RF
- Sadar Beat: Northern Bank of Brahmaputra, All along Monabari tea estateto Biswanath Ghat
- Borgang Range: Northern bank of Brahmaputra Gangmouthan, Rangsali etc.
- Pabhoi Range: Behali RF(Hatidepot) to Borjharoni to Monabari Tea Estate, from Dering to Pabhoi Village

# CHAPTER 4
# MAINTENANCE AND ENHANCEMENT OF FOREST HEALTH AND VITALITY

## 4.1 Status of Regeneration

The status of natural regeneration is not promising in Semi evergreen and tropical evergreen type of forests in Sonitpur East Forest Division; especially in the degraded patches. The threat factors for the natural regeneration are weed growth, consequent to the opening in canopy and grazing. Grasses and weeds severely deprive regeneration of moisture, light and heat. The climbers smother and constrict plants, especially young ones, by climbing upon them resulting in gradual decrease in mean annual increments. Anthropogenic interference also affects regeneration. The damage to the natural regeneration by weeds, climbers etc. are prominent in young plantations. Profuse regeneration of Bhelkors observed near Hatidepot, Kolaguri and Thandapani. Pansopa and *Lali poma* obseved at Golbil area. Pole size of Pansopa are less owing to feeling by woodcutters. Poma regeneration can be seen at Rongagorah beat. Entire Dikal to Radhasoo area has Bola, amari trees of all age groups. Dillenia, Azar and Bogipoma regenerations could be seen behind serelia FV. Sporadic growth of Lejai cane (*Calcaus floribunda*) Torapat (*Alpinia allunghas*) Kaupat (*Phrynium* spp) found along hatidepot to Dikal.

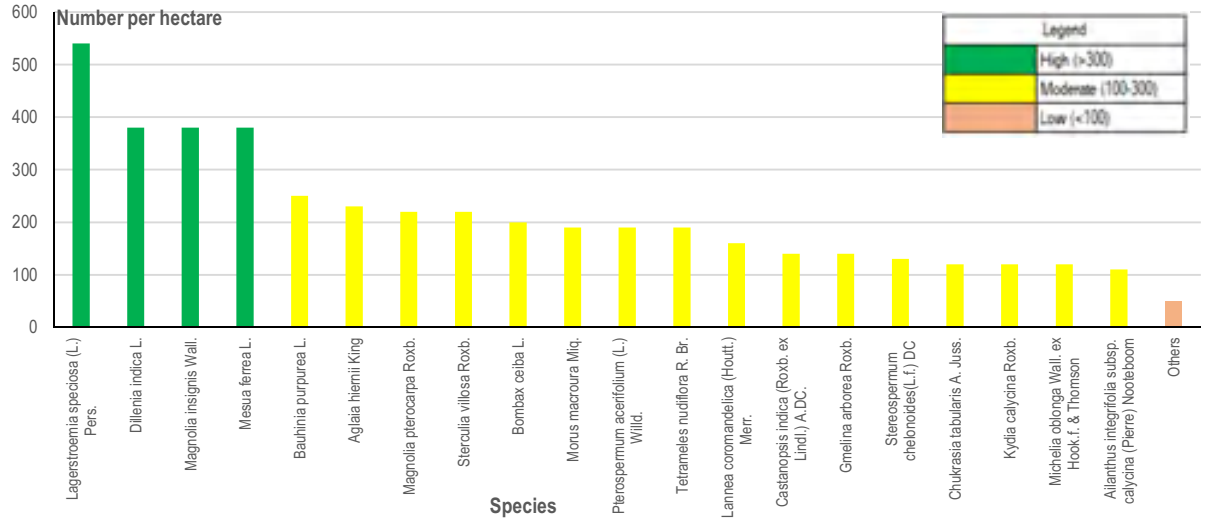



**Figure: Graph showing the regeneration status of different species in Behali RF.**

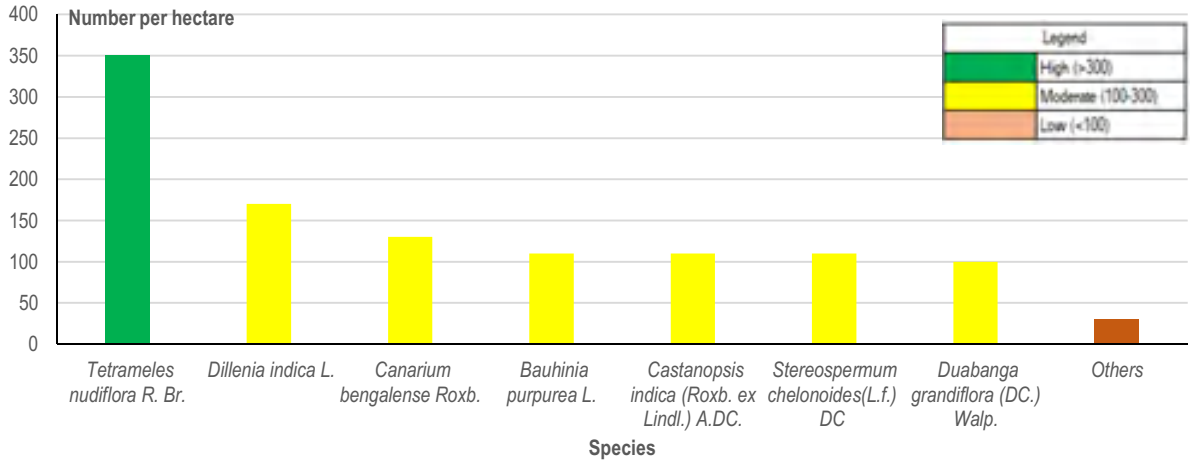


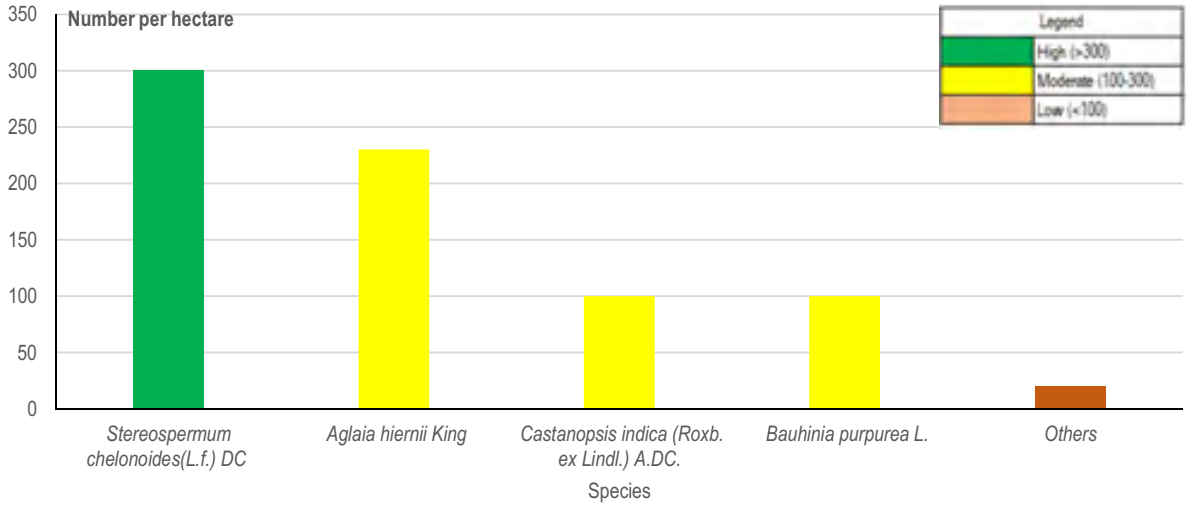
**Figure: Graph showing the regeneration status of different species in Biswanath RF.**

## 4.2 Area Affected by Forest Fires

There were few forest fire incededents in the past. Figure 4.2 shows the fire incedences in the Division from 2004 to 2016. This is detailed in figure 4.1. Forest Fire is not major issue in Sonitpur East Division. Whatever fire incidence detected or reported is entirely man made and related to agriculture practices in Encroached area.

## 4.3 Area Damaged by Natural Calamities

The Division is vulnerable to a number of natural calamities such as floods, flash floods, earthquake, drought, hailstorm /whirlwind and riverbank erosion. The state of Assam as a whole can




be categorized as a flood prone state. The river Brahmaputra flows along the entire southern border of district with its tributaries criss-cross through the district in the north-south direction. Gohpur Revenue Circle is annually affected by natural disasters like flood, erosion and storms causing loss of standing crops, damage to public property like roads, schools, houses etc. The southern part of Gohpur is a riverine tract bounded by river Brahmaputra and its network of tributaries. Incidences of flash floods have been observed in these tributaries in the upper reaches. In the year 2008, 104 villages were affected by flood directly affecting a total population of 9,209. Approximately 2,051 ha of agricultural land was affected resulting in loss of standing paddy crops. Riverbank erosion has led to extensive loss of land in Gohpur. Table 4.3a provides an overview of natural disasters in the Division.

**Erosion Threat to Behali Reserve Forest:**

Borgang river which act as a natural boundary between Behali R F and Biswanath R F has been poised a threat to the Behali Reresve Forest. With a view to increase the tree cover, artificial regeneration plantation in an area of 79 Ha was undertaken by the ECO Task Force in the year 2014 in Hatideopt area of Behali Reserve Forest. But due to change in course of borgang river which leads to bank erosion and has wiped out a large portion of Hatidepot plantation area. Therefore erosion is one of factor which contributes towards shrinkage of the reserve forest area. River bank erosion is a

perennial problem in Assam. To combat against such erosion proper protection measure should be adopted such as construction porcupine, massive plantation programme in river bank etc.

**Table 4.1: Overview of natural disasters in Sonitpur East Forest Division, Assam**

| Type of Disaster | Time of Occurrence | Potential Impact | Vulnerable Areas |
|---|---|---|---|
| Flood | May to October | Loss of human life, livestock, infrastructure, houses, disruption of communication network etc | Entire Division |
| Earthquake | Any time | | |
| Cyclone/Storms | March to September | | |
| Drought | May to October | Damages to crops, drinking water shortage | |
| Fire Incident | Any time | Loss of life, houses, infrastructure, properties | |
| River bank erosion | May to December | Loss of lands, house, crops, infrastructure, disruption of road, communication etc. | Biswanath, Panpur,Depota, Belsiri, Gabhoru, Singitolijan, Chamdhora, Kholihamari, Singri, Sitolmari |

### 4.3.1 Flood mitigation

Flood mitigation measures help in reducing the actual or probable impact of floods on the people and their environment. The objective of flood mitigation is to control changes in the volume of run-off, peak stage of the flood, time of rise and duration of floodwaters, and location of flooding.

Borgang river which act as a natural boundary between Behali R F and Biswanath R F has been poised a threat to the Behali Reserve Forest. With a view to increase the tree cover, artificial regeneration plantation in an area of 79 Ha was undertaken by the ECO Task Force in the year 2014 in Hatideopt area of Behali Reserve Forest. But due to change in course of borgang river which leads to bank erosion and has wiped out a large portion of Hatidepot plantation area. Therefore erosion is one of factor which contributes towards shrinkage of the reserve forest area. River bank erosion is a perennial problem in Assam. To combat against such erosion proper protection measure should be adopted such as construction porcupine, massive plantation programme in river bank etc.

### 4.3.2 Cyclonic storm mitigation

Sonitpur is frequently stuck by cyclonic storms during pre-monsoon season. The following mitigation measures can be adopted to reduce the impact of cyclonic storm.

- Planting wind break trees in the most vulnerable locations (by DFO).
- Crops can be protected by introducing agricultural practices and cultivation of those crops which are more resistant to high winds.

## 4.4 Area Protected from Grazing

As considerable area of the Reserve Forest is under encroachment. The intensity of grazing is higher in the reserve forests. Due to high rate of grazing in this area, the plantation is badly affected.

## 4.5 Lopping Practices

Lopping is not permitted in the RFs of the Division.

## 4.6 Area Infested by Pests and Invasive Weed Species in Forests

Large tracts of forests are affected due to invasive weed species, which hinder the growth and development of the young seedlings. A survey[1] conducted in the State of Assam, which included the Sonitpur Division, to assess the vulnerability of bamboo species to various pests, led to collection of 32 species of pests belonging to eight orders i.e. Hemiptera, Homoptera, Thysanoptera, Lepidoptera, Orthoptera, Coleoptera and Isoptera and one species from Acariformes. Out of these pest species, four species of sap feeders and six defoliators were adjudged as major pests and twentytwo pests as minor pests, based on the incidence and intensity of insect pest attack. List of insect pest of selected bamboo species and their status is provided in Annexure XI.

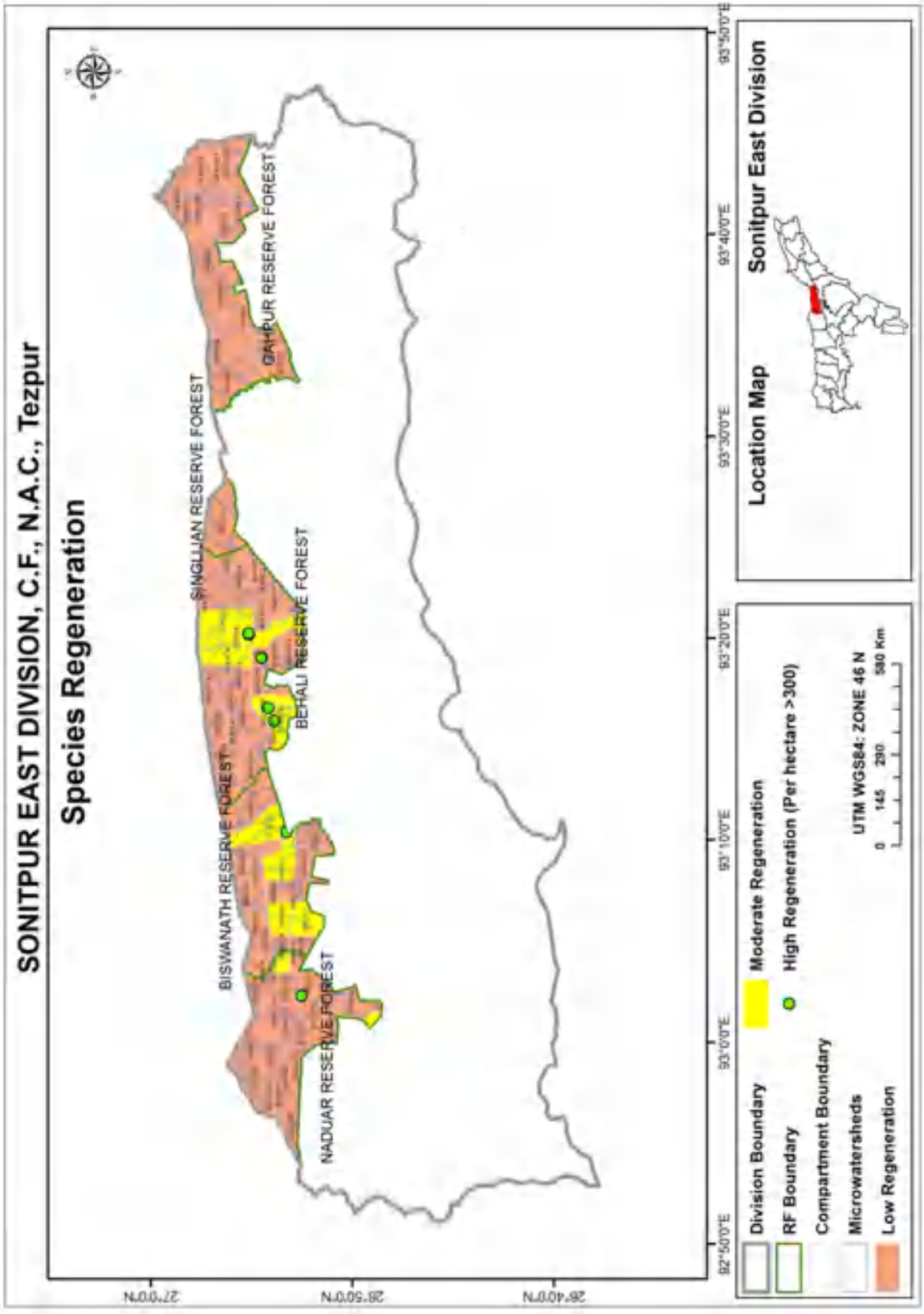



**Figure 4.1: Regenration Map of Sonitpur East Forest Division**

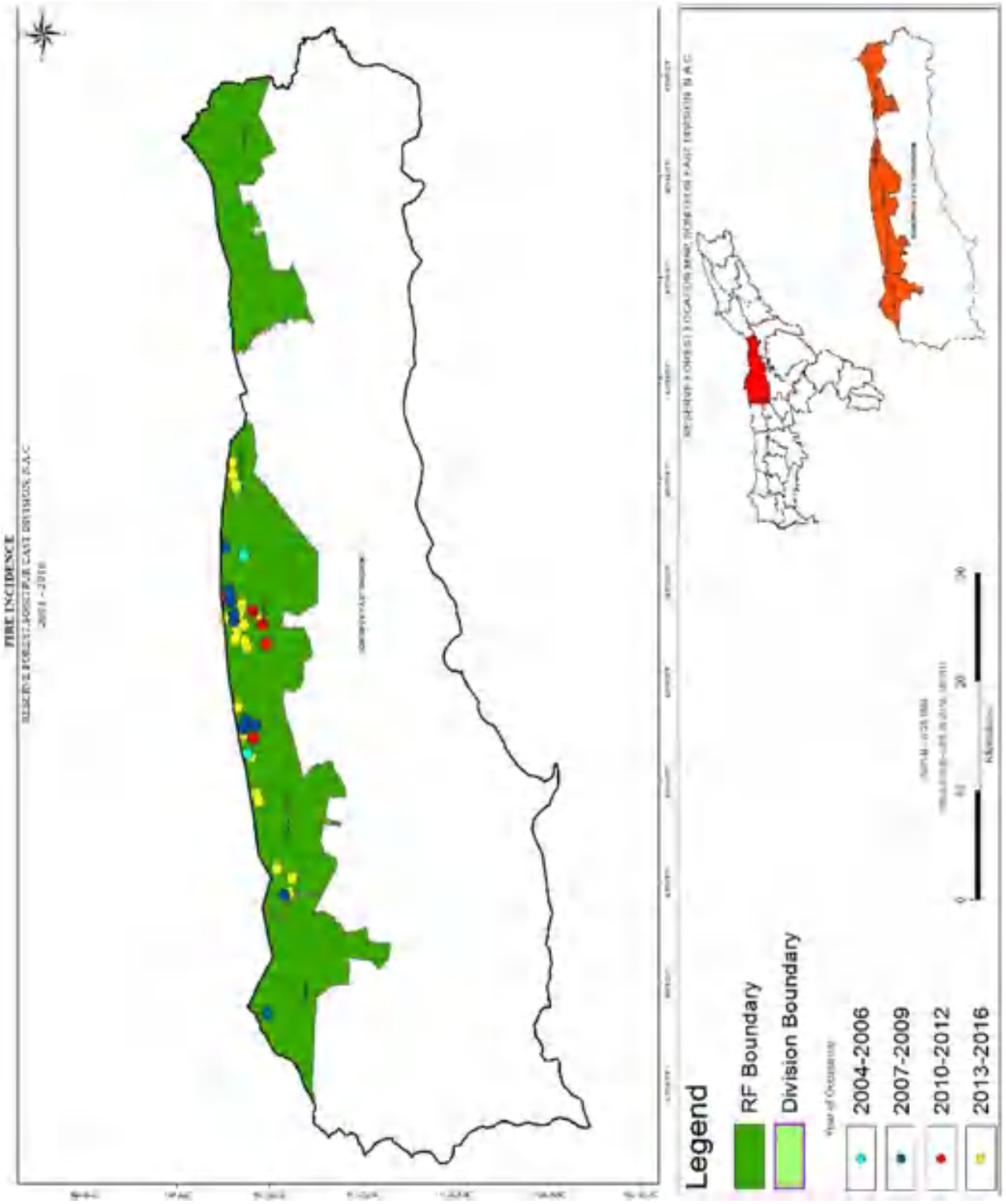



**Figure 4.1a: Fire incidence map of Sonitpur East Forest Division**

## 4.7 Incidents of Pest and Diseases

Pest and diseases affect the forest stand by deteriorating the quality of stock. However no systematic study was ever conducted in the reserve forests of Sonitpur east Division. Therefore ther is no record of such incidences.

## 4.8 Forest Degradation and its Drivers

Forest loss in Sonitpur East Division is mainly due to anthropogenic pressure - Encroachment for agriculture and settlements, habitations, illegal felling, etc., in the RFs. Almost all the RFs had encroachments. Table 4.8a presents data on land-use change in the Division in three time periods between 1994 and 2007. A sharp decline in the dense forest category has been observed during this period.

**Table 4.3: Land-use change in Sonitpur Division (1994, 1999, 2007)**

| Land use category | 1994 | 1999 | 2007 |
|---|---|---|---|
| Tea Garden | 38,693.66 | 38,486.11 | 38,565.81 |
| Dense Forest | 75,457.98 | 44,061.39 | 32,241.24 |
| Grassland/Riverine Forest | 36,725.12 | 3,680.14 | 13,380.93 |
| Agricultural Land/Non-forest area | 2,31,897.41 | 1,89,454.22 | 2,15,154.63 |
| Degraded Forest/Homestead garden | 44,395.21 | 1,90,240.71 | 1,44,147.33 |
| Water | 26,156.78 | 26,308.53 | 23,230.53 |
| Sandbar | 75,019.79 | 36,132.21 | 61,663.68 |
| Total area | 5,28,345.95 | 5,28,363.31 | 5,28,384.15 |

## 4.9 Pollution Control and Protection of Environment

Pollution of forests and environment is caused due to destruction of forests by way of encroachment, jhuming, illegal felling of trees and setting fire to forests and other biotic interferences. No specific study was ever conducted in this direction. There is need for conducting such quantitative and qualitative studies

# CHAPTER 5
# CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES

## 5.1 Area Treated under Soil and Water Conservation Measures

No soil and water conservation measures have been adopted so far in any part of the Division. Appropriate measures for soil and water conservation in the forest area and their systematic documentation will be taken up during the tenure of this Working Plan. Micro watershed map of the Division is shown in Figure 5.1.

## 5.2 Duration of Water Flow in the Selected Seasonal Streams

The total area covered by the river/stream in the Division is 8,215.8 ha, of which 1,487.8 ha falls within the RFs. River stream map of the Division is shown in Figure 5.2. All the rivers in the Division flow in the north-south direction. The streams are largely perennial in nature. Flooding is observed during the monsoon season. Major rivers of the Division are Brahmaputra, Jiabharali, Gabharu and Borgang.Figure 5.2 presents the average stream flow for each month during the year 2015. The highest flow can be observed in September while the lowest in month of January and February.

Figure 5.2 shows the combined waterbodies including the wetlands in the Division. Figure 5.3 shows the stream flow with respect to rainfall in litres per minute in the Division.

## 5.3 Wetlands in Forest Areas

The total area covered by the wetlands of the Division is 1961.84 ha of which 54.30 Ha falls within the RFs. Wetland map of the divison is shown in Figure 5.3. The waterbody/wetland areas of the RFs have been reduced, and wetlands fauna and flora population of the Division is declining as a result of degradation and disturbance of wetlands. The total area covered by wetlands in the Division is 1,961.84 ha. Wetland map of the Divison is shown in Figure 5.5

## 5.4 Waterlevel in the Wells in the Vicinity (upto 5 km) of Forest Areas.

The RFs of the Division are traversed by numerous streams, which form a source of water to the local population. However, no periodic monitoring of water level with respect to annual rainfall has been carried out during the last working plan. The water level with respect to annual rainfall will be monitored and documented during the tenure of this Working Plan. The groundwater map for entire district is as in ANNEXURE VIII. Entire bhabar belt along the foothills have fluctuating water table. During lean season the water table falls below 200 ft. In Radhasoo Forest Protection Camp faced lot of crisis fo potable water during early establishment period.

Table 5.1. Depth of ground water in Tube Wells and Wells in various forest camps under Sonitpur East Division

| Location | Range | Ground water Depth (July – August) | Ground water Depth (March) |
|---|---|---|---|
| Naharjan | Borgang | 20ft | 30ft |
| Bihumari | Borgang | 22ft | 30ft |
| Rangagorah beat | Borgang | 15ft | 25ft-30ft |
| Singlijan | Borgang | 40ft | 60ft |
| Diplonga | Diplonga | 20ft-25ft | 50ft-55ft |
| Pabhoi staff | Pabhoi | 20ft | 25-30ft |
| Gohpur RF | Gohpur Beat | 12ft | 22ft |

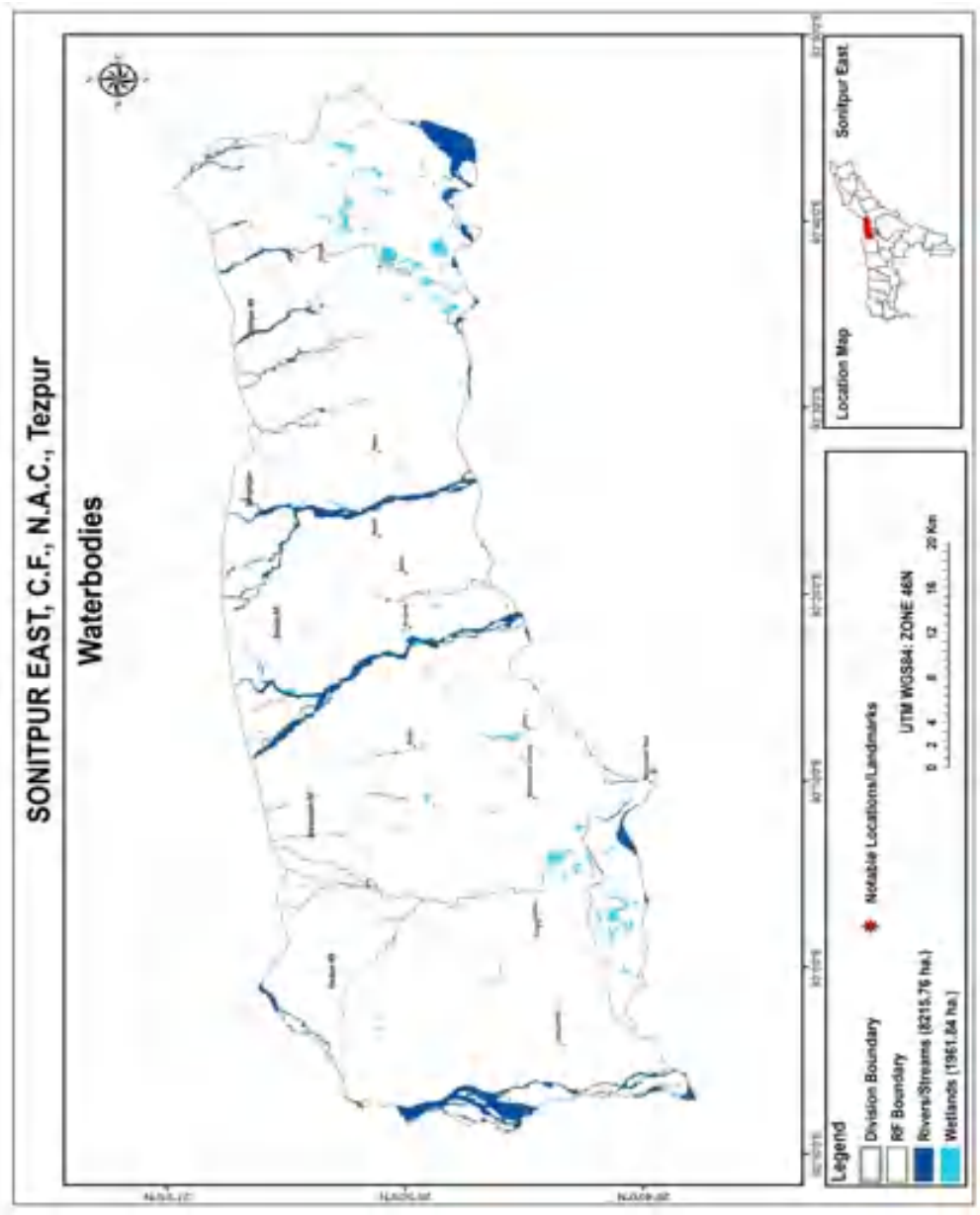



**Figure 5.1: River/stream map of Sonitpur East Forest Division, Assam**

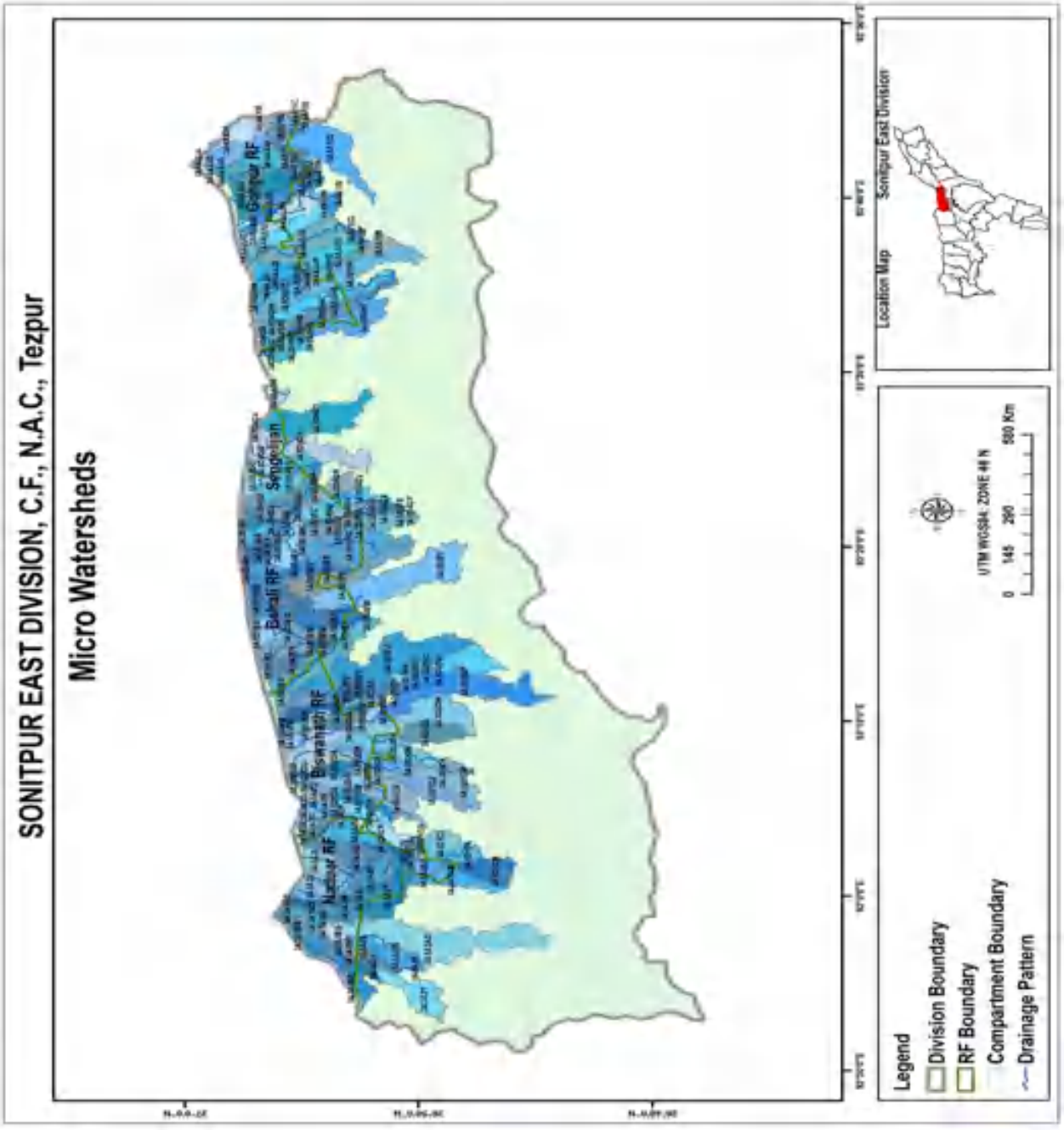



**Figure 5.2: Micro watershed map of Sonitpur East Forest Division**

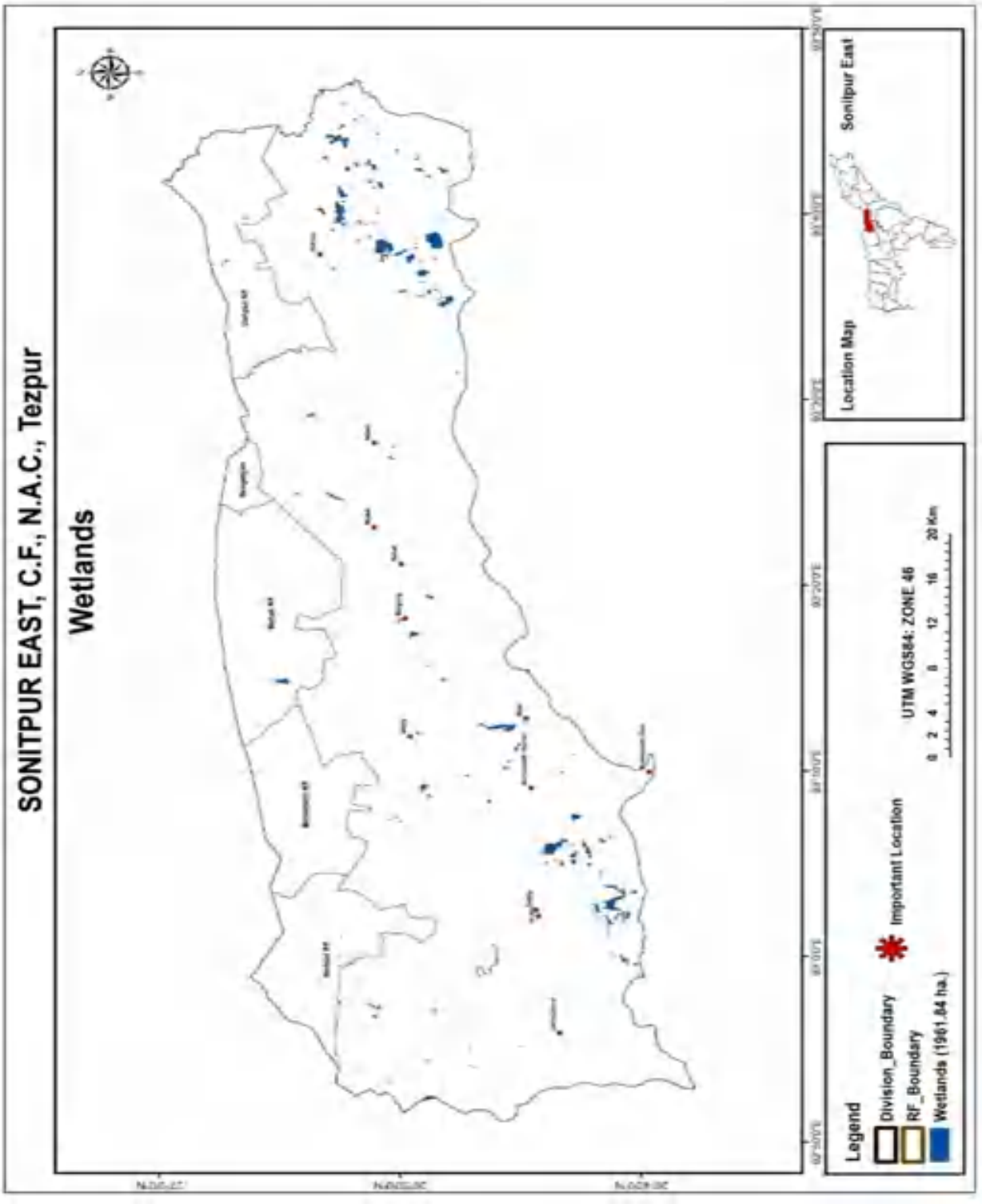
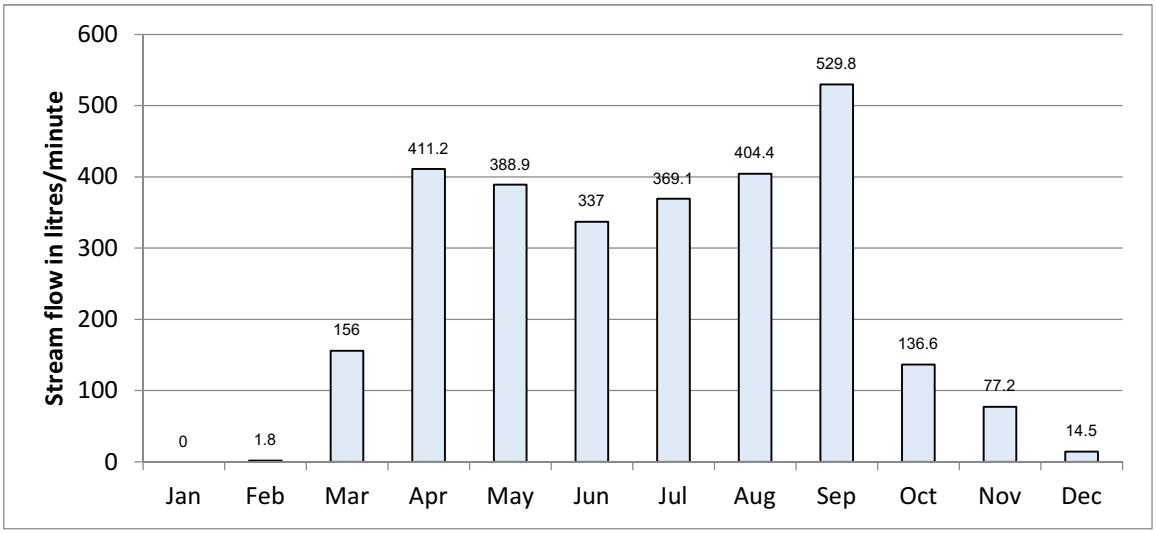



**Figure 5.3: Wetland map of Sonitpur East Division, Assam**

Figure 5.4: Status of stream flow in Sonitpur East Division, Assam




## 5.5 Status of Aquifers

Hydrogeology The district can be divided into two distinct hydrogeological units, viz., semiconsolidated and unconsolidated formations based on geology and hydrogeological character. The semi-consolidated formation composed of Neogene Siwalik Group of rocks bordering the northern boundary of the district. The Siwalik rocks are not suitable for ground water development. A very small area in the extreme southern part is occupied by consolidated Archean rocks.

The major water bearing formations include alluvial sediments in foothills and flood plain that constitute the unconsolidated formation. The piedmont zone extends over 8-10km from the foothill, which is laterally followed by younger flood plain area extending up to northern bank of the Brahmaputra River in south. The alluvial formations in the foothills are composed of sand, pebble, cobble and boulders. These materials have high permeability. In the flood plain area, however, little gravel mingles with different grades of sand.

Shallow Aquifer: The water bearing horizons occur within 30-50mbgl is considered to constitute shallow aquifer system. Ground water in this aquifer occurs under unconfined to semi-confined conditions. The aquifer materials comprise sands of different grades with varying proportions of gravels. The grain size of the aquifer materials is found to decrease towards the southern part of the district. The semi-confining layers are not persistent throughout the district. The development of groundwater from the aquifer for domestic and irrigational purpose is by open wells (Dug wells) and shallow tube wells. The performance of the shallow tube wells constructed by State Government for irrigation purpose indicates that the shallow aquifer system is quite potential. A shallow tube well constructed down to the depth of 30 to 40 m, tapping 6 to 15 m of aquifer giving discharge of 10-36 m3/hr.

Deeper Aquifer: In the deeper aquifers, ground water occurs under semi-confined to confined conditions. The aquifer materials are composed of sands and gravels of different size grade. In this district, CGWB, NER had explored the subsurface down to the depth of 301 m at Erabari. The

cumulative thickness of the granular zones in the deeper aquifer varies from 60 to 150m.. The grain size of the aquifer material increases towards north, i.e., towards the foothill.

Ground Water Movement As mentioned earlier the district is bounded in the north by Arunachal Himalayas and the south by the Brahmaputra River, evidently the ground water flow direction is from the higher elevation in north towards the plain area in the south. In the western part of the district the ground water flow is from northwest to southeast. In general the gradient of flow is high towards west as compared to the gradient in the eastern part. In the northern foothill region, the water table gradient is steeper (1.5m/km) and it forms the recharge zone for the entire district. Depth to Water Level CGWB is monitoring 31 ground water wells (GWW) in Sonitpur district. During 2012, premonsoon depth to water level varied from 2.16 to 9.21 mbgl (Fig. 3) and post-monsoon depth to water level varied from 0.76 to 4.57 mbgl.

During pre-monsoon period about 67% of GWM stations showed water level between 25 mbgl and rests showed water level below 5-10 mbgl. During post-monsoon period about 43% of GWM stations showed water level above 3mbgl and rests showed water level between 2-5 mbgl. Water Level Fluctuations The study of the water level data has revealed that the general fluctuation of water table during pre and post-monsoon is in between 0 to 2 m in plain area and more than 2 m in Biswanath (occupied by Archean rocks) area adjacent to river Brahmaputra. The major parts of the gross rise in water table during April to July dissipates quickly. Low ground water fluctuation in the area is due to low ground water draft and rapid ground water movement through the aquifer where by and large scale draft at one place is compensated by ground water recharge from other places.

Ground Water Maps are as in **ANNEXURE VIII**

## 5.6. Soil Type

The soils of the Sonitpur East Division can broadly be classified into the following groups:

1. Red Loamy soils: These are found in the northern border of the district. This soil type develops in the hill slopes under high rainfall condition. This soil is characterized by low nitrogen, low phosphate and medium to high potash. PH is acidic.

2. Lateritic Soil: The lateritic soils are the product of high leaching and found in hilly region. Soil PH is acidic due to intensive leaching of bases and formation of clay minerals and ferric hydroxides. The lateritic soils are characterized by brick red to brownish red colour and poor plant nutrient. The foot hills have this type of soil and also characterised as Tarai Soils( Haplaquolls).

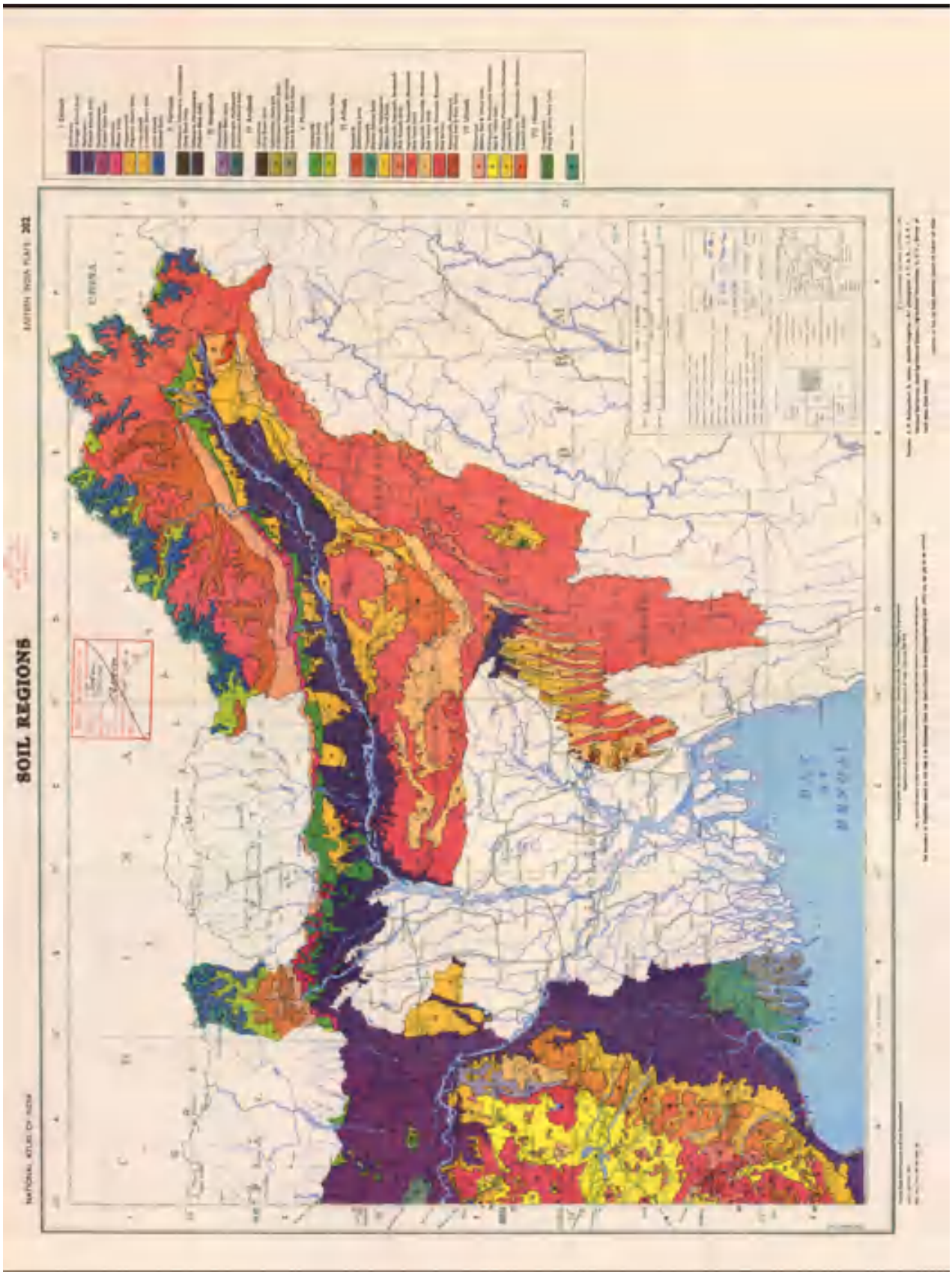
3. New Alluvial Soils: The new alluvial soils are found in the flood plain area and are subjected to occasional floods and consequently receive considerable silt deposit after the flood recedes. These are yellow to yellowish grey in colour and are admixtures of sand, silt and clay in varying proportions. Mineral weathering and geo-chemical changes are nominal. But incipient changes in the top layer have been noticed due to biological activity. Soil PH is feebly alkaline and moderately rich in plant nutrient. New Alluvial soil dominates the region outside reserve forest area all along River Brahmaputra.

4. Older Alluvial Soil: It develops at higher levels and practically unaltered alluvium representing a broad spectrum of sand, silt and humus rich clay depending on landform. The soils are comparatively more acidic than the newer alluvial soil and hence more crop sensitive. The morphological and

physicochemical properties of older alluvium reveal its unique characteristics. Older alluvium soil profiles were very deep, well-drained and highly developed. These are believed to be formed during the Pleistocene time. The soils are dark yellowish brown to reddish brown in colour and finer in texture. Soils are sticky on wetting and hard when dry and compact. Surface soils vary considerably in organic matter (1.3-3.6%) which decreases with depth. Cation exchange capacity (3.2-5.6me/100g), exchangeable cations and base saturation are low. The soils are very strongly to extremely acidic (pH-4.0-4.9) in nature. Soils formed on older alluvium vary considerably with associated soil (Old flood plain) in characters like colour, texture, consistence, pH and profile development. Favourable climatic condition, acidic nature and high depth of the soil made the older alluvium area suitable for valuable trees. This type of soil dominates the southern part reserve forest

Soil Map of Assam (Fig 5) was sourced from JOINT RESEARCH CENTRE,EUROPEAN SOIL DATA CENTRE (ESDAC) Https://esdac.jrc.ec.europa.eu/documentspublications.

## FIG.5. SOIL MAP OF NORTH EAST



# CHAPTER 6
# MAINTENANCE AND ENHANCEMENT OF FOREST RESOURCE PRODUCTIVITY

## 6.1 Growing Stock of Wood

Forest inventory and analysis of growing stock is necessary to quantify tree growth and its sustainable utilization. Growing stock can be defined as the living tree component of the standing volume. Growing stock analysis is essential to calculate harvestable yield in the working plan and is necessary to ensure sustained income flow and ecosystem services to local communities, considering conservation and ecological security.Mean annual increment (MAI) which is also another important parameter is the voume of wood growing in one hectare of forest every year on an average since the existence of the forest. MAI provides insights and inputs to the forest managers for sustainable management of forest.

The forest resource assessment methodology prescribed in the National Working Plan Code – 2014 was followed to conduct assessment of the total growing stock of trees and biomass. Grid based Systematic Sampling was carried out. Systemtically classified randomly sampled grid with sample plot locations are mentioned in Figure 6.1. Sample plots were laid out and observational assessment of site quality, tree species, composition, its health, density and crop age etc. were recorded in Plot Approach Form I. Blanks, important scattered trees, plantations raised were noted. Information on drivers of forest degradation, NTFP species, intensity of invasive species, faunal sights/ traces, microhabitats of wildlife were recorded.

Sample points were allocated by North East Space Application Center (NESAC) adopting the method as provided in the National Working Plan Code 2014. Plot locations are shown through figure 6.1. After navigating to each sample point using a hand held GPS, a square plot of 0.1 ha was laid by measuring 22.36 m horizontal distance i.e. half of the diagonal in all the four directions. After checking the dimensions of the plot the latitude, longitude and altitude at the centre of the plot were recorded using the handheld GPS device. The enumeration of trees was done by measuring the girth of each tree above 30 cm girth found in the sample plot. In case of bamboo, each clump was enumerated by taking its height, number of first, second and third year old culms, dried, congested culms and overall condition of the culms.

Information on regeneration status of forest species, injury to forest species, grazing incidence, fire incidence, soil type, gradient of slope etc. were gathered through visible evidences and recorded. Data of shrubs, climbers and regeneration status were recorded from quadrates of 3m×3m laid out at a distance of 30 metres from the centre of the main sample plot at SE and NW directions. Data of herbs from all nested quadrats of 1m×1m laid within each quadrate of 3m×3m was collected and recorded in the plot enumeration form.

**Figure 6.1: Systematic Grid Design adopted for Forestry Resources Survey Assessment in Sonitpur East Forest Division**

Growing stock analysis is a representation of 59 different tree species recorded in the sample plots. RF wise volume (cu.m.) under different density class and canopuy cover is provided in Table 6.1 and number of trees in each diameter class is shown in Figure 6.2.

The most predominant species in terms of number of individuals are *Dillenia indica L.*, and *Lagerstroemia speciosa (L.) Pers*.However basal area of *Lagerstroemia speciosa (L.) Pers*was found to be more than *Dillenia indica L.*Other dominant species observed in the quadrats were are *Bauhinia purpurea, Mesua ferrea L.* and *Magnolia insignis Wall*. Plotting number of trees against the diameter classes as shown in Figure 6.2. Compartment wise growing stock is presented in Annexure IV to this working plan.

**Table 6.1a: RF wise growing stock (cu.m.) of trees under different dia class and canopy cover.**

| Name of the RF | Density class | Diameter class | | | | | | Total (cu.m.) |
|---|---|---|---|---|---|---|---|---|
| | | D1 | D2 | D3 | D4 | D5 | D6 | |
| Gohpur RF | Open forest | 6.19 | 76.76 | 1,362.41 | 2,132.87 | 1,411.53 | 3,502.16 | 8,491.92 |
| | Moderately dense forest | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Very dense forest | 0.00 | 0.00 | 1.16 | 1.16 | 0.00 | 0.00 | 2.32 |
| | **Total of Gohpur RF** | **6.19** | **76.76** | **1,363.57** | **2,134.03** | **1411.53** | **3,502.16** | **8,494.24** |
| Bishwanath RF | Open forest | 16.93 | 210.14 | 3729.93 | 5839.21 | 3,864.39 | 9,587.96 | 23,248.56 |
| | Moderately dense forest | 0.39 | 10.82 | 118.15 | 135.53 | 169.13 | 729.30 | 1,163.32 |
| | Very dense forest | 0.01 | 2.10 | 15.99 | 10.75 | 30.05 | 105.32 | 164.22 |
| | **Total of Bishwanath RF** | **17.33** | **223.06** | **3,864.07** | **5,985.49** | **4,063.57** | **10,422.58** | **24,576.10** |
| Behali RF | Open forest | 6.19 | 76.76 | 1362.41 | 2,132.87 | 1,411.53 | 3502.16 | 8,491.92 |
| | Moderately dense forest | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Very dense forest | 0.48 | 17.34 | 131.87 | 88.61 | 247.85 | 868.63 | 1,354.78 |
| | **Total of Behali RF** | **6.67** | **94.10** | **1,494.28** | **2,221.48** | **1,659.38** | **4370.79** | **9,846.70** |
| Naduar | Open forest | 6.19 | 76.76 | 1,362.41 | 2,132.87 | 1,411.53 | 3502.16 | 8,491.92 |
| | Moderately dense forest | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Very dense forest | 0.00 | 0.00 | 1.16 | 1.16 | 0.00 | 0.00 | 2.32 |
| | **Total of Naduar RF** | **6.19** | **76.76** | **1,363.57** | **2,134.03** | **1,411.53** | **3502.16** | **8,494.24** |
| Sengelijan | Open forest | 0.00 | 0.00 | 102.73 | 102.73 | 0.00 | 0.00 | 205.46 |
| | Moderately dense forest | 0.00 | 0.00 | 157.05 | 157.05 | 0.00 | 0.00 | 314.10 |
| | Very dense forest | 0.00 | 0.00 | 1.16 | 1.16 | 0.00 | 0.00 | 2.32 |
| | **Total of Sengelijan RF** | **0.00** | **0.00** | **260.94** | **260.94** | **0.00** | **0.00** | **521.88** |
| **Total of the Sonitpur East division** | | **36.38** | **470.68** | **8,346.43** | **12,735.97** | **8,546.01** | **21,797.69** | **51,933.16** |

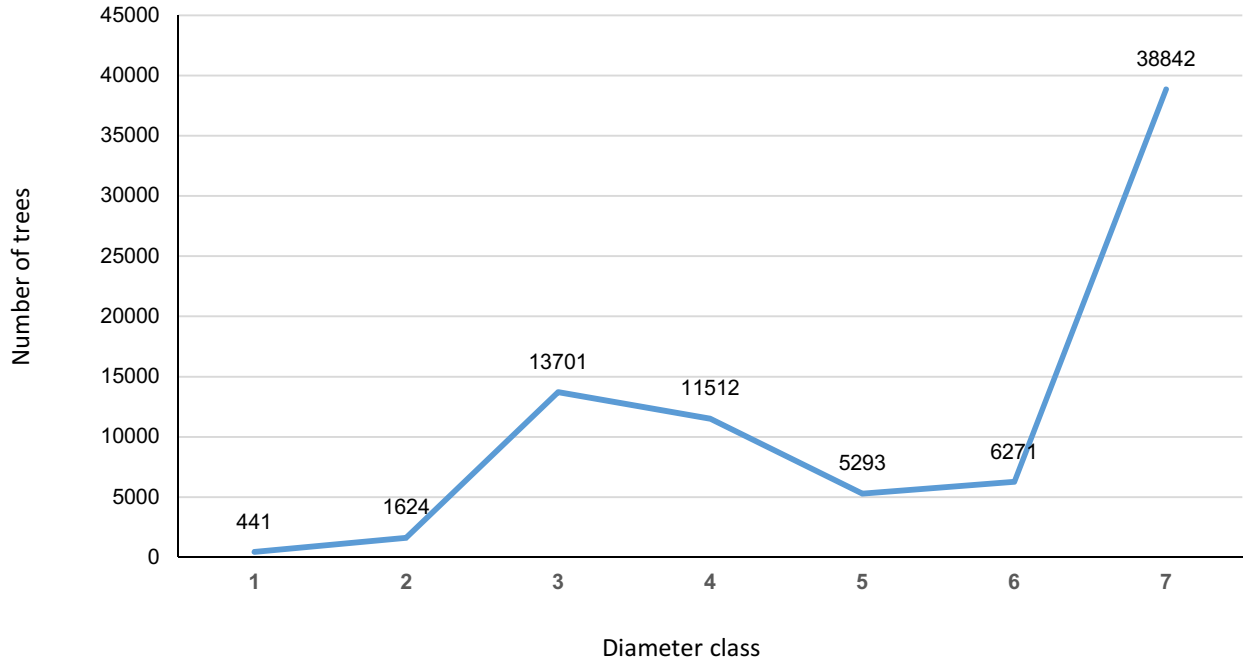



**Figure 6.2: Number of trees under different diameter classes in Sonitpur East Forest Division**

## 6.2 Growing Stock of Bamboo

The following table (Table 6.3) shows the growing stock of secondary moist bamboo brakes under Bamboo overlapping working circles for the base year of 2015-16. Distribution of bamboo stocks are mostly observed in Sonitpur East Forest Division FDA areas. Reserve forest areas Behali Reserve Forest contains maximum bamboo stock followed by Singlijan Resesrve Forest. Table 6.3 describes in details Reserve Forest wise distribution and quantity of bamboo stocks available.

**Table 6.3: Growing stock of bamboo in Sonitpur East Forest Division**

| Reserve Forest | Area (ha) | Stock (tonnes) |
|---|---|---|
| Behali Reserve Forest | 382.7 | 482.176 |
| Biswanath Reserve Forest | 97.9 | 123.341 |
| Naduar Reserve Forest | 41.3 | 52.063 |
| Singlijan Reserve Forest | 102.7 | 129.439 |
| Sonitpur East FDA | 410.0 | 516.6 |
| Total | 1,034.6 | 1,303.619 |

## 6.3 Increment in Volume of Identified Timber Species

Table 6.4 presents information on volume of various timber species of different diameters in Sonitpur East Forest Division.

**Table 6.4: Timber volume under different diameter class in Sonitpur East Division (in $m^3$)**

| Species | 5-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90 < |
|---|---|---|---|---|---|---|---|---|---|---|
| *Aglaia hiernii King* | | 0.15 | 0.23 | 8.54 | 20.58 | 13.43 | 16.07 | | | 1.32 |
| *Ailanthus integrifolia subsp. calycina (Pierre) Nooteboom* | | | 0.82 | 5.55 | 3.49 | | 3.93 | 6.2 | 7.25 | |
| *Albizia lucidior (Steud.)I.C.Nielsen* | | | | 2.24 | 1.99 | 7.83 | 2.63 | 3.59 | | |
| *Albizia procera (Roxb.)Benth.* | | | 0.56 | 1.65 | 1.83 | | | | 8.07 | |

| Species | 5-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90 < |
|---|---|---|---|---|---|---|---|---|---|---|
| *Altingia excelsa Noronha* | | | | | 1.29 | 2.36 | | | | |
| *Artocarpus chaplasha Roxb.* | | | | | 1.14 | 1.4 | | | | 14.33 |
| *Baccaurea ramiflora Lour.* | | | | 2.52 | 1.89 | | | | | |
| *Bauhinia purpurea L.* | | 0.44 | 1.79 | 16.76 | 5.59 | 1.74 | 4.86 | | | |
| *Beilschmiedia assamica Meisn.* | | 0.11 | | | | | | | | |
| *Bischofia javanica Blume* | | | | 0.99 | 3.36 | 1.96 | | | | |
| *Bombax ceiba L.* | | | | 2.4 | 3.21 | 9.07 | 13.07 | 9.85 | | 67.72 |
| *Canarium bengalense Roxb.* | | | 0.23 | | 12.18 | 7.44 | | 3.53 | | |
| *Cassia fistula L.* | | | | | | | 4.12 | | | |
| *Castanopsis indica (Roxb. ex Lindl.) A.DC.* | | 0.16 | | 10.99 | 22.96 | 2.7 | 5.14 | | | |
| *Celtis tetrandra Roxb.* | | | | | | | 3.69 | | | |
| *Chukrasia tabularis A. Juss.* | | | | 6.6 | 5.82 | | 11.39 | 5.78 | | |
| *Cinnamomum glaucescens ( Nees) Hand.-Mazz.* | | | | 1.05 | 13.11 | 8.15 | | | | |
| *Dalbergia assamica Benth.* | | | | | 2.42 | | | | | |
| *Dillenia indica L.* | | | | 12.18 | 23.64 | 18.47 | 26.65 | 29.49 | 6.94 | 24.3 |
| *Dillenia pentagyna Roxb.* | | | | | 2.93 | | | | | |
| *Dillenia scabrella(D.Don) Roxb.ex Wall.* | | | | | 3.24 | | | 5.57 | | |
| *Duabanga grandiflora (DC.) Walp.* | | 0.16 | | 7.5 | 12.51 | 5.07 | | | | |
| *Dysoxylum excelsum Blume* | | | | 3.11 | | | 7.81 | | | |
| *Ficus hispida L. f.* | | | | | 2.8 | | 3.54 | | 7.04 | |
| *Garcinia xanthochymus Hook.f. ex T.Anderson* | | | 0.54 | | | | | | | |
| *Gmelina arborea Roxb.* | | | | 3.66 | 11.84 | 6.41 | 2.27 | 3.63 | | |
| *Khasiaclunea oligocephala (Havil.) Ridsdale* | | | | | 1.27 | 1.69 | 3.01 | | | |
| *Knema linifolia (Roxb.) Warb* | | | | 1.81 | | | | | | |
| *Kydia calycina Roxb.* | | | | 4.04 | 2.23 | 0.53 | 1.57 | | | |
| *Lagerstroemia speciosa (L.) Pers.* | | | 5.11 | 20.25 | 10.53 | 2.57 | 12.81 | 5.04 | 12.93 | |
| *Lannea coromandelica (Houtt.) Merr.* | | | | 3.51 | 12.43 | | 2.63 | | 5.69 | 8.32 |
| *Litsea monopetala (Roxb. ) Pers.* | | | | 0.7 | 4.56 | | | | | |
| *Magnolia champaca (L.) Baill. ex Pierre* | | | | 1.26 | 2.23 | 3.07 | | | | |
| *Magnolia griffithii Hook.f. & Thomson* | | | | 1.11 | 1.61 | 2.9 | 7.4 | 6.1 | | 9.13 |
| *Magnolia insignis Wall.* | | | | 9.21 | 9.57 | 22.27 | 18.46 | 38.5 | 14.3 | 11.26 |
| *Magnolia kingii (Dandy) Figlar* | | | | 0.7 | | 4.74 | 4.12 | | | |
| *Magnolia pterocarpa Roxb.* | | | 1.87 | 8.72 | 6.88 | 7.63 | 4.12 | | | 9.13 |
| *Mallotus nudiflorus (L.) Kulju & Welzen* | | | 0.26 | 1.69 | 0.65 | | 0.99 | | 2.63 | |
| *Mangifera indica L.* | | | 0.54 | | | | 3.69 | | | |
| *Mansonia dipikae Purkayastha* | | | 0.51 | 2.23 | | | | | | |
| *Mesua ferrea L.* | | 0.12 | 0.47 | 6.2 | 13.44 | 29.85 | 35.67 | 7.1 | 35.69 | 9.81 |
| *Michelia oblonga Wall. ex Hook.f. & Thomson* | | | | 3.79 | 6.91 | 4.01 | 21.46 | 6.76 | | 12.96 |
| *Misc* | | | | | | | | 6.1 | | |
| *Morus macroura Miq.* | | 0.15 | 2.93 | 9.6 | 2.69 | | | | | |
| *Neolamarckia cadamba (Roxb.) Bosser* | | | | | 1.59 | | 2.94 | | | 7.35 |
| *Oroxylum indicum (L.) Kurz* | | | 0.54 | 1.11 | | | | | | |
| *Phoebe goalparensis Hutch* | | | | | 1.79 | 2.82 | | | | |
| *Premna bengalensis C.B.Clarke* | | | 0.99 | 0.69 | | | | | | |
| *Pterospermum acerifolium (L.) Willd.* | | | | 10.08 | 2.63 | 2.09 | 9.26 | | | |
| *Sapindus rarak DC.* | | | | 2.92 | | | | | | |
| *Sapium eugeniaefolium Buch-Ham.* | | | | 1.35 | 0.93 | | | | | |
| *Sterculia villosa Roxb.* | | | | 6.78 | 9.91 | 7.4 | 14.25 | 6.22 | 6.81 | |
| *Stereospermum chelonoides(L.f.) DC* | | 0.28 | 0.43 | 5.74 | 10.29 | 18.25 | 8.85 | 5.31 | | 14.94 |
| *Terminalia bellirica (Gaertn.) Roxb.* | | | | 6.03 | 1.12 | | | | | |
| *Terminalia chebula Retz.* | | | | | 3.25 | 5.61 | 4.76 | | | |
| *Terminalia myriocarpa Van Heurck & Müll. Arg.* | | | | | 3.13 | 4.24 | | | | |
| *Tetrameles nudiflora R. Br.* | | | | 11.32 | 22.37 | 31.88 | 19.44 | 7.12 | | |
| *Toona ciliata M.Roem.* | | | | | 4.03 | 3.53 | | 7.78 | | |
| *Ziziphus funiculosa Buch.-Ham. ex Wall.* | | | 0.54 | 0.7 | | | 3.69 | | | |
| Akathi | 20.57 | | | | | | | | | |

## 6.4 Efforts towards Enhancement of Forest Productivity through Quality Plantation Activities

For enhancement of forest productivity and restoration of habitat for wild animal in the Division several plantation schemes have been implemented by Joint Forest Management Committees.for plantation in order to restore the degraded forest area due to heavy encroachment. The plantation carried out in the Division during last 10 years is shown in the following tables.Table 8.4. presents data on plantations carried out in the Division between 2009 and 2019.

**Table 6.5: Plantations created under different schemes in Sonitpur East Division, Assam**

| Range | Scheme/Plan | Area of Plantation (in ha) | Year of Creation |
|---|---|---|---|
| Borgang | CAMPA | 50 | 2018-19 |
| | APFBC | 50 | 2016-17 |
| | APFBC (ANR) | 20 | 2013-14 |
| | APFBC (HHW) | 15 | 2013-14 |
| | APFBC (NTFP) | 5 | 2013-14 |
| | RDF | 30 | 2008-09 |
| | RDF | 10 | 2009-10 |
| | RDF | 15 | 2010-11 |
| | RDF | 70 | 2011-12 |
| | RDF | 30 | 2012-13 |
| | RDF | 2 | 2013-14 |
| | National Bamboo Mission | 60 | 2006-07 |
| | National Bamboo Mission | 50 | 2007-08 |
| | National Bamboo Mission | 50 | 2008-09 |
| | Revolving Fund | 20 | 2006-07 |
| Pabhoi | RDF | 20 | 2009-10 |
| | RDF | 20 | 2010-11 |
| | RDF | 30 | 2011-12 |
| | RDF | 15 | 2012-13 |
| | RDF | 2 | 2013-14 |
| | RDF | 20 | 2008-09 |
| | RDF | 14 | 2017-18 |
| | National Bamboo Mission | 50 | 2007-08 |
| | National Bamboo Mission | 50 | 2008-09 |
| | National Bamboo Mission | 50 | 2008-09 |
| | CCS – Project Elephant | 20 | 2006-07 |
| | CCS – Project Elephant | 35 | 2009-10 |
| | MMABY | 10 | 2008-09 |
| | MMABY | 2.20 | 2010-11 |
| | MMABY | 10 | 2011-12 |
| Diplonga | RDF | 2 | 2013-14 |
| | MMABY | 4 | 2013-14 |
| Gohpur | RDF | 5 | 2012-13 |
| | RDF | 2 | 2013-14 |
| | Revolving Fund | 5 | 2006-07 |

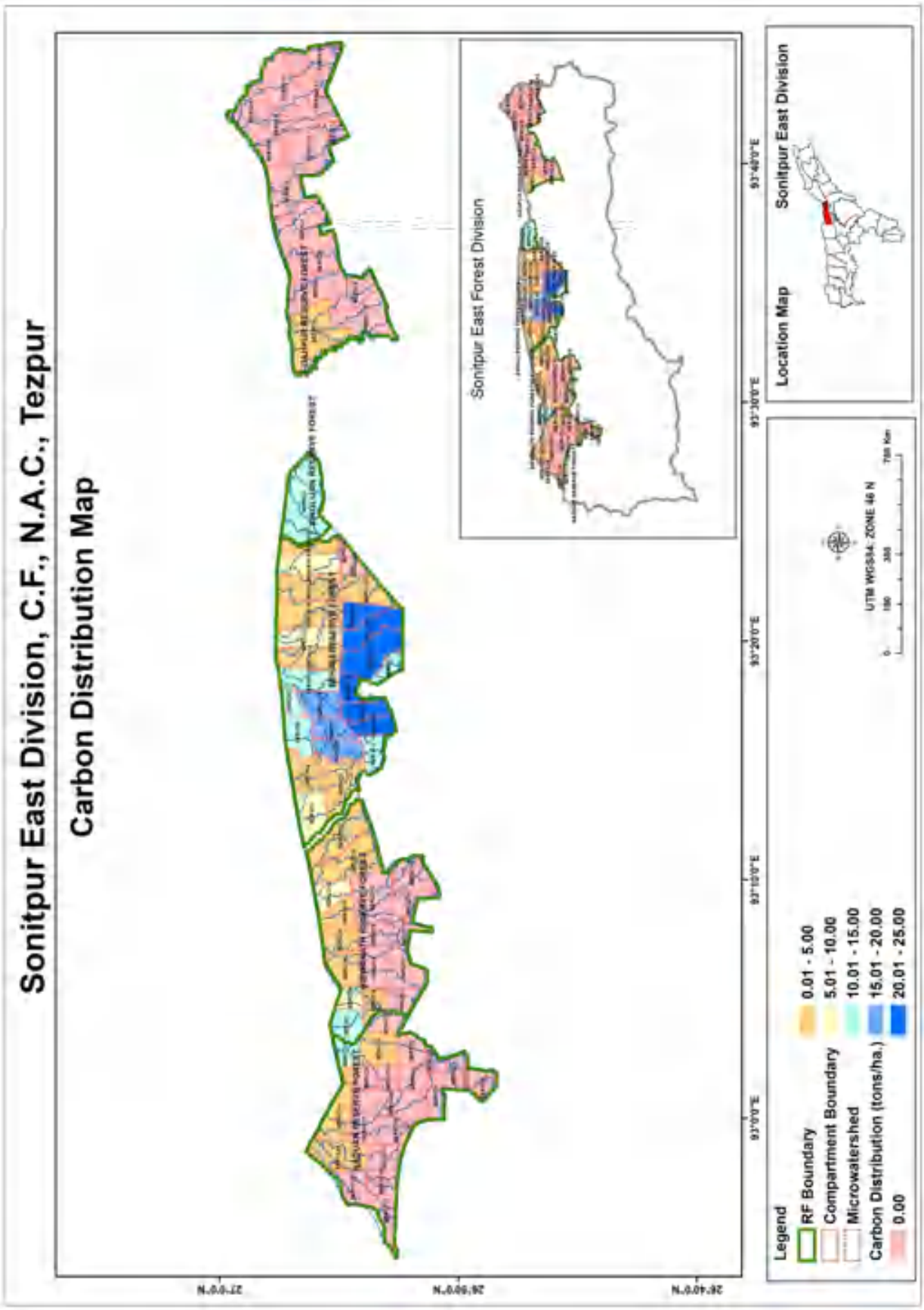
## 6.5 Carbon Stock

The Reserve Forest wise carbon stock, in tons, in Sonitpur East Forest Division is given in Table 6.5a.

**Table 6.5a. The forest carbon stock observed in reserve forest areas are as follows:**

| Reserve Forest | Compartment | Carbon Content (tons) |
|---|---|---|
| Behali reserve forest | SER3C1, SER3C10, SER3C11, SER3C12, SER3C13, SER3C14, SER3C15, SER3C16, SER3C17, SER3C18, SER3C19, SER3C2, SER3C20, SER3C21, SER3C22, SER3C23, SER3C25, SER3C3, SER3C4, SER3C5, SER3C6, SER3C7, SER3C8, SER3C9 | 1,55,655.22 |
| Biswanath reserve forest | SER2C1, SER2C11, SER2C12, SER2C16, SER2C17, SER2C2, SER2C4, SER2C5, SER2C8 | 20,523.95 |
| Gahpur reserve forest | SER5C1 | 32.23 |
| Naduar reserve forest | SER1C13, SER1C14, SER1C21, SER1C8 | 6,661.33 |
| Singlijan reserve forest | SER4C1 | 16,384.37 |

Figure 6.4 and Figure 6.5 shows the Carbon distribution map as per existing compartmnets and recasted compartments in the Division. Compartment wise estimations is presented in Annexure VI.


Sonitpur East Division, C.F., N.A.C., Tezpur
Carbon Distribution Map
Sonitpur East Forest Division
Location Map
Sonitpur East Division
Legend
RF Boundary
Compartment Boundary
Microwatershed
Carbon Distribution (tons/ha.)
0.00
0.01 - 5.00
5.01 - 10.00
10.01 - 15.00
15.01 - 20.00
20.01 - 25.00
UTM WGS84, ZONE 46 N
93°0'0"E
93°10'0"E
93°20'0"E
93°30'0"E
93°40'0"E

## 6.6 Carbon Sequestration and Mitigation

Greenhouse Gases (GHG) have the capability to reflect back shorter wavelength infra-red (IR) radiation. GHGs allow the longer wavelength IR radiation from sun to reach earth through the atmosphere. Earth absorbs the IR radiation, and radiates shorter wavelength IR radiation back into the atmosphere, which is reflected back into earth by the GHGs. So, the GHGs (such as water vapor, $CO_2$, $CH_4$, $SF_6$, HFCs, PFCs and $O_3$ (in troposphere)) form a blanket around earth and ensure there is no huge variation in night and day temperatures, which Is critical for life to flourish. This phenomenon is called greenhouse effect. However, due to the increase in consumption of fossil fuels after the industrial revolution and other sustained life style patterns of humans, the concentration of GHGs in the atmosphere increased, leading to an increase in the average temperatures on land as well as oceans. This increase in temperature caused the air and ocean circulation systems to behave differently, and change course patterns in certain cases, resulting in a change in climatic patterns in the world. Further, life on earth will have to adapt to this increase in temperatures in a very short period. This phenomenon, which threatens the very existence of life on earth, is called Global Climate Change or **GCC**. Since these changes have been brought about due to human action, these are also called anthropogenic climate change. Mitigation strategies include reduction in emissions of GHGs from sources as well as capture and storage of GHGs over a long period of time (sequestration).

Trees use the energy from sunlight to convert $CO_2$ in the atmosphere to sugars through the process of photosynthesis. Melvin Calvin was awarded the Nobel Prize in 1961 in Chemistry for his research on the process of carbon dioxide assimilation in plants using carbon isotopes, which proved that the carbon assimilated in trees, are absorbed from atmospheric $CO_2$. This way trees and forests act as a major sink of carbon in the natural carbon cycle. Destruction of forests leads to release of $CO_2$ into atmosphere, which has been calculated to be more than the global vehicular emissions. Harvested wood traps and stores the carbon within it over a long period of time. So promoting carbon sequestration in trees is a practical and cost effective way to capture carbon from atmosphere and store away for a long period of time. Hence the emission reductions are real and long term.

### 6.5.1 Forest Carbon Inventory in India

India has been involved in climate change negotiations since the formation of UNFCCC in 1992, and is an international leader in carbon markets, especially in the Clean Development Mechanism (CDM). In forestry sector, India led the evolution of REDD to REDD+ through decisions adopted at the Climate Change COP at Bali, 2007. The Bali COP defined the instrument as “reducing emissions from deforestation and forest degradation; and the role of conservation, sustainable management of forests and enhancement of forest

carbon stocks in developing countries" (REDD+). With over 70 million hectares (ha) under forest cover (primarily stewarded by State governments and local communities), approximately 33% of which is managed through the Joint Forest Management (JFM) initiative, India is well-positioned to take advantage of and champion REDD+.

The Ministry of Environment and Forestry (MOEF) has created a REDD+ Cell, to lead the nation's efforts to participate in REDD+. To decrease national emissions and increase India's forest cover by over two million ha annually and the carbon stocks within existing forest, the nation created the Green India Mission (GIM) and National Afforestation Program (NAP), along with other agricultural and rural development programs.

India is a country with tremendous human and institutional capacity and strong forest mapping capacity, extensive research and training capacity, and State Forest Departments (SFDs) that reach down into local communities or "beats." The Forest Survey Institute (FSI) develops a bi-annual forest cover inventory, and it will lead the national-level carbon stock accounting system in coordination with the India Institute of Remote Sensing (IIRS), the India Institute for Sciences (IISc), and the India Council for Forestry Research and Education (ICFRE). All of these will be critical to the long-term success of REDD+ in India.

One of the biggest challenges on carbon forestry is quantifying nation's carbon emissions and storage in forests, which requires region specific information. A credible monitoring system that shall measure, report and verify carbon in the Indian forests is a very critical element for the mitigation activities of India. This involves developing cost-effective, robust and compatible national monitoring and MRV systems, innovating tools, methodologies, inclusive training and knowledge sharing that shall strengthen India's technical and institutional capacity for effective MRV systems. Monitoring of forest carbon requires remote sensing as well as ground based data. Monitoring is essential for appropriate compensation of the carbon sequestered as well as fulfilling India's commitments of the GIM.

The IPCC 2006 Guidelines provides advice on estimation methods at three levels of detail, from tier 1 (default) to tier 3 (most detailed locally applicable data). This consists of mathematical specifications of the methods, information on emission factors or other parameters to use in generating the estimates, and sources of activity data to estimate the overall level of net emissions (emission by sources minus removals by sinks). When properly implemented, all tiers are intended to provide unbiased estimates. Accuracy and precision should, in general, improve from tier 1 to tier 3. The provision of different tiers enables inventory compilers to use methods consistent with their resources and to focus their efforts on those categories of emissions and removals that contribute most significantly to national emission totals and trends. The subsequent sub-chapters shall discuss the steps involved in carbon quantification of forests in Sonitpur East division.

### 6.5.2 Forests of Sonitpur East division

The type and cover of forests in Sonitpur East division has been discussed in chapter 2. Please refer to table 2.6.

### 6.5.3 Inventorying and reporting emissions and removals

The steps involved in inventorying and reporting follows the National Working Plan Code – 2014, with additional references made to recommendations of reports of Forest Survey of India, Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG LULUCF) (IPCC, 2003) and the National Greenhouse Gas Inventory Guideline (IPCC, 2006)[2]. The steps in brief are given below:

I. Identify land use category and, estimate the land areas in each land use category for the time period required.

   As per GPG LULUCF, the total area is to be categorised into six major land classes, which are, forest land, cropland, grassland, wetlands, settlements and other land. The exact land area under each land classification is to be done by remote sensing analysis to reach at the area covered by each category.

(ii) Carry out assessment for the relevant LULUCF categories. Within the key categories, carry out an assessment on which non-$CO_2$ gases and carbon pools are significant.

Carbon pools are broadly classified into three groups:

1. Living biomass; consisting of above ground biomass (AGB) and below ground biomass (BGB).
2. Dead organic matter; consisting of Dead wood and Litter.
3. Soil; consisting of soil organic matter.

For the computation purpose, all non-$CO_2$ gases and carbon pools that are significant are to be selected. As per the forestry regime in Sonitpur East division, no non-$CO_2$ gases are considered to be significant. There are no peat lands identified in the landscape; and the emissions from and fertilizer application in the forest nurseries are considered to be negligible as only organic fertilizers are used as much as possible. Among the carbon pools, Above Ground Biomass, Below Ground Biomass and Soil Organic Carbon are considered to be significant; Dead Wood and Litter are considered to be *de minimis* and is not considered in the estimations.

(iii) Ensuring that the requirements in terms of emission and removal factors and activity data appropriate to the tier level are being met.

As far as possible region specific volume equations, wood density, root to shoot ratio and biomass expansion factors are to be applied in the absence of tier-3 data sets. In the absence of tier-3 data, efforts are to be made to make them available.

[2] http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html

(iv) Quantification of emissions and removals and estimation of the uncertainty in each estimate.

Quantification of total carbon content in steps

**AGB:**
**Step 1:** Calculate mercantile volume using volume equations ($m^3$).
$V = a + bD^2H$
Where V = Mercantile volume ($m^3$)
D = DBH (m)
H = Height (m)
**Step 2:** Calculate the mass of the AGB biomass in tons
$G_{AGB} = V * BEF * WD$
Where $G_{AGB}$ = Biomass at above ground biomass in tons of dry matter (t)
V = Mercantile volume ($m^3$)
BEF = Biomass Expansion factor
WD = Wood density
**BGB:**
**Step 3:** Calculate the mass of BGB (roots) using the RF
$G_{BGB} = G_{AGB} * RF$
Where $G_{BGB}$ = Biomass at below ground biomass in tons of dry matter (t)
$G_{AGB}$ = Biomass at above ground biomass in tons of dry matter (t)
RF = Root to shoot ratio
**Step 4:** Calculate total biomass in tons of dry matter (tdm)
$G_{TOTAL} = G_{AGB} + G_{BGB}$
Where $G_{TOTAL}$ = Total biomass of the tree in tdm
$G_{BGB}$ = Biomass at below ground biomass in tons of dry matter (t)
$G_{AGB}$ = Biomass at above ground biomass in tons of dry matter (t)
**Step 5:** Calculate the carbon content in a tree
$C_{TOTAL} = G_{TOTAL} * 0.5$
Where $C_{TOTAL}$ = Total carbon content in a tree (tC)
$G_{TOTAL}$ = Total biomass of the tree in tdm
**Step 6:** Calculation of net anthropogenic sequestration or $CO_2$ sequestered from living biomass
$ER = C_{TOTAL} * 44/12$
Where ER = Net anthropogenic sequestration or $CO_2$ sequestered in $tCO_2$
$C_{TOTAL}$ = Total carbon content in a tree (tC)
**Step 7:** Calculation of carbon content in litter and dead wood and soil organic carbon as per the tier-3 methodology. In the absence of tier-3 data, tier-2 or tier 1, in that order may be used.
**Step 8:** $C_{living} + C_{dead} + C_{soil}$ = Total Carbon content

It has been estimated that 50% of a tree's biomass by weight is carbon. By estimating the biomass of a tree, carbon content of a tree, or the AGB, can be calculated. Volume equations of most of the trees have already been developed by FSI. These regression functions in volume, height and DBH provide the mercantile or bole volume ($m^3$) of a species. Each forest class has a specific biomass expansion factor (BEF), which is the ratio of the total volume of a tree above ground (including leaves, branches etc.) to that of its mercantile volume. Further, species have a specific wood density (WD) which is used to convert volume into mass (in tons). Volume of BGB depends on AGB. IPCC in its Good Practice Guidance for Land Use, Land-use Change and forestry (GPG-LULUCF) has provided root-to-shoot ratios (RF) from which the root volume can be calculated. Since the mass of AGB in tons is already calculated, BGB is calculated using RF. Sum of AGB+BGB gives total biomass in tons in a tree. 50% of biomass by weight is carbon. Carbon is completely assimilated from atmospheric $CO_2$. From the amount of carbon stored within a tree, the amount of $CO_2$

sequestered can be calculated using the molecular weights of carbon and oxygen. To this the carbon content in the dead wood, litter and soil organic carbon are added to arrive at the total carbon content. Wood density has been sourced from country specific (tier-2) data[3]. Biomass expansion factor and root-to-shoot ratio have been sourced from GPG LULUCF (tier-1 data). The volume equations used are sourced from Forest Survey of India (tier-2 data). Soil Organic Content has been estimated from Government recognized laboratories using the soil samples collected during ecological data collection exercises.

(v) Using appropriate reporting tables to report emissions and removals estimates.

Appropriate tables shall be used in reporting that shall ensure transparency in calculation.

(vi) Documentation and archiving all information used to produce the emissions and removals estimates.

Appropriate documentation and archiving practices shall be followed for all the records used in the calculations.

(vii) Quality control checks, verification, and expert/peer review of the emission estimates.

Appropriate quality control, which includes checking by competent source shall be undertaken to ensure the veracity of the calculations.

### 6.5.4 Calculations of Carbon Content

The estimation of the carbon stock in forests of Sonitpur East has been carried out on the compilation of the estimated growing stock in natural forests, as given in the Table 6.5a

### 6.5.5 Note on Forest Carbon Finance

Carbon financing for forestry is a mechanism to incentivize carbon sequestration and long-time storage in forest lands. This can take different forms such as carbon credit based which includes Clean Development Mechanism (CDM) based Afforestation/Reforestation (AR) project activities and voluntary markets such as Agriculture, Forest and Other Land Uses (AFOLU) projects under Verified Carbon Standard (VCS), Plan Vivo and Gold Standard; or program based where carbon forestry is made a part of a state's Nationally Approved Mitigation Activities (NAMAs) or a specific program aimed at improving tools and techniques and the Monitoring, Reporting and Verification (MRV) systems associated with carbon forestry. It is understood that the financing options could be domestic, bilateral or multilateral; in-line with the Government's decisions. Currently the Assam Forest Department has considered potential revenues from carbon that may arise from the REDD+ carbon projects, and had piloted a jurisdictional REDD+ project design in Nagaon division (Lowering Emissions, Enhancing Forests (LEEF) in Nagaon). This REDD+ design detailed the prescriptions for various elements and extent of conservation, regeneration and afforestation activities, which can be included in the working plans to account Carbon sequestration by forest also. This can eventually help in state-wide reporting of contribution to national NDC goals.

[3] Benthall, A.P. 1984. The Trees of Calcutta: And its Neighborhood. Thacker Spink and Co. Ltd. Calcutta India.

Forests play a major role in the carbon cycle by acting as carbon sinks as well as a source. The conversion of forest land into other land use categories result in greenhouse gas (GHG) emissions into the atmosphere. Assam SAPCC says “If mechanisms could be created to provide payments for mitigation benefits, these could add 5% to 10% to forestry GDP, based on the relative value of net carbon sequestration, compared with commercial benefits from forestry”.

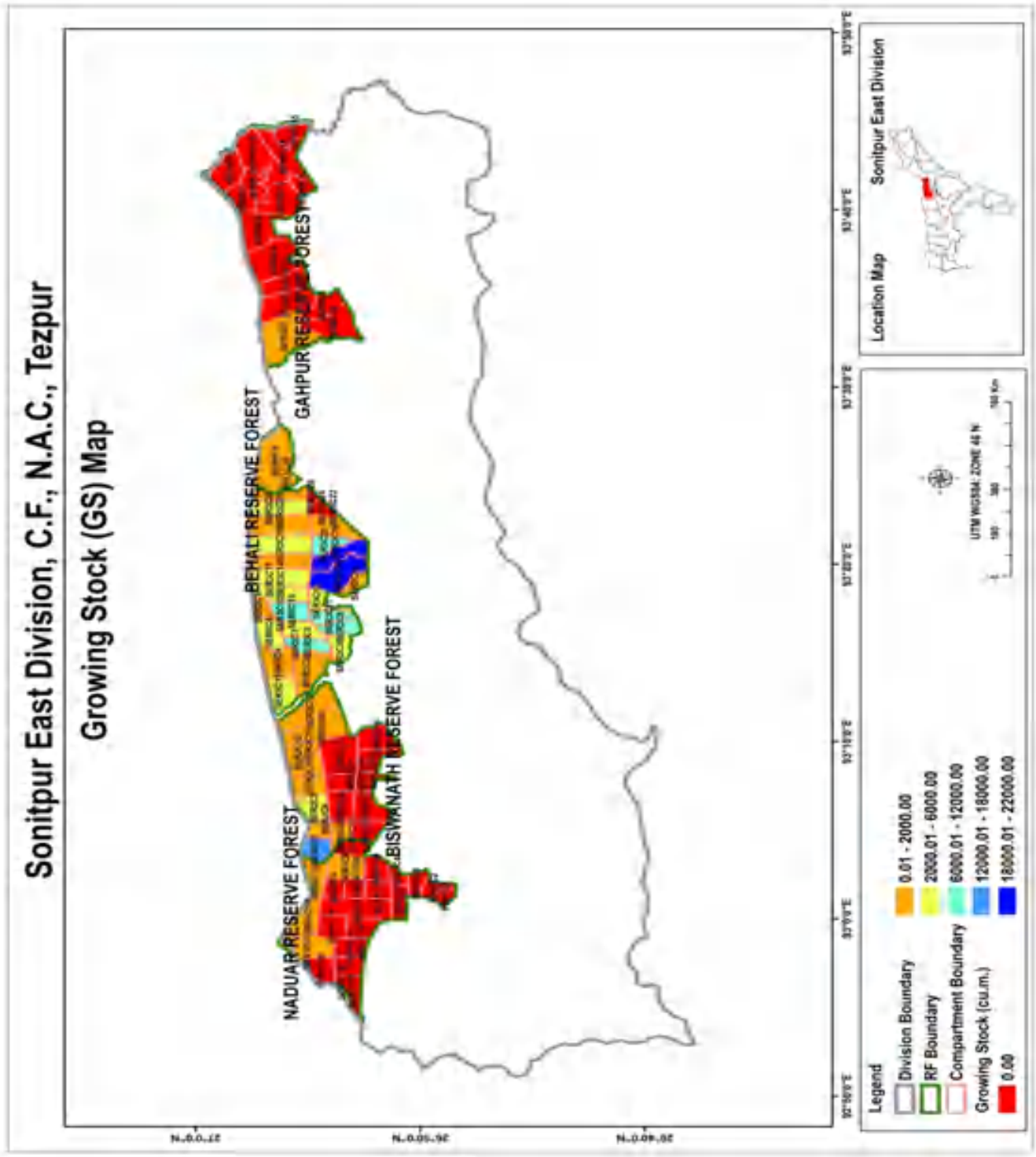
Efforts to limit the global average temperature within 2 C of the pre-industrial era temperatures and reduction of Greenhouse Gas (GHG) emissions from deforestation and forest degradation source, and capture and store GHGs through forest plantations is stressed through this Working Plan.

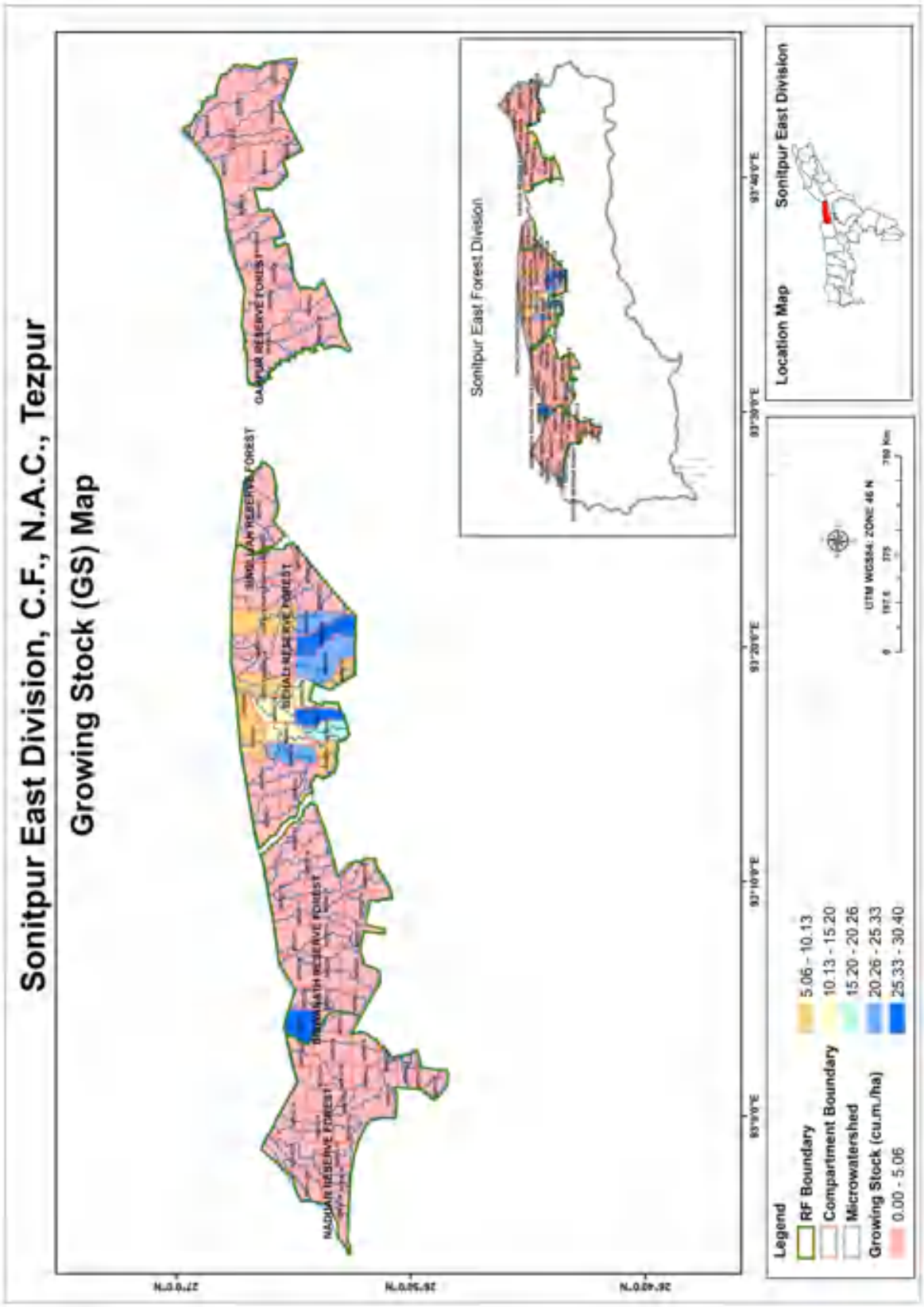
Carbon financing for forestry is a mechanism to incentivize carbon sequestration and long-time storage in forest lands. This can take different forms such as carbon credit based Working Plan which may include Clean Development Mechanism (CDM) based Afforestation/Reforestation (AR) project activities and voluntary markets such as Agriculture, Forest and Other Land Uses (AFOLU) projects under Verified Carbon Standard (VCS), Plan Vivo and Gold Standard; or program based where carbon forestry is made a part of a state’s Nationally Approved Mitigation Activities (NAMAs) or a specific program aimed at improving tools and techniques and the Monitoring, Reporting and Verification (MRV) systems associated with carbon forestry. It is understood that the financing options could be domestic, bilateral or multilateral; in-line with the Government’s decisions.

In Sonitpur EastForest Division, during the tenure of this Working Plan innovative and suitable practices of silvicultural, eco-restoration of degraded / mined out forestlands, improved biomass

productivity, etc. which will result in improving forest health and vitality and enhanced carbon sequestration will be undertaken. Forest conservation and enhancement activities such as Afforestation, Assisted Natural Regeneration, Restoration, REDD+, Rehabilitation of shifting cultivation and mining areas, agroforestry, etc. will be carried out. Forest soil must be kept as healthy and fertile as possible and the forest crops must be kept as vigorous as possible to produce as rapidly as they can be until the biomass production attains its most desirable level. The growing stock of trees must be so constituted that it provides regularly the greatest possible quantity of the desired products including intangible benefits. These activities will not only help in carbon sequestration and storage but also other co-benefits in terms of community and biodiversity.

**Figure 6.2: Growing stock ($m^3$) map as per the existing compartments.**




Sonitpur East Division, C.F., N.A.C., Tezpur
Growing Stock (GS) Map
Sonitpur East Forest Division
Location Map
Sonitpur East Division
Legend
RF Boundary
Compartment Boundary
Microwatershed
Growing Stock (cu.m./ha)
0.00 - 5.06
5.06 - 10.13
10.13 - 15.20
15.20 - 20.26
20.26 - 25.33
25.33 - 30.40

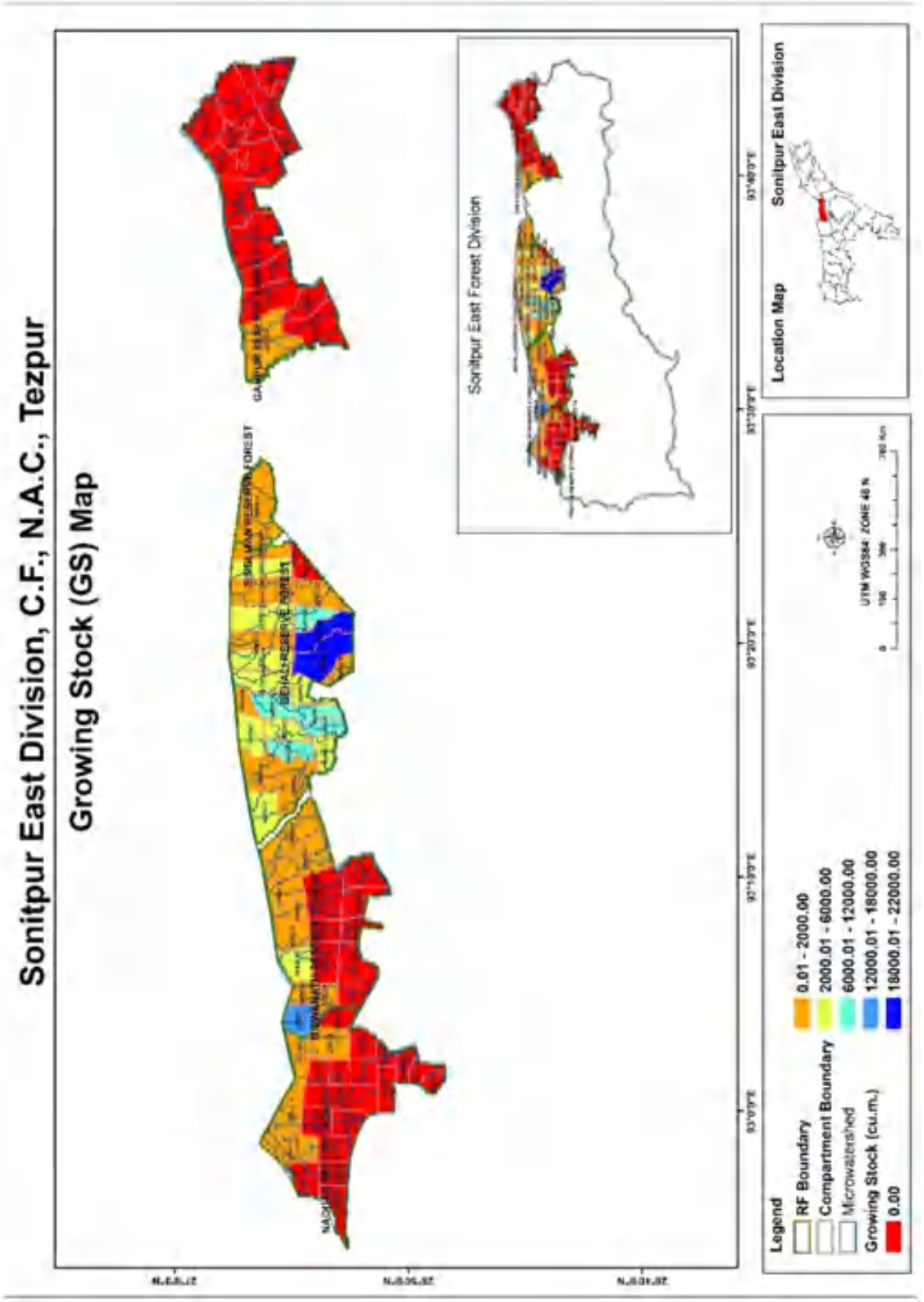



**Fig. 6.3: Growing stock ($m^3$) map as per microwatershed based recasted compartments**

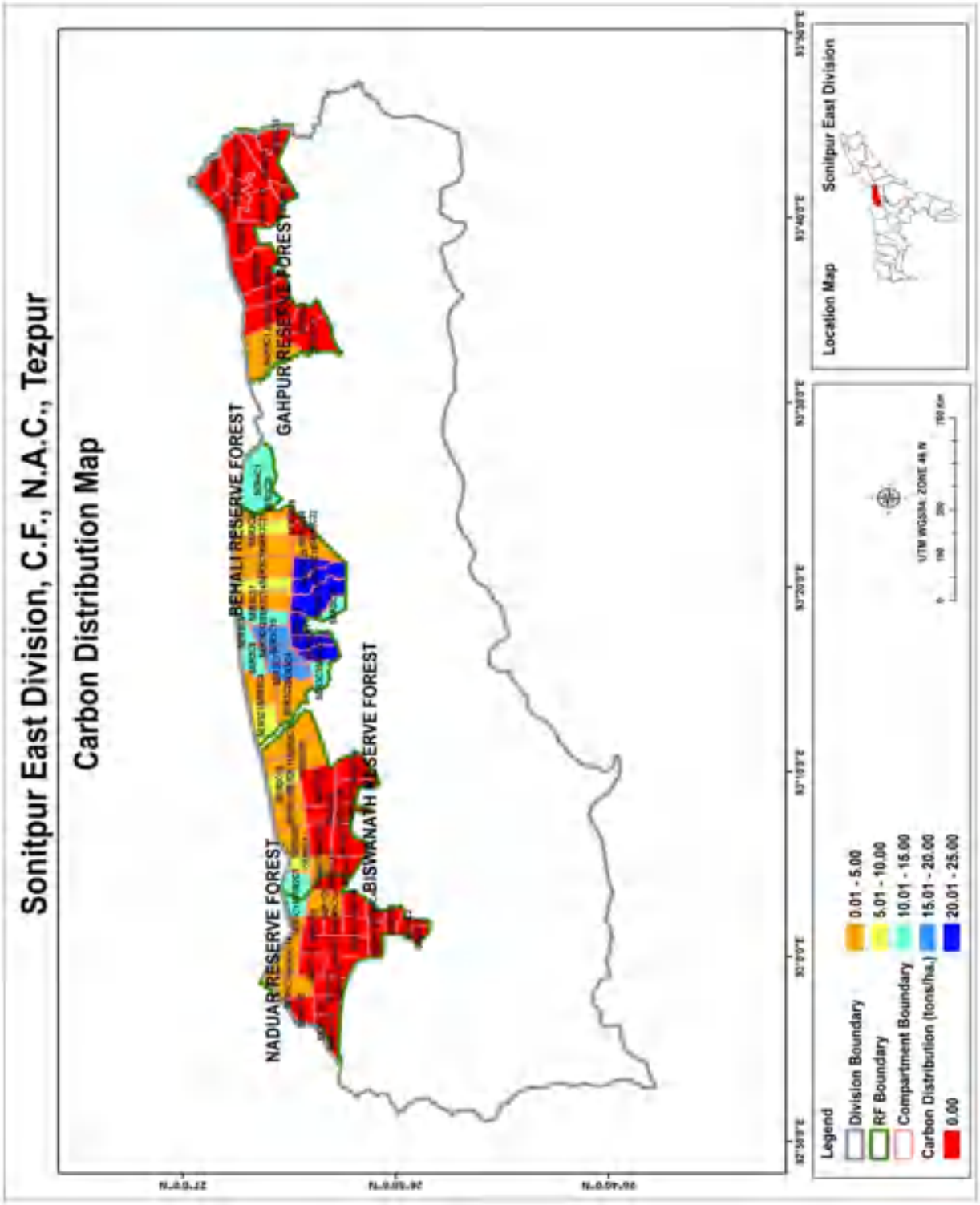



**Fig. 6.4: Carbon distribution (tons/ha) map of Sonitpur East Division as per existing compartments**

# CHAPTER 7

# OPTIMIZATION OF FOREST RESOURCES UTILIZATION

## 7.1 Recorded Removal of Timber:

Timber from the division is disposed off on the basis of open tender. However, there was no systematic extraction of timber owing to lack of working plan. Between 1990 and 2005-06 large scale encroachment has been reported from the division. Departmental timber operation has been restricted to seizure of illegally felled trees, extraction of roadside tree felled for road expansion and salvaging wind fallen trees from reserve forest areas.Seized timber and proceeds from sale of minor mineral claimed and unclaimed timbers seized under different ranges are presented in Table 7.1a.

**Table: 7.1. Recorded removal of timber (2009-10 to 2018-19).**

| Reporting year | Wood | | Total extraction (cft) from un-authorized means (if any) |
|---|---|---|---|
| | Type / quality | Extraction (cft) | |
| 2009-2010 | Sal | | Nil |
| | Teak | | Nil |
| | Non-Sal | | 699.765 |
| | Fire wood | | Nil |
| 2010-2011 | Sal | | Nil |
| | Teak | | Nil |
| | Non-Sal | | 371.535 |
| | Fire wood | | Nil |
| 2011-2012 | Sal | Nil | |
| | Teak | Nil | |
| | Non-Sal | 467.499 | |
| | Fire wood | Nil | |
| 2012-2013 | Sal | | Nil |
| | Teak | | Nil |
| | Non-Sal | 8.944 | 128.792 |
| | Fire wood | | Nil |
| 2013-2014 | Sal | | |
| | Teak | 11.583 | Nil |
| | Non-Sal | 16.827 | 85.479 |
| | Fire wood | | |
| 2014-2015 | Sal | | Nil |
| | Teak | | Nil |
| | Non-Sal | | 480.113 |
| | Fire wood | | 23 stec |
| 2015-2016 | Sal | | Nil |
| | Teak | | Nil |
| | Non-Sal | | 121.648 |
| | Fire wood | | 72 stack |
| 2016-2017 | Sal | | Nil |
| | Teak | | Nil |

| | | | |
|---|---|---|---|
| | Non-Sal | | 126.894 |
| | Fire wood | | Nil |
| 2017-18 | Sal | | Nil |
| | Teak | | Nil |
| | Non-Sal | | 215.102 |
| | Fire wood | | Nil |
| 2018-19 | Sal | | Nil |
| | Teak | | Nil |
| | Non-Sal | | 94.684 |
| | Fire wood | | Nil |

## 7.2 Recorded Removal of Fuel Wood

There is no recorded removal of fuelwood though. Entire removal is illegal and fringe villagers are heavily dependent on firewood from reserve forest area.

## 7.3 Recorded Removal of Bamboo/Rattans

Out of a total area of 624.62 ha under bamboo in Sonitpur East Division, 1,303.62 tonnes of harvestable green bamboo was recorded to be removed in 2015-16.

## 7.4 Recorded Removal of Locally Important NTFPs

There is no recorded removal of NTFPs from the reserve forests of Sonitpur East Division. Periodic removal of *Dilenia Indica* fuits, *Magnolia pterocarpa* (Barhamthuri) flowers, *Homalomena aromatic* ( Gandi kachu) were reported from fringe villagers. However systematic removal in commercial scale is not recorded. It has been observed that the Mishing community in Sonitpur district is highly dependent on NTFPs as a major source of their income(Jintu Sarma et. al, 2016). Further, majority of the NTFPs are collected and marketed by females. Fruits (37%) were most extensively collected, followed by leaves (25%), whole plant (18%), bark (5%), stem and tuberous roots (3%) and seed, rhizome and shoot (2%). Fruits, vegetables and timber for contruction purposes are largely collected by thecommunity from the surrounding forests and natural habitat. It has also been estimated that the highest number of species the local community collects are used as vegetable (35%), followed by medicine (27%), fruit (raw edible fruits) (20%), forest products as construction materials contribute about13% and other miscellaneous purpose contributes about 5% of the total recorded species.Apart from the plants, two other very important commercial NTFPs, viz. honey and silkworms were also reported from the area. In village markets of Sonitpur district, selling price of honey was recorded at Rs.100 for 500 ml and silk worm larvae at a price of Rs.120/- to 130/- for 1kilogram.*Phyllanthus acidus* is another commercially important NTFP largely marketed in this district. The availability of NTFPs are also recorded and found that majority of the recorded NTFPs are availablethroughout the year and some are also seasonal.

7.4.1. **Minor Minerals under Sonitpur East Division:** Minor mineral contract area has been identified under Assam Minor Mineral Concession (MMC) Rules, 2013. And it has been major source of revenue

till date. All the MMC areas have been put onsale thorugh open tender. After obtaining Environmental Clearance, the Mahals are allowed to extract minor mineral as per approved Mining Plan. Table 7.4a provides an overview of Mahals under operation in Sonitpur EastForest Division, Assam. Further, Table 7.4b presents revenue generated from minor minerals in the Division between 2005-06 and 20118-19. The detailed statement showing present status of Minor Mineral Areas which are operational, inoperative, under process of settlement during writing of the plan, under operation for allotment of government works permit is Given in Annexure XIV(a, b, c and d)

**Table 7.2: Minor Mineral Contract Area (Mahals) under Sonitpur East Division.**

| Sl. No. | RANGE | Name of MMC Area (Mahal) | RF/Non RF | Area of Mahal (in ha) | Quantity | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Gravel (in $m^3$) | Boulder (in $m^3$) | Sand (in $m^3$) | Earth (in $m^3$) |
| 1 | Borgang Range | Borgang Sand, Gravel Mahal No -1 | Non R.F | 5 | 21,000 | | 10,500 | |
| 2 | | Borgang Sand, Gravel, Boulder Mahal No -2 | Non R.F | 5 | 35,000 | 21,000 | 42,000 | |
| 3 | | Borgang Sand, Gravel Mahal No -3 | Non R.F | 5 | 10,500 | | 10,500 | |
| 4 | | Borgang Sand, Gravel Mahal No -4 | Non R.F | 5 | 19,250 | | 17,500 | |
| 5 | | Buroi Sand, Gravel Mahal No -1 | Non R.F | 5 | 21,000 | | 10,500 | |
| 6 | | Buroi Sand, Gravel Mahal No -2 | Non R.F | 6.2 | 56,000 | | 70,000 | |
| 7 | | Buroi Sand, Gravel Mahal No -3 | Non R.F | 5 | 14,000 | | 14,000 | |
| 8 | Pabhoi Range | Burigang S.Mahal No 1 | Non R.F | 5 | | | 17,500 | |
| 9 | | Burigang S.Mahal No 2 | Non R.F | 5 | | | 17,500 | |
| 10 | | Ghiladhari O. Earth | Non R.F | 5 | | | | 14,000 |
| 11 | | Sadharu O. Earth | Non R.F | 4.5 | | | | 14,000 |
| 12 | | Pabhoi Ordinary Earth | Non R.F | 5 | | | | 17,500 |
| 13 | Diplonga Range | Hatinga Sand , Gravel Boulder Mahal | Non R.F | 5.625 | 28,000 | 21,000 | 7,000 | |
| 14 | | Jiabhorali Morisuti Sand, Gravel Mahal | Non R.F | 5 | 14,000 | | 10,500 | |
| 15 | | Jiabhorali Sand Mahal No-4 | Non R.F | 5 | | | 70,000 | |
| 16 | Gohpur Beat | Solengi ordinary Earth | Non R.F | 3.15 | | | | 35,000 |

**Table 7.3: Revenue generation from minor minerals from 2005-06 to 2018-19 in Sonitpur East Forest Division**

| Year | Total(in Rs.) |
|---|---|
| **2005-06** | 30,37,307 |
| **2006-07** | 23,22,380 |
| **2007-08** | 20,33,800 |
| **2008-09** | 32,28,231 |
| **2009-10** | 5420397 |
| **2010-11** | 1625412 |
| **2011-12** | 1629611 |

| Year | Total(in Rs.) |
|---|---|
| **2012-13** | 472000 |
| **2013-14** | 0 |
| **2014-15** | 149850 |
| **2015-16** | 4713563 |
| **2016-17** | 66942157 |
| **2017-18** | 57039310 |
| **2018-19** | 33990081 |

The number of sawmills located in the Division and the Annual output against each are furnished in Table 7.4.

Table 7.5 presents the list of stone crusher industries in Sonitpur East Division, Assam.

**Table 7.5: List of stone crusher industry in Sonitpur East Division**

| Sl. No. | Range | Name and Add Crusher Unit & Owner | Reg. No. | Remarks |
|---|---|---|---|---|
| 1 | Diplonga Range | M/s Swastika Stone Crusher Unit Sri Ashok Kr Gupta , Itakhola | SE-14 of 2011 | Functional and duly renewed. |
| 2 | Pabhoi Range | M/s Biswanath Stone Crusher Unit , Sri Biswanath Stone Crusher Unit , Itakhola | SE-11 of 2010 | Functional and duly renewed. |
| 3 | Pabhoi Range | M/s Laxmi Enterprise Stone Crusher Unit, Sri P.N. Choudhury, Burigang | SE-2 of 2003 | Functional and duly renewed. |
| 4 | Borgang Range | M/s Nameri Construction & supplier stone crusher unit, Sri Gogeswar Saikia, Morangaon | SE-12 of 2010 | Functional and duly renewed. |
| 5 | Borgang Range | M/s M.D. Stone Crusher Unit Sri Mohiram Das, Chandamari, Helem | SE-07 of 2007 | Functional and duly renewed. |
| 6 | Borgang Range | M/s Sailaja Commercial Stone Crusher Unit , Sri Udayaditya Goswami, Madurali, Rotowa | SE-10 of 2009 | Functional and duly renewed. |
| 7 | Diplanga Range | M/s Luit Stone Crusher Unit, Sri Binay Saikia, Sootea | SE-15 of 2019 | Duly renewed. Commercial production yet to be started. |
| 8 | Pabhoi Range | M/s Borah Stone Crusher Unit, Sri Pradip Bora, Borkura, Pabhoi | SE-03 of 2006 | Renewed till 2019. |
| 9 | Diplanga Range | M/s Simplex Stone Crusher Unit, Jamuguri | SE-17 of 2019 | Functional and duly renewed. |
| 10 | Gohpur Beat | M/s ECI Stone Crusher Unit, Magoni | SE-16 of 2019 | Functional and duly renewed |
| 11 | Borgang Range | M/s RAMKY-TK (JV) Stone Crusher Unit, Nasbor | - | Approved by the Licencing Committee. But licence not yet issued due to non submission of latest pollution certificate |

## 7.5 Demand and Supply of Timber and Important Non-Timber Forest Produce

The information collected from the record of Timber sale held through open tender or auction for the years 2008-09 to 2018-19 are furnished in Table 7.6. The outturn includes wind-fallen timber,

seized timver and timber acquired through departmental operations. There are 10 privately owned Saw Mills having clearanve from SIT( Hon'ble Supreme Court). The Saw Mills were supplied with Timbers from Arunachal Pradesh. However, such transportation of timber have stopped since 2015.

**Table7.6: Annual Timber sale by volume on tender from Sonitpur East Division for the year 2008-09 to2018-19**

| Year | Volume (in $m^3$) | Remarks |
|---|---|---|
| 2008-2009 | 241.576 | Wind fallen and Siezed Timber( Both from RF and on transit from other state) |
| 2009-2010 | 815.521 | |
| 2010-2011 | 365.195 | |
| 2011-2012 | 493.791 | |
| 2012-2013 | 181.535 | |
| 2013-2014 | 119.529 | |
| 2014-2015 | 565.224 | |
| 2015-2016 | 3815.651 | 4 lanning of National highway and felling of roadside trees led to increase in outturn |
| 2016-2017 | 534.374 | |
| 2017-2018 | 469.772 | |
| 2018-2019 | 161.47 | |

**Table 7,6a. Timber operated from Private Land(PP Land) undder Assam (Control of Felling and Removal of Trees from Non-Forest Lands ) Rules, 2002. w.e.f. 2008-09 to 2018-19**

| Sl. No. | Year | No. of Certificate Of Origin against PP Land timber issued | Total volume involved (in Cu.m) | No. of trees involved |
|---|---|---|---|---|
| 1 | 2008-09 | 11 | 1193.589 | 749 |
| 2 | 2009-10 | 7 | 1103.742 | 508 |
| 3 | 2010-11 | 7 | 1231.199 | 585 |
| 4 | 2011-12 | 3 | 647.199 | 284 |
| 5 | 2012-13 | 6 | 714.042 | 407 |
| 6 | 2013-14 | 10 | 622.192 | 367 |
| 7 | 2014-15 | 4 | 646.370 | 297 |
| 8 | 2015-16 | 7 | 975.154 | 715 |
| 9 | 2016-17 | 4 | 335.648 | 231 |
| 10 | 2017-18 | 3 | 314.554 | 187 |
| 11 | 2018-19 | 4 | 337.446 | 299 |

**Table 7.4: Statement showing No. of Saw Mills in the Division and their annual outturn**

| Sl. No. | Name of Mill | Type | Year-wise Output of Sawn timber (in $m^3$) | | | | | | | Range |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2012-13 | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | |
| 1 | Probhat Industry | Round | 80.781 | 82.493 | 61.731 | N.A | 203.57 | 152.852 | 78.916 | Pabhoi |

| Sl. No. | Name of Mill | Type | Year-wise Output of Sawn timber (in $m^3$) | | | | | | | Range |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Sawn | 109.398 | 63.95 | 43.488 | NA | 140.564 | 99.982 | 52.894 | |
| 2 | Dutta Saw Mill | Round | 29.512 | 58.509 | 21.614 | 132.884 (Last two Qtr.) | 309.492 | 98.419 (First two Qtr.) | NA | Sadar |
| | | Sawn | 28.018 | 25.454 | 11.542 | 90.675 | 209.439 | 65.662 | NA | |
| 3 | Lakhi Co-Operative Saw Mill | Round | 48.605 | 113.695 | 105.82 | NA | NA | NA | NA | Borgang |
| | | Sawn | 43.734 | 55.742 | 87.786 | NA | NA | NA | NA | |
| 4 | M.R Saw Mill | Round | 212.921 | 106.347 | 52.685 | 85.77 (Last two Qtr.) | 500.111 | 95.901 | 154.714 | Pabhoi |
| | | Sawn | 124.093 | 70.355 | 25.698 | 61.274 (Last two Qtr.) | 357.092 | 68.769 | 110.487 | |
| 5 | Bhagawati Saw Mill | Round | 69.278 | 46.53 | 12.216 | 56.486 (Last two Qtr.) | 259.739 | 94.239 | 8.739 (First two Qtr.) | Pabhoi |
| | | Sawn | 29.201 | 44.65 | 3.174 | 40.253 (Last two Qtr.) | 185.424 | 67.443 | 6.263 (First two Qtr.) | |
| 6 | Chariali Saw Mill | Round | 137.92 | 25.808 | 36.712 | 38.855 (Last two Qtr.) | 46.757 | 61.844 | 37.384 | Pabhoi |
| | | Sawn | 76.655 | 44.522 | 26.535 | 28.152 (Last two Qtr.) | 33.72 | 44.569 | 25.816 | |
| 7 | Laxmi Saw Mill | Round | 46.305 | 59.534 | 34.306 | NA | NA | NA | NA | Pabhoi |
| | | Sawn | 32.709 | 41.136 | 23.371 | NA | NA | NA | NA | |
| 8 | J.K Saw Mill | Round | 114.996 | 61.647 | 53.752 | 87.307 (Last two Qtr.) | 524.766 | 240.98 (First two Qtr.) | 40.686 (Last two Qtr.) | Sadar |
| | | Sawn | 133.957 | 67.514 | 36.24 | 58.595 (Last two Qtr.) | 374.543 | 171.841 (First two Qtr.) | 29.042 (Last two Qtr.) | |
| 9 | Atul Saw Mill | Round | 17.683 | 15.397 | 74.639 | 68.73 (Last two Qtr.) | 398.944 | 117.53 | 84.067 | Pabhoi |
| | | Sawn | 10.239 | 10.153 | 24.618 | 49.275 (Last two Qtr.) | 285.421 | 83.946 | 54.917 | |
| 10 | Durlav Saw Mill | Round | 101.551 | 79.639 | 11.101 | NA | NA | NA | NA | Pabhoi |
| | | Sawn | 74.635 | 60.439 | 10.215 | NA | NA | NA | NA | |

## 7.6 Import And Export of Wood and Wood Products

No information is available regarding import and export of wood and non wood products. However, no wood has been exported from the Division during last 10 years.

## 7.7 Import and Export of NTFPs

No information is available regarding import of NTFP to this Division. However no NTFP has been exported from the Division during last 10 years. No study has so far been conducted in regards to the demand and supply of NTFPs.

## 7.8 Removal of Fodder

Unlike other forest Divisions of Assam, collection of fodder for the cattles is not common in the Division. Normally the local domesticated cattles are allowed to graze in the open field or Forest areas having grasses. Stall feeding of the local breed of cattle is very rare. Hybrid varities of cattles are stall fed with other feeding materials, while goats feed on specieslike Artocarpus spp etc. Usually, fodder is collected from private land or other govt. non forests land. However the encroachers are totally dependant on the forest for their fodder requirements.

## 7.9 Valuation of the Products:

Table 7.7 provides prices of different species of timver as per 1977-78 prices in the Sonitpur East Division. These were obtained from previos Working Plans of the Division. Further, Table 7.8 provides the current price of different species of timber as per market prices in 2014-15.

### 7.10. Resources of The Forest Divisions.

Sonitpur East Division has 16 Minor Mineral Mahals or Minor Mineral Concession Areas operated under Assam Mnor Mineral Concession rules. All MMC areas are outside reserve forest areas. 4 ordinary earth Mahal, 9 sand gravel mahal and 4 Sand Mahals, 10 Privately operated Saw Mill, 6 privately owned Stone crusher units and 2 departmental Nurseries ( 1.5 ha Nursery at Bihmari and Rangarmuri. The Resource Map of the Forest Division is as in Figure 7.1a and 71.1b.

Fig 7.1a. Resource Map of Sonitpur East Division

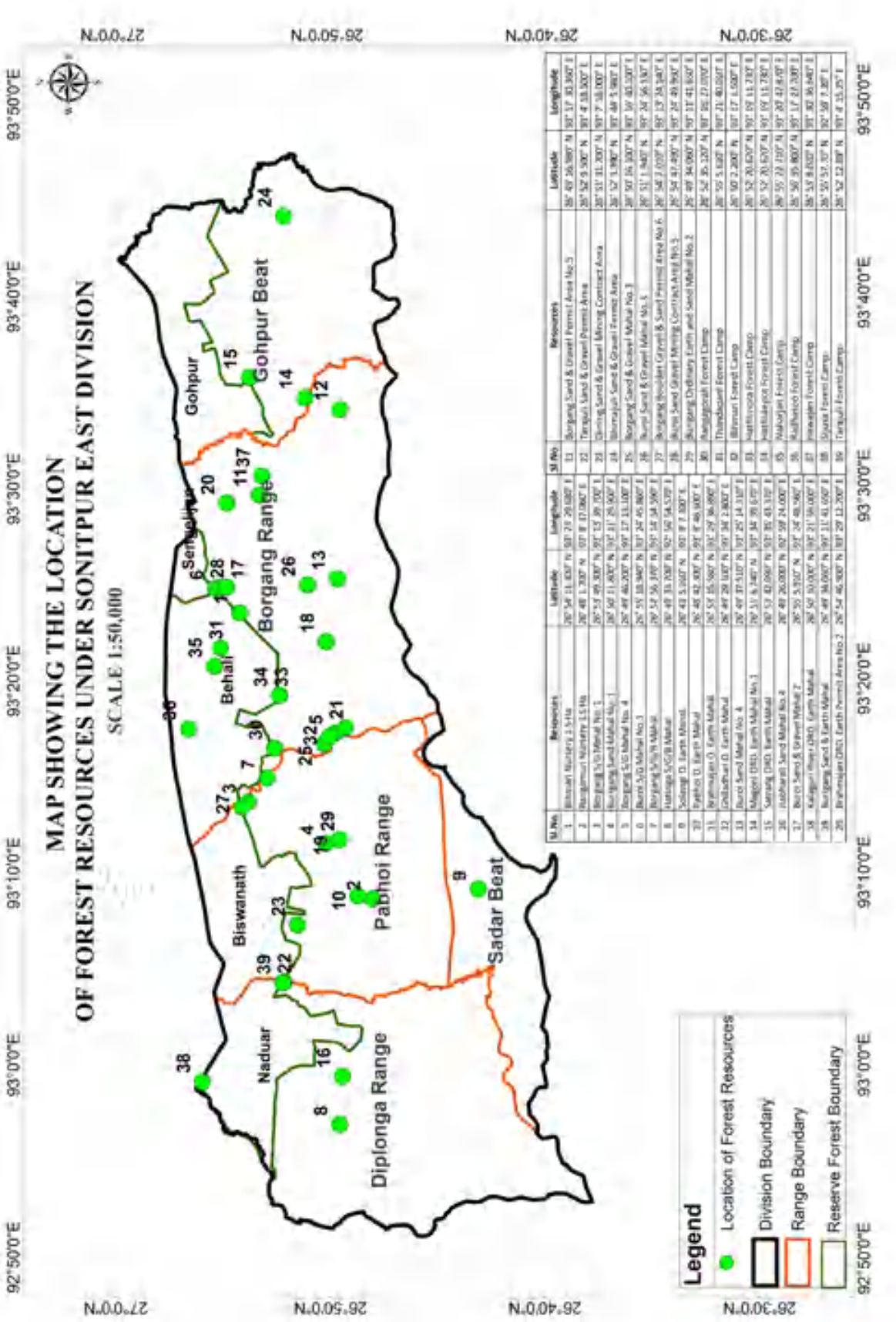


Fig 7.1b. Resource Map of Sonitpur East Division in Toposheet

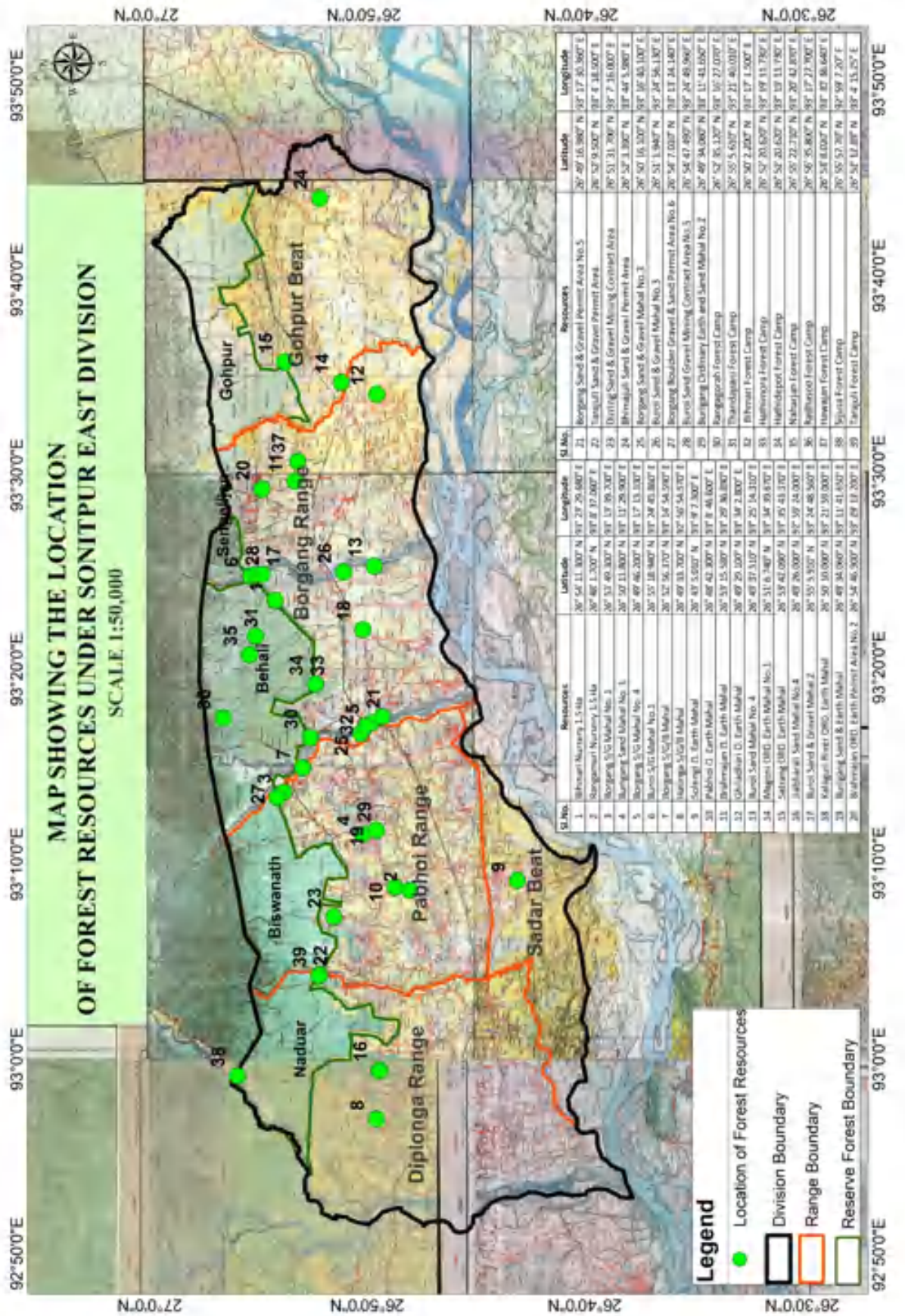


**Table 7.7: Price of timber as per 1977-78 prices**

| Species | Log (in Rs. per $m^3$) | Plank (in Rs. per $m^3$) | Beam Scantling (in Rs. per $m^3$) | Post pole (in Rs. per running metre) |
|---|---|---|---|---|
| Sisoo | 620 | 920 | 760 | |
| Titasopa | 350 | 650 | 530 | |
| Bonsum | 350 | 620 | 530 | |
| Gomari | 400 | 700 | 600 | |
| Hollok | 315 | 500 | 450 | |
| Gonsorai | 310 | 450 | | |
| Amari | 280 | 425 | 390 | |
| Cham | 240 | 350 | 310 | |
| Koroi | 240 | 400 | 360 | |
| Sonaru | 230 | | 380 | 8 to 10 |
| Kuhir | 230 | | 390 | 8 to 10 |
| Bogipoma | 300 | 500 | 450 | |
| Pama | 280 | 460 | 410 | |
| Sopa | 250 | 400 | 380 | |
| Ajhar | 250 | 400 | 350 | 7 to 8 |
| Simul | 170 | 250 | 250 | |
| Sida | 200 | | 300 | |
| Ahoi | 200 | | 310 | |
| Dhuna | 195 | 270 | 240 | |
| Bhelu | 195 | 265 | | |

**Table 7.8: Price of Timber as per rate in open tender during 2014-15**

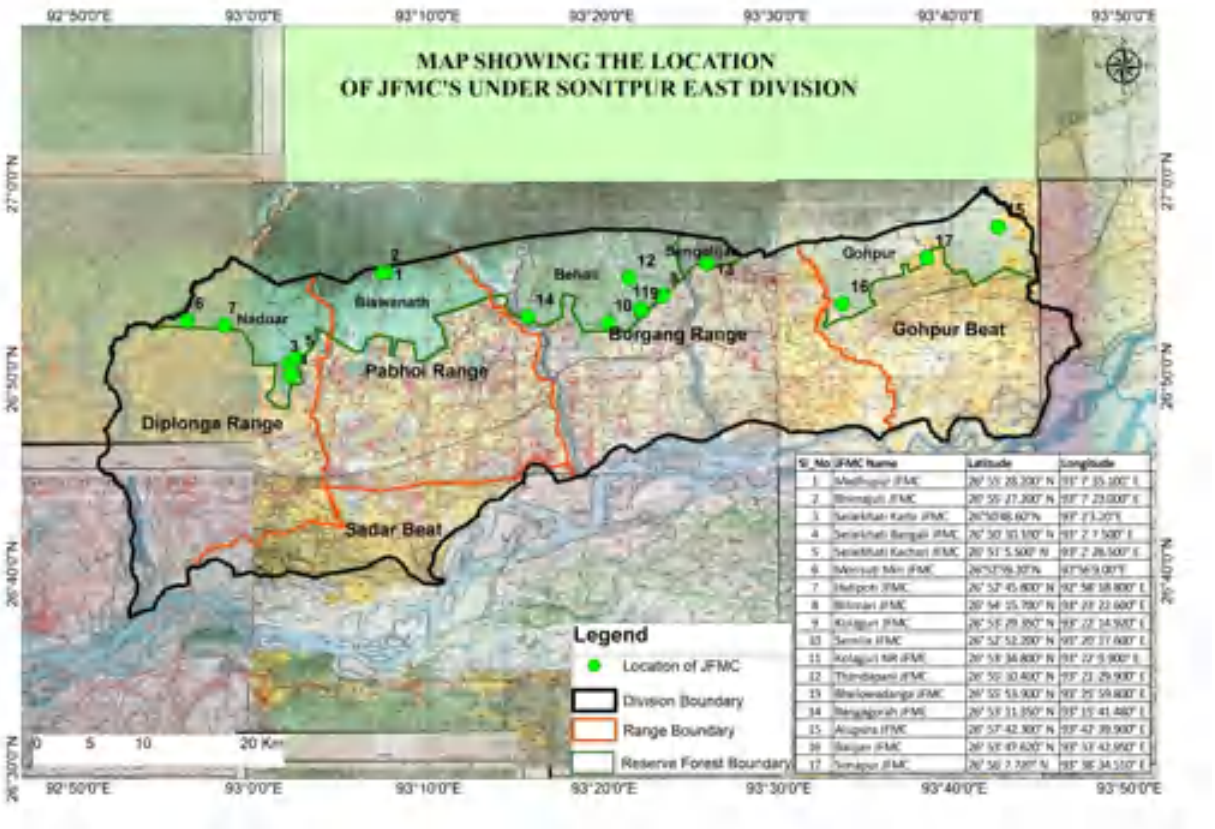
| Sl. No. | Species | Round Logs (in Rs. per $m^3$) | Sawn Timber (In Rs. per $m^3$) |
|---|---|---|---|
| 1 | Sisso | 4,606 | 24,500 |
| 2 | Titasopa | 6,600 | 26,250 |
| 3 | Segun | 9,900 | 36,750 |
| 4 | Bonsum | 4,998 | 22,750 |
| 5 | Gomari | 6,396 | 15,750 |
| 6 | Hollock | 3,549 | 22,750 |
| 7 | Gonsorai | 4,605 | 19,250 |
| 8 | Amari | 2,492 | 15,750 |
| 9 | Cham, Koroi | 1,400 | 19,250 |
| 10 | Sonaru | 2,403 | 15,750 |
| 11 | Kuhir | 2,492 | 21,000 |
| 12 | Bogipoma | 2,403 | 26,250 |
| 13 | Pama | 2,403 | 15,750 |
| 14 | Sopa | 492 | 16,800 |
| 15 | Ajhar | 2,405 | 17,500 |
| 16 | Simul | 2,018 | 10,500 |
| 17 | Sida | 2,400 | 19,250 |
| 18 | Dhuna | 3,675 | 10,500 |
| 19 | Bhelu | 1,346 | 10,500 |
| 20 | Bon Bogori | 1,202 | 15,750 |
| 21 | Khakan | 2,403 | 17,500 |
| 22 | Jutuli | 3,998 | 17,500 |
| 23 | Jamu | 2,403 | 15,750 |
| 24 | Bon Jalakia | 1,202 | 10,500 |
| 25 | Udal | 843 | 10,500 |

# CHAPTER 8

# MAINTENANCE OF SOCIAL, ECONOMIC, CULTURAL AND SPIRITUAL BENEFITS

As per the National Forest Policy of India 1988, the participation of local community living in and around the forest areas is vital for the conservation and development of forests. In order to implement this policy, the Government of India issued a clear Guideline on 1st June, 1990 to develop and manage degraded forestland with the help of the local community and voluntary organizations. Communities organize themselves into a Joint Forest Management Committee (JFMC) to protect and manage forests. The benefits to them is direct access and control on the use and sale of most NTFPs and a share in the income from timber as well as other intangible benefits from local ecosystem services – like water recharge, pollination, wildlife habitat etc. Thus involvement of communities in conservation of forests and wildlife is of paramount interest. Also, as per the Assam Forest Policy 2004, Joint Forest Management (JFM) practices would form the basis of forest management in the State.

Hence, the working plan will make all the necessary provision for participation of forest fringe communities aiming to sustainable forest management and benefits of communites.



## 8.1. JFMCs and Forest villages

### 8.1.1 Existing JFMCs under Sonitpur East Division

**Figure 2.1: Map of joint forest management woking circle in Sonitpur East Division, Assam**

There are 17 functional JFMCs under Sonitpur East Divisions and the coordinates are as under. The area under each Division is 50 Ha for protection purposes and area under plantation has varied from time to time. This plan seeks to allot areas under plantation annually.

**GPS Coordinates of the JFMCs:-**

| | | | |
|---|---|---|---|
| **PABHOI** | | | |
| Madhupur | 26°55'28.20"N, 93°07'35.1"E | Bhimajuli | 26°55'27.20"N, 93°07'23"E |
| **DIPLONGA** | | | |
| Selaikhati Karbi | 26°48'59.00"N, 92°58'23.50"E | Hatipoti | 26°52'45.8"N, 92°58'18.8"E) |
| Selaikhati Bangali | 26°50'10.10"N, 92°02'07.50"E | Morisuti | 26°52'59.2"N, 92°56'09.0"E |
| Selaikhati Kachari | 26°51'05.5"N, 92°02'28.50"E | | |
| **BORGANG** | | | |
| Bihmari | 26°54'15.7"N, 93°23'22.6"E | Serelia | 26°52'52.2"N, 93°20'17.6"E |
| Kolaguri | 26°53'29.35"N, 93°22'14.92"E | Kolaguri NR | 26°53'34.8"N, 93°22'09.9"E |

| | | | |
|---|---|---|---|
| Thandapani | 26°55'10.4"N, 93°21'29.9"E | Bhelowadanga | 26°55'53.9"N, 93°25'59.8"E |
| Rangagorah | 26°53'11.35"N, 93°15'41.48"E | | |
| **GOHPUR** | | | |
| Alupara | 26°57'42.300"N, 93°42'39.900"E | Balijan | 26°53'47.620"N, 93°33'42.950"E |
| Sonapur | 26°56'7.720"N, 93°38'34.510"E | | |

## 8.1.2. Forest Villages

Sonitpur East Division has 32 Notified Forest Villages, as detailed in the table below. The population socioeconomic status, population, household etc are are recorded as in ANNEXURE X

**Table 8.1. Forest Villages under Sonitpur East Division**

| Sl. No. | Name of the Forest Village | Name of the Range/Beat | Name of the R.F. | Year of creation |
|---|---|---|---|---|
| 1 | Jarani Karbi. | Gohpur Beat | Gohpur R.F. | 11-05-1950 |
| 2 | Balijan | | | 09-06-1951 |
| 3 | Bikrampur | | | 1952 |
| 4 | Ouguri | | | 29-07-1952 |
| 5 | Alupara | | | 27-09-1952 |
| 6 | Sonapur | | | 27-09-1952 |
| 7 | Ghogra East | | | 1952 |
| 8 | Ghogra West | | | 8/8/1954-55 |
| 9 | Gopsar guri | | | 27-09-1953 |
| 10 | Kalmouguri | | | 1955 |
| 11 | Pulisumani Deuri | | | 1952 |
| 12 | Pulisumani Miri | | | 1953 |
| 13 | Pulisumani Daffala | | | 1955 |
| 14 | Sessa Miri | | | 1952 |
| 15 | Sessa Extention | | | 1969 |
| 16 | Sessa Assamese | | | 1954 |
| 17 | Rangajan Miri | | | 1952 |
| 18 | Rangajan Daffala | | | 1955 |
| 19 | Marisuti | Diplonga Range | Naduar R.F. | 1957 |
| 20 | Selaikhati Bangali | | | 1949 |
| 21 | Selaikhati Kachari | | | 1957 |
| 22 | Selaikhati Mikir | | | 1949 |
| 23 | Hatipati | | | |
| 24 | Madhupur | Pabhoi Range | Biswanath R.F. | 1962 |
| 25 | Bhimajuli | | | 1970 |
| 26 | Bihmari | Borgang Range | Behali R.F. | 1965 |
| 27 | Kalaguri | | | 1933 |
| 28 | Serelia | | | 1954-55 |
| 29 | Kalaguri NR | | | |
| 30 | Thandapani | | | |
| 31 | Bhelowadanga | | | |

| Sl. No. | Name of the Forest Village | Name of the Range/Beat | Name of the R.F. | Year of creation |
|---|---|---|---|---|
| 32 | Rangagarah | | | |

## 8.2 Status of Empowerment of JFMCs

The JFMCs are constituted under the Sonitpur East Forest Development Agency (FDA) which is already registered under the Societies Act. The flow of fund is designed in a purely "Decentralized Module" and the JFMCs have been empowered to draw the sanctioned fund and execute the works after taking resolution from the Gram Sabha. The President, who is a villager, heads the JFMC with other Executive Members who are also from the same village. The Range Officer is the Member Secretary of a particular JFMC.. The Committee must have at least a Member of the Panchayat. The Range Officer cum Member Secretary maintains the "Joint Account" in the Bank with the President of the JFMC and can draw fund jointly as per sanctioned work and after due resolution in Gram Sabha. The villagers of a particular village(S) are the 'General Members' of the JFMC. The Executive Committee can be changed periodically if the Members decide so. All other activities are performed as per Societies Act.

**Distribution of the 'Usufructs':** The authority to distribute the 'Usufructs or related benefits' lies with the JFMC. In case of timber/thinning material, the JFMC is authorised to receive 25% of the value after selling the same departmentally and deducting the expenses etc. as per Assam Joint (People's participation) Forestry Management Rules, 1998. The present plan proposes to adopt the JFMC Manual of APFBC( Annexure IX) for operation and management.

## 8.3 Labour Welfare

All wages paid to labourers are based o notified wage rate by Assam Forest Deprtment from time to time. The JFMC members, fringe forest dwellers are employed in all forestry related works both inside and outside RF area. The works ranges from construction of road, bridges, wind fallen trees and JFMC plantations etc. Range Officer and Beat Officers to ensure that Forest Villagers and Fringe Forest Villagers should be compulsorily engaged in all forestry and non forestry operations of Forest Department.

## 8.4 Use of Indigenous Knowledge

Documentation of the indigenous traditional knowledge and incorporation of the same in the micro-plans and other prescriptions of the plan has not been done so far in the Division. During the tenure of this Working Plan traditional and indigenous knowledge will be identified and systematically documented.

## 8.5 Extent of Cultural/Sacred Groves

There are no reports of the presence of any sacred grove in the Division's forests. During the tenure of this Working Plan extent of cultural/sacred groves (if reported) will be identified and systematically documented.

## 8.6 Eco-tourism Areas and Activities

Hatidepot was developed as ecotourism area in Behali RF. The area can be managed by JFMC. During the month of December and January the site is sought after picnic site. The area can be developed further for nature educational trek route, night camping and nature trail. Behali RF is home to several birds and endangered floral species. Nature treks can be developed.

Hathidepot was opened up as eco tourism site. Hathidepot Forest camp is located along the bank of river dikal. Dikal river is tributary of Borgang River. A forest walking trail was developed for 2 km from Hathidepot tiniali to hathidepot. Major tree species were named and important information were inscribed on wooden plates all along the route.

One can walk along right inside middle of forest for 2 km. Feel the spirit of forest. Learn to identify few species which are marked with labelled. Enroute avid bird watchers can spot few avian species as well. Hathidepot is a Forest camp located along bank of Dikal River. Dikal River is tributary of Borgang River. Hills of Arunachal Pradesh is visible from Hathidepot. The place is developed so that one can enjoy leisurely picnic along riverside and enjoy the charm of Behali.

We have Bird enthusiast and Binoculars here at Forest camp. Interested person can join our JFMC Volunteer for bird watching.

**Objective of the Eco Tourism Site**

1. Its last patch of tropical rainforest left in Sonitpur District after Nameri tiger Reserve, and people should be made aware of its importance.
2. Survival of Behali RF is crucial for agricultural productivity, water table, soil, moisture conservation and wildlife.
3. To develop the site for educational tours/excursions.
4. Behali is the Only green lungs of Biswanath.

Fig: Picnic Site of Hatidepot along right bank of Borgang River

The speciality of the above Ecotourism sites are aesthetic Scenery, Biodiversity( Caped Langur, Butterflies, Birds Species etc.). Additionally competition of Volleyball near River beatch, Cultural Programs can also be arranged. In Kolaguri, Boulder Pukhuri (few of the Geological Remains of Ahom Kings ), Biodiversity( Caped Langur, Butterflies, Birds Species etc.) are other attractions.

The various ecotourism activities that can be promoted and special attractions are as below:

| Location | Type of ecotourism activities | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Nature trail** | **Trekking** | **Night Camping** | **Bird watching** | **Wild Elephant Tourism** | **Butterfly Identification** | **Carrying capacity(Visits /day)** |
| **Rangagorah-Hati Depot/ Rangagorah JFMC** | Yes | Yes | Yes | Yes | Yes | Yes | 200 |
| **Bedeti – Rangaghora/ KolaguriJFMC** | Yes | Yes | Yes | Yes | Yes | Yes | 240 |
| | **Photography** | **Rafting/ Boating** | **Angling** | **Canopy walk** | **Rock climbing** | **Cycling** | **Awareness camp** |
| **Rangagorah-Hati Depot/ Rangagorah JFMC** | Yes | No | No | Yes | No | Yes | Yes |
| **Bedeti – Rangaghora/ KolaguriJFMC** | Yes | No | No | Yes | No | Yes | Yes |

## 8.7 Social Customs

The Asssamese culture is traditionally based on forests. More than 90% of population of the Division resides in the rural areas and are mostly dependednt on natural reasources for their sustenance. Traditionally, the people residing in the fringe areas collect fire wood and other timbers for making their agricultural equipments. Also, some people earn their livelihood with bamboo and cane craft work. The local people collect orchids from the forest during Bihu festivals. They also depend on forest for other herbs and medicinal plants. In recent years the dependency of the local people on forests has greatly reduced due to changing agricultural practices.

## 8.8 Status of Compliance of Forest Right Act (FRA)

The Information regarding the status of the claims and settlement under Forest Right Act, 2006 in the Division is given in Table 8.3.

**Table 8.3: Status of compliance of FRA**

A. FRA Claims Recieved

| Revenue Districts | Sub Division | Forest Range | Claim Received | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Claim received by Gram Sabha | | | Area (Ha) involved | | |
| | | | Individual | Community | Total | Individual | Community | Total |
| Biswanath | Biswanath | Diplonga, Pabhoi, Borgang | 3931 | 147 | 4078 | 4888 | 194 | 5082 |
| | Gohpur | Gohpur Beat | 8864 | 592 | 9456 | 8937.47 | 241.33 | 9178.8 |
| Sonitpur | Tezpur | Diplonga | 2571 | 204 | 2775 | 4456 | 154.8 | 4610.8 |
| TOTAL | | | **15366** | **943** | **16309** | **18281.47** | **590.13** | **18871.6** |

B. FRA Claims Accepted

| Revenue Districts | Sub Division | Forest Range | Claim Accepted | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Claim Accepted | | | Area (Ha) involved | | |
| | | | Individual | Community | Total | Individual | Community | Total |
| Biswanath | Biswanath | Diplonga, Pabhoi, Borgang | 935 | 44 | 979 | 1464.79 | 41.5 | 1506.29 |
| | Gohpur | Gohpur Beat | 2851 | 124 | 2975 | 3204.5 | 43 | 3247.5 |
| Sonitpur | Tezpur | Diplonga | 228 | 34 | 262 | 469.6 | 25.33 | 494.93 |
| TOTAL | | | **4014** | **2025** | **4216** | **5138.89** | **109.83** | **5248.72** |

C. FRA Claims Rejected

| District | Sub Division | Forest Range | Claim rejected | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Claim rejected | | | Area (Ha) involved | | |
| | | | Individual | Community | Total | Individual | Community | Total |
| Biswanath | Biswanath | Diplonga, Pabhoi, Borgang | 0 | 0 | 0 | 0 | 0 | 0 |
| | Gohpur | Gohpur Beat | 7 | 0 | 7 | 7.2 | 0 | 7.2 |
| Sonitpur | Tezpur | Diplonga | 2343 | 170 | 2513 | 3986.4 | 129.47 | 4115.87 |
| TOTAL | | | **2350** | **170** | **2520** | **3993.6** | **129.47** | **4123.07** |

D. FRA Claims Pending

| District | Sub Division | Forest Range | Claim pending | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Claim pending | | | Area (Ha) involved | | |
| | | | Individual | Community | Total | Individual | Community | Total |
| Biswanath | Biswanath | Diplonga, Pabhoi, Borgang | 2996 | 103 | 3099 | 3423.21 | 152.5 | 3575.71 |
| | Gohpur | Gohpur Beat | 6006 | 468 | 6474 | 3725.77 | 198.33 | 5924 |
| Sonitpur | Tezpur | Diplonga | 0 | 0 | 0 | 0 | 0 | 10 |
| TOTAL | | | **9002** | **571** | **9573** | **9148.98** | **350.83** | **9499.81** |

## 8.9 Other Rights and Concessions

Other rights and concessions granted in the RFs of Sonitpur East Forest Division are discussed below -

- **Status of Implementation of Scheduled Tribes and Traditional Forest Dwellers Act 2006:** District Level Committee under the Chairmanship of Deputy Commissioner, Sonitpur District and Sub Divisional Level Committee under the Chairmanship of SDO (Civil) at Biswanath Chariali and Gohpur. Implementation of Scheduled Tribes and Traditional Forest Dwellers Act 2006 commenced with effect from 30/1/2008 vide Notification of District Level Committee by Member Secretary DLC. (No. ITDP (T) FD ACT06/338/2008-2009/688-94 Dt 30/10/2008).
- **Behali RF:** As per the notification no 29/2 G.J. dtd. 18.05.39 the following rights and concessions had been given to some of the fringe villages of the RF which are not exercised since long.

o Commitments: In the Behali RF annually 200 trees of exploitable size have been granted on permit system for 3 year payment of schedule Royalty only to Sri P.K. Baruah, Ex-Zamindar, Gouripur to feed the Saw Mill at Borgang vide Government letter no. FOR/SETT/106/59/18 dated. 07.01.60. There trees will be operated from 1960.61, which were never exercised during last 3 decades.

- **Naduar RFs:** As per the notification no. For/Sett/438/66 dtd. 29.01.1968 the following rights and privileges had been given to some of the fringe villages of the Reserved Forests.

o Right of way to the public along a path in the RF leading from Biswanath Tea Company grant no. 93 to Hatipati on the Bordikorai river.

o Right of way to the public along the bed of the Bordikorai River.

- **Singlijan RF:** As per the notification no. FRS.238/87/22.A dtd. 17.11.1987, the following rights and privileges had been given to some of the fringe villages of the Reserved Forests.

o Free use of firewood and minor forests produce on rendering free labour and grazing of cattle on payment of usual grazing tax, which not exercised.

## 8.10 Dependency of Local People on NTFPs

As per the rights and concessions narrated in in Section 8.9, the fringe villagers, JFMC beneficiaries and FRA Rights holders are dependent on the forest to meet their domestic demand of NTFPs like roots, tubers, flowers, fruits, fibers, gums, resins, dyes, tannins, honey bamboo and wax etc. and they are being traditionally empowered with rights.

The legally enforced, Assam Forest Regulation Act beyond the individual demand of the Right holders the local selling and marketing shall be under proper transit pass or challan for commercial use of NTFPs. However, due to their traditional practices the provision of T.P/T.C. not yet properly implemented though the same is legally required. The forest administration shall impose the mechanism for assessing the quantity domestically uses and also the quantity marketed to the local

market. During the constitution of the RFs, certain rights and concessions were allocated to the people living in and around the RFs.

## 8.11 Other Aspects

There are no other aspects as such to be mentioned in the Working Plan.

# CHAPTER 9
# ADEQUACY OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

## 9.1 Existing Policy and Legal Framework and their Compliance

Forest resources have been regulated since early times. The roots of legislations, policies and guidelines for natural resource management in India can be traced back to the days of British Colonialism. The relevant constitutional frameworks at the backdrop of management of forests resources are briefly enumerated as following.

### 9.1.1 The Constitution of India

**Article 48** of the Directive Principles, states that the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country.

**Article 51 A** deals with the fundamental duties of citizens, which includes the citizen's duty to value and preserve the rich heritage of our composite culture and to protect and improve the natural improvement including forests, lakes, rivers and wildlife and to have compassion for living creatures.

**Article 246** points towards the Seventh Shedule to the Constitution, which enlists (in the union list, and the concurrent list) the subjects that the Central and State governments are to legislate upon. Forest is one of the subject placed in the Concurrent List on which both the Central and State Government shall legislate upon.

In 1952, the erstwhile Ministry of Food and Agriculture, Government of India enunciated a Forest Policy to be followed in the management of Forests in the country. Subsequently, due to large scale deforestation and diversion of forest land for non forestry uses finally led to the formulation of a new forest policy in 1988. The Forest Policy of 1988 was a pro people document, placing greater emphasis on the ecological role of forests and recognizing for the first time the rights of the people, especially the tribals, with the direction that their domestic requirements of fuel wood, minor forest produce and construction timber would be the first charge on forest produce. Subsequently Assam enunciated a Specific Forest Policy for the State in the year 2004 with certain definite objectives.

The management of Forests in the Division is to be in accordance with the existing Assam Forest Policy 2004. The Reserve Forests have been declared as per the provisions made in Assam Forest Regulation 1891 and in managing Forests, provisions made in the said Regulation and Assam Forest Regulation (Ammendment) Act 1995 are strictly followed. The Wildlife (Protection) Act 1972 as amended till date and the The Wildlife Protection Rule 1995 are other Acts and Rules in force for dealing with the matter related to Wildlife in the Division. Other Acts and Rules which are held by the Division for discharging its functions for management of Forests are 'The Assam (Control of felling and Removal of trees from non-forest lands Rule, 2002', 'The Assam Joint Management Rule

(Amendment) 2003', 'The Assam Wood Base Industries Establishment and Regulation Rules 2000', 'Forest Conservation Act. 1980', 'Schedule Tribe and other Traditional Forest Dwellers (Recognition of Forest Right) Act. 2006', 'Assam Sale of Forest Produce Coupe and Mohal (Amendment) Rules, 2000'.

The Policy and the Rules and Acts are in place in the Division to ensure Conservation, Protection and Sustainable use of forest produces in scientific manner.

## 9.2 Status of Approved Working Plan and Compliance

The KC Das Plan was the last approved plan for the Division. It expired in 1994-95. This plan was compiled and approved for fifteen years i.e. 1980-81 to 1994-95. It was found that the field workfor the completion of the plan was was started in 1980. However, the field situation as reflected in the plan has undergone tremendous change by the end of the plan in 1994-95. The object of management of the plan was 'Conservation of the existing woodlands, improvement of the growing stock and extension of the woodlands wherever feasible. The following working circles were constituted under the plan –

- **Mixed Evergreen Hardwood Plantation Working Circle:** The actual yield/outturn during the plan period could not be assessed due to insufficient data. Due to heavy encroachment the plantations raised in the Division do not exist. However, the basic objective of constitution of this working circle could not be achieved due to rampant encroachments in the PRFs.
- **Softwood Working Circle:** The data on the operation of the Circle are not available. The plantation raised with the fast growing species do not exist due to rampant encroachment.
- **Matchwood Plantation Working Circle:** The area under fellng series under this working circle are also completely encroached. The Panpur RF has already been included in the 6$^{th}$ addition to Kaziranga National Park and Gohpur RF is completely encroached. So the management objectives could not be attained.
- **Evergreen Selection Working Circle:** The assessment of the prescriptions given this working cicle also could not be assessed. The matured trees prescribed for operartion in Nameri Block were included in Nameri National Park.The operation of trees in Behali RF was carried out.

## 9.3 Number of Forest Offences

The forest offences registered can be categorized into 4 categories. Timber related illegalities inside RF and breaking of Forest land etc in Violation of Sec 25 of Assam Forest Regulation 1891, Illicit mining and transport of Minor Minerals in Violation of Asssam Minor Mineral Concession Rules 2016, Violation of Forest Conservation Act 1980 and Offence under Wildlife Protection Act 1972. Aprt from the above another categories of cases under IPC and CrPC where Government of Arunachal Pradesh registered false cases against Forest Staff for their legitimate discharge of their bonafide duties. This has been presented in Table 9.1a. The cases registered in Assam Minor Mineral

Concession Rules were compounded following due process of law and offences of Assam Forest Regulation 1891 were sent to Court.

**Table 9.1: Number of forest offences in Division.**

| Assessment year | Types of offence | Number | Cases taken to the court of law |
|---|---|---|---|
| **2009-10** | Boulder | 8 | |
| | Broken chips | 1 | |
| | Sand/Gravel | 5 | |
| | Sand | 1 | |
| | Gravel | 2 | |
| | Firewood | 3 | |
| | Timber | 3 | 2 |
| **2010-11** | Sand | 2 | |
| | Boulder | 5 | |
| | Silt | 3 | |
| | Sand /Gravel | 2 | |
| | Timber | 6 | 6 |
| **2011-12** | Sand | 3 | |
| | Sand/Gravel | 2 | |
| | Chips | 2 | |
| | Gravel | 2 | |
| | Boulder | 13 | |
| | Stone | 6 | |
| | Sandy-Sail | 5 | |
| | Timber | 8 | 10 |
| **2012-13** | Sand | 5 | |
| | Broken chips | 6 | |
| | Stone | | |
| | Earth | 1 | |
| | Boulder | 2 | |
| | Timber | 5 | 3 |
| **2013-14** | Sand | 6 | |
| | Stone | 3 | |
| | Chips | 3 | |
| | Timber | 6 | 5 |
| | Sand/Gravel | - | |
| | Boulder | 4 | |
| | Gravel | 1 | |
| **2014-15** | Sand | 9 | |
| | Stone | 5 | |
| | Earth | 2 | |
| | Boulder | 7 | |
| | Chips | 2 | |
| | S/Gravel | 1 | |
| | Timber | 4 | 3 |
| **2015-16** | Sand | 12 | |
| | Earth | 3 | |
| | Broken Stone | 11 | |
| | Fire wood | 3 | |
| | Timber | 12 | 2 |
| **2016-17** | Sand | 17 | 1 |
| | Gravel | 4 | |
| | Boulder | 4 | |

| | | | |
|---|---|---|---|
| | Stone | 8 | |
| | Chips | 3 | |
| | Sand/Gravel | 43 | |
| | Timber | 10 | 4 |
| | Firewood | 3 | |
| | Sandy Soil | 4 | |
| | Sandy Earth | 13 | |
| **2017-2018** | Sand | 20 | 1 |
| | Gravel | 13 | |
| | Boulder | 11 | |
| | Stone | 5 | |
| | Chips | --- | |
| | Sand/Gravel | 17 | |
| | Timber | 14 | |
| | Sandy Soil | 11 | |
| | Sandy Earth | 14 | |
| 2018-2019 | Sand | 18 | |
| | Gravel | 10 | |
| | Boulder | 5 | |
| | Stone | 37 | 6 |
| | Chips | 5 | |
| | Sand/Gravel | 22 | |
| | Timber | 44 | |
| | Sandy Soil | - | |
| | Sandy Earth | 23 | |

**Table 9.1a: Overview of legal cases against forest department officials of Sonitpur East Forest Division, Assam**

| Case No. | Registered with | Against Officer | Fall out of eviction drives |
|---|---|---|---|
| **17/2008**: u/s 353/365/ 380/427/447/506/34 IPC | Balijan PS, Arunachal Pradesh | *Praneshwar Das*, Range Officer, Borgang. | Eviction drive at Singlijan RF |
| **12/2013**: u/s 295/447 /95 IPC | Seijosa PS, Arunachal Pradesh | *Sh Anirrudha Dey DFO, Sonitpur East Division*. | Eviction at Dikalmukh in Behali RF |
| **8/2014**: u/s 447/427 IPC | Balijan PS, Arunachal Pradesh, Filed by Tacha Kaso | *Ranjan Baruah*, Range Officer, Borgang. | Arrest of Arunachal Pradeshi encroacher in Naharjan area |
| **7/2015:** U/s 447/341/506 IPC | Balijan PS, Arunachal Pradesh on 22.02.2015 | *DFO, Sonitpur East Division, Biswanath and Chariali.* | For clearing the Dikal Tiniali and Chaluldhowa forest road blockade created by miscreants from Arunachal Pradesh inside Behali RF. |

In all such cases mentioned above, officer concerned had to evade arrest from Arunachal Pradesh Police due to issue of non-bailable warrant from ADC court and approach Hon'ble Gauhati High Court for Anticipatory bail on personal basis. This has become a major deterrent where Officers are subjected to harassment, mental agony and social stigma for legitimate discharge of their lawful

duties. There have alos been instances of armed retaliation by encroachers. This has been presented in Table 9.2.

**Table 9.2: Armed retaliation by encroachers against Forest Department personnel**

| Eviction Drives in Behali RF in dated | Resistance provided by | Fall Out of eviction drive |
|---|---|---|
| 09/01/2014, 4 huts belonging to Arunachal Pradeshi encroachers were ejected by Assam Forest Department inside notified boundaries of Behali RF. | Indian Reserve Battalion of Arunachal Pradesh Police objected and stopped Forest personnel | On 10/1/2014, Thandapani Forest camp was attacked by Arunachal Pradesh Miscreants/ultra. One staff ***Shri Somnath Sharma, Timber Depot Chowkidar sustained bullet injuries***.<br>10/1/2014 DC and SP Papumpare visited the site of ejection and ***assured financial grant*** for reconstruction of huts Statement by ***Nabam Rebia MLA***, and State Planning and development parliamentary Secretary, Govt of Aruanchal Pradesh issued statement as enclosed in Paper cutting(Assam Tribune dated Jan 11, 2014) |

## 9.4 Status of Research and Development

Assam is one of the most important pocket of rich biodirversity in india as well as the world. there are many scopes for forestry research in assam . Our forest has rich diversity of timber species, like in the evergreen forest of upper assam magnolia spp ( phulsopa, pansopa, gahorisopa, titasopa ,khorikasopa, kothalsopa etc.) *ailanthus excelsa* roxb (borpat) ***shorea assamica*** dyer (mekai) dipterocarpus retusus blume (hollong)*terminalia myriocarpa* van heurck and mull.arg. (hollokh) etc are found and simultaneously we have *phoebe goalparensis* hutchinson(bonsum) *shorea robusta roth (sal) in goalpara region, dipterocarpus turbinatus c.f.gaertn . (garjan) in barak valley ,including valuable hard wood species kayea assamica* king & prain (sia nahar) in Dullung reserve forest of lakhimpur region. But in present days the abundance of valuable tree species has gradually declined due to many biotic and abiotic factors. we may perhaps take steps to protect those valuable indigenous species in their natural habitat as the silviculture division, assam has recently introduced three new preservation plots with an aim to protect such species like *morus laevigata* wall. (bola) in behali reserve forest, *Dipterocarpus turbinatus c.f.gaertn . (garjan) in* innerline reserve forest , *Shorea assamica* dyer (mekai) in upper dihing reserve forest . the main aim and objective of creating such plots is to study the species in their natural habitat by focusing – a) percentage of natural regeneration, b) search of healthy mother tree for quality seed production , c) study of soil and other biotic and abiotic factors etc. For comparative data base study we may also lay out some control plots of those specifically targeted species in the selected areas where there were past records of abundant growth of that species, but at present there are no further records of satisfactory growth . here we may carry out the study related to the poor growth of the concern species by studying the a) soil condition of both plot 1 and plot 2. b) study of any invasive species in the control plot which may threaten the growth of particular species.

Orchids: orchids are good bioindicators because they have very low tolerance for changes in their environment and are most valuable and commercially demanding flowering plant . the forest of entire north east and assam is naturally blessed with numerous beautiful orchids. not only orchids have highest market demand for its long lasting beautiful flowers but also medicinal properties. many of dendrobium orchids are used as ayurvedic medicine to cure many diseases like treating cancer, strengthen the immune system and improve eye sight . the jeypore reserve forest of dibrugarh division and udrf of digboi division is itself a big hotspot of many rare and endangered orchid species. this zone has the most rare and beautiful orchid like *anoectochilus sikkimensis king & pantl* (jewel orchid) *rhynchostylis retusa alba* (white rhynchostylis). similarly garampani area, in karbi anglong, borail range in barakvalley , dibru - saikhowa and chandubi forest etc , we have very good concentration of orchids. in garampani r.f. we have valuable species like *vanilla* pillifera (climbing orchid), *phalaenopsis mannii, acanthephippium sylhetense, etc* . according to the concentration of occurrence of orchid species in various reserve forest areas we may create some special plots to conserve and preserve these beautiful flora . again we may also propose an orchid park , orchid sanctuary, etc which will help us to protect the orchids in their natural habitat and by which we may also generate revenue.

Medicinal Plants – the variety of medicinal plants found in the north eastern part of india makes assam the perfect spot to harbour the process for conserving, preserving and utilising the important aspects of medicinal plant. the traditional system of medicine plays an important role in the health care of rural people for all types of ailments . however the scope of devlopement in this field is almost none and so , we need to look into the miraculous and potential phytochemical constituents which could be modified for formulating medicines , which are present in the plants grown in wild and ignorance on the roadside , backyards and villages of assam.

## 9.5 Human Resource Capacity Building Efforts

To develop the human resource, capacity building for developmental works, this Division organizes several programmes in the circle level. Short term training/refresher course is also initiated by the department for managing and developinghuman resources.

## 9.6 Forest Resource Accounting

Tangible benefits from forest are timber, NTFPs, fuelwood, fodder, livelihood, ecotourism, biodiversity, etc. The non-tangible benefits of forests are carbon sequestration, soil erosion control, water recycling, oxygen production, control of air pollution, animal habitat, etc. Duing the tenure of these Working Plan positive efforts will be made to quantify intangible benefits.

## 9.7 Budgetary Allocation to the Forestry Sector

During every five year plan funds are allocated to the forest sector in the Division.

**Table 9.7. Budget allocated to the forestry sector in Division**

| Reporting year | Budgetary allocation | Total budget received (Rs. in lakhs) | Timely completion of the work | Efficiency in cash flow | Audited report and reporting |
|---|---|---|---|---|---|
| **2015-16** | Plan – CSS(NBM) | Nil | Completed | External Aided Projects and CAMPA, NBM, APFBC were released on time and utilized. | AG Audit and Internal CA Audit Completed |
| | Non-Plan | 22,77,000/- | | | |
| | FDA | Nil | | | |
| | GIM | | | | |
| | CAMPA | Nil | | | |
| | APFBC | 95,290/- | | | |
| **2016-17** | Plan – CSS(NBM) | Nil | Completed | | AG Audit and Internal CA Audit Completed |
| | Non-Plan | 30,36,000/- | Completed | | AG Audit and Internal CA Audit Completed |
| | FDA | Nil | Completed | | AG Audit and Internal CA Audit Completed |
| | GIM | | Completed | | AG Audit and Internal CA Audit Completed |
| | CAMPA | 24,28,682/- | Completed | | AG Audit and Internal CA Audit Completed |
| | APFBC | 20,99,500/- | Completed | | AG Audit and Internal CA Audit Completed |
| **2017-18** | Plan – CSS(NBM) | Nil | Completed | | AG Audit and Internal CA Audit Completed |
| | Non-Plan | 25,69,000/- | Completed | | AG Audit and Internal CA Audit Completed |
| | FDA | Nil | Completed | | AG Audit and Internal CA Audit Completed |
| | GIM | Nil | Completed | | AG Audit and Internal CA Audit Completed |
| | CAMPA | 16,87,000/- | Completed | | AG Audit and Internal CA Audit Completed |
| | APFBC | 25,36,552/- | Completed | | AG Audit and Internal CA Audit Completed |
| **2018-19** | Plan –CSS | 1976480 | Completed | | AG Audit and Internal CA Audit Completed |
| | Non-Plan | 4993000 | Completed | | AG Audit and Internal CA Audit Completed |
| | FDA | --- | Completed | | AG Audit and Internal CA Audit Completed |
| | GIM | -- | Completed | | AG Audit and Internal CA Audit Completed |
| | CAMPA | 14151425 | Completed | | AG Audit and Internal CA Audit Completed |
| | APFBC | 784200 | Completed | | AG Audit and Internal CA Audit Completed |

## 9.8 Existence of Monitoring, Assessment and Reporting Mechanism

Both physical and financial monitoring are done from time to time by C.C.F., C.F, D.F.O, and other external agencies.Execution of the work takes place through the Range officer of the respective ranges by the Divisional Forest Officer. Monitoring, assessment of the executed work is done by the Divisional Forest Officer himself or through the Assistant Conservator of Forests and reported to the Circle Conservator. In their fortnight diaries the Assistant Conservator of Forests and Divisional Forest Officer record their findings of monitoring and assessment and submit to the Circle Conservator of Forests. The Circle Conservator also monitors and assess the work and reports to the Addl Principal Chief Conservator of Forests who subsequently reports to the Principal Chief Conservator of Forests and finally it reaches to the Government accordingly. The Addl Principal Chief Conservator of Forests

of Upper Assam Zone also time to time monitors and assess the work and reports to the Principal Chief Conservator of Forests.

## 9.9 Public Awareness and Education

Ennvironmental awareness programmes, training on microplans, awareness on need to conserve signature species, plantation drives are being carried out in the Division from time to time. During the tenure of this working plan, the efforts should be made to increase public awareness of the important forestry programmes, benefits provided by forests and sustanaible management of forests, along with distribution of published materials such as brochures, pamphlets, leaflets, posters etc. Forestry/environmental awareness and education programmes should be conducted for students. Meetings and workshops are to be held regularly inviting resource persons from outside. Powerpoint presentations and documentary films should be exhibited during such workshops. Van Mahotsava, World Environment Day, World Biodiversity Day, World Wildlife Week, Earth Day are celebrated in the Division.

## 9.10 Adequate Manpower in Forest Division

The Sonitpur East Division has 4 Territorial Ranges viz. Diplonga, Pabhoi, Borgang and Protection Range;and 2 Account Beat with independent territory i.e., Sadar(Hq) Beat and Gohpur Beat. The Ranges are further divided into Beats and Forest Camps. The Division has sanctioned staff strength of 6 Range Officers, 3 Deputy Rangers, 56 Foresters I and II, 91 Forest Guards and 2 Game Watchers for protection of the field.

The existing establishment of the executive and ministerial staff in the Division as on 31.08.2015 is given in Table 9.3. Table 9.4 provides information on expenditure on establishments by the Division between 2005-06 and 2014-15.

**Table 9.3: Statement of Sanctioned Post, Strength and Vacancy under Sonitpur East Forest Division**

| Sl. No | Name of Post | Sanctioned Strength | Present Strength | Vacancy |
|---|---|---|---|---|
| **1** | DCF | 1 | 1 | Nil |
| **2** | ACF | 4 | 2 | 2 |
| **3** | FR | 6 | 4 | 2 |
| **4** | H.A | 1 | 1 | -- |
| **5** | Acctt. | 1 | 1 | Nil |
| **6** | Sr. Asstt | 2 | 1 | 1 |
| **7** | Jr. Asstt | 7 | 2 | 5 |
| **8** | F/Surveyor | 2 | 0 | 2 |
| **9** | Dy Ranger | 3 | 2 | 1 |
| **10** | Fr-I | 40 | 20 | 20 |
| **11** | Fr-II | 16 | 13 | 3 |
| **12** | Fgd | 91 | 28 | 63 |
| **13** | TDC | 3 | 0 | 3 |
| **14** | IBC | 1 | 0 | 1 |
| **15** | Office Peon | 4 | 1 | 3 |
| **16** | Office Chowkidar | 1 | -- | 1 |
| **17** | Duk runner | 1 | -- | 1 |
| **18** | Driver | 6 | 4 | 2 |
| **19** | H/Man | 1 | 1 | -- |
| **20** | G/Watcher | 2 | 2 | 0 |
| | Total | 193 | 83 | 110 |

**Table 9.4: Expenditure on Establishment from 2005 to 2015**

| Year | Salary including DA (in Rs.) | Wages /Fixed pay Casual (in Rs.) | TA (in Rs.) | Total (in Rs.) |
|---|---|---|---|---|
| 2005-06 | 36,44,000 | - | - | 36,44,000 |
| 2006-07 | 1,27,21,000 | - | 25,000.00 | 1,27,46,000 |
| 2007-08 | 1,73,89,000 | 7,80,000 | 57,000.00 | 1,82,26,000 |
| 2008-09 | 1,98,17,000 | 8,19,000 | 65,000.00 | 2,07,01,000 |
| 2009-10 | 2,22,89,000 | 10,14,000 | 76,000.00 | 2,33,79,000 |
| 2010-11 | 3,65,51,000 | 14,04,000 | 40,000.00 | 3,79,95,000 |
| 2011-12 | 3,67,95,000 | 13,50,000 | 78,000.00 | 3,82,23,000 |
| 2012-13 | 3,99,39,000 | 13,87,500 | 8,000.00 | 4,13,34,500 |
| 2013-14 | 4,36,82,000 | 17,28,000 | 1,00,000 | 4,55,10,000 |
| 2014-15 | 4,62,00,000 | 18,00,000 | 60,000 | 4,80,60,000 |
| 2015-16 | 4,86,00,000 | 20,16,000 | 1,00,000 | 5,07,16,000 |
| 2016-17 | 5,21,46,439 | 20,16,000 | 1,05,000 | 5,42,67,439 |
| 2017-18 | 6,03,05,532 | 20,16,000 | 1,20,000 | 6,24,41,532 |
| 2018-19 | 5,91,90,615 | 24,64,000 | 3,06,000 | 6,19,60,615 |

## 9.10 Adequate Man Power in Forest Division:

The position of staff of the division as it stands on 1st Jan,2020

**Table 9.10a: The total number of posts and total amount spent during the financial year under Non-Plan Head of Division.**

| Sl. No. | Name of post | No. of posts | Total amount of the month (In Rs`) | Total amount for the year (In Rs) |
|---|---|---|---|---|
| 1 | Dy. C F | 01 | 105546.00 | 1304592.00 |
| 2 | ACF | 02 | 145419.00 | 1797468.00 |
| 3 | Forest Ranger | 04 | 191126.00 | 2362392.00 |
| 4 | Dy. Ranger | 03 | 187504.00 | 2317608.00 |
| 5 | Forester Grade - I | 24 | 1175748.00 | 14532336.00 |
| 6 | Forester Grade - II | 13 | 1828512.00 | 22600464.00 |
| 7 | Forest Guard | 29 | 1423408.00 | 17485416.00 |
| 8 | Draftsman | 00 | | |
| 9 | H. Asstt. | 01 | 69762.00 | 862344.00 |
| 10 | Acctt. | 01 | 61113.00 | 755436.00 |
| 11 | U. D. Asstt. | 01 | 61400.00 | 759000.00 |
| 12 | L. D. Asstt. | 02 | 84126.00 | 1039872.00 |
| 13 | O.P. | 01 | 34587.00 | 427524.00 |
| 14 | Driver | 04 | 172631.00 | 2137732.00 |
| 15 | Gate Chowkidar | 00 | | |
| 16 | Night Chowkidar | 00 | | |
| 17 | I. B. Chowkidar | 00 | | |
| 18 | Mali | 00 | | |
| 19 | Dak Runner | 00 | | |
| 20 | Chalnmam | 00 | | |
| **Total** | | **86** | | |

**Table 9.10b: Excess staff under Non-Plan Head of Division**

| Name of Post | Sanctioned strength | Excess staff |
|---|---|---|
| ACF | 04 | Nil |
| Forest Ranger | 06 | Nil |
| Dy. Range | 03 | Nil |
| Forester Grade - I | 40 | Nil |
| Forester Grade - II | 16 | Nil |
| Forest Guard | 91 | Nil |
| U. D. Asstt. | 2 | Nil |
| **Total** | **162** | |

**Table 9.10.1: Daily labour wages prevalent in the past and at present under the Division**

| Sl. No. | Type of labour | Local rates during the year 2000 (`per day) | Local rates during the year 2018/19 (`per day) |
|---|---|---|---|
| 1 | Ordinary labour male & female | 143 | 247 |
| 2. | Skilled labour | 250 | 350 |
| 3. | Mason, Carpenters | 300 | 500 |
| 4. | Wages of Homeguards engaged for protection & patrolling duty. | 250 | 300 |

## 9.10.1 Labour

Unskilled labour is available from forest villages for operation inside the forests. Mostly labourers are available from Adivasi community along the tea garden areas. The current wage as per MGNREGA notification is Rs 152. Details are given in table 9.5 below.

**Table 9.5: Wage Rates as per various schemes in the Division**

| Year | MGNREGA (in Rs/Day) | APFBC (in Rs/Day) | CAMPA (in Rs/Day) |
|---|---|---|---|
| 2009-10 | 88 | -- | -- |
| 2010-11 to 2013 | 114 | -- | -- |
| 2013-14 | 146.00 | 140.00 | 140 |
| 2014-15 | 152.00 | 250.00 | 250 |
| 2015-16 | | 250 | 250 |
| 2017-18 | | 250 | 250 |
| 2018-19 | | 250 | 250 |

# CHAPTER 10
# FIVE YEARS PLANS

## 10.1 Environment

Protection of the environment has to be a central part of any sustainable inclusive growth strategy. This aspect of development is especially important in the Eleventh Plan when consciousness of the dangers of environmental degradation has increased greatly. Population growth, urbanization and anthropogenic development employing energy-intensive technologies have resulted in injecting a heavy load of pollutants into the environment. More recently, the issue assumed special importance because of the accumulation of evidence of global warming and the associated climate change that it is likely to bring. An important feature of any environmental strategy is that environmental objectives require action in several areas, which typically lie in the purview of different ministries. The Ministry of Environment and Forests (MoEF) has the important role of monitoring the development process and its environmental impact in a perspective of sustainable development and to devise suitable regulatory structures to achieve the desired results. While this role is crucial, environmental objectives can only be achieved if environmental concerns are internalized in policy making in a large number of sectors. This would require sharing of Sonitpur East Forest Division responsibility at all levels of government and across sectors with respect to monitoring of pollution, enforcement of regulations, and development of programmes for mitigation and abatement. Regulatory enforcement must also be combined with incentives, including market and fiscal mechanisms to encourage both industry and people in their day-to-day working to act in a manner responsive to environmental concerns, sustainable use of natural resources also requires community participation with a responsible role assigned to the communities for conservation.

## 10.2 Management of Forests under Five Year Plans

Forest is a dynamic living entity that is to be managed with a view to conserve the capital without any depletion, while catering the present needs of the society. As such, the forest planning becomes a multifaceted, consistent and well integratedaffair, where due weightage has to be given to soil and moisture conservation along with satisfaction of the present and future demands of the society and that of the industries utilizing forest produces. The Planning Commission of India, which is approving plans for the most effective and balanced utilization of the Country's resources, for the development of the Country, gave due importance to planning in forestry sector too. Accordingly, special attention was given in the Five Year Plans to enhance the productivity of the Forests by adopting sound schemes, such as rehabilitating the depleted forests and creating valuable man-made forests to cater to the needs of the industrial sector. The successive Five Year Plans have aimed at accelerating the pace of Forestry Development and expansion of the forestry activities in the Country. Forests in the Division have benefitted from these schemes.

## 10.3 Introduction of Fast Growing Plantations

During the Third Plan, initiatives were taken to alter the purely conservative and biological management system hitherto followed to a system in which significance is given to maximum production of raw materials required by the society. To attain this objective, manmade forest plantations of quick growing valuable species were started. Full assistance was given to State Governments to undertake large scale planting of quick growing specie/s, mainly to meet the requirements of paper and pulp as well as cottage industries. In accordance with this proposal, the Forest Department took up a scheme to raise pulpwood plantations like Acacia, Eucalyptus etc within the forest areas with the financial assistance of the Central government. Following are some of the activities where central assistance weregiven for various works.

Integrated Forest Protection (IFP), XII Finance Commission, Regeneration of Degraded Forests (RDF), Survey of Forest Boundaries, Forest Resource Survey (FRS), Forest Consolidation. Some of the Schemes under Plan Head with annual allotment and its expenditure are given in the Table 10.1.

**Table 10.1: Fund received under schemes between 2002-03 and 2018-19**

| Year | Name of Scheme | Fund Utilised (in Rs.) |
|---|---|---|
| 2002-03 | Intensification of Forest Management | 1,00,000 |
| 2003-04 | Plantation in RF | 10,95,000 |
| 2004-05 | Intensification of Forest Management | 5,00,000 |
| 2005-06 | Dev. of other WL area | 80,000 |
| 2006-07 | Dev. of other WL area | 1,00,000 |
| 2007-08 | Dev. of other WL area | 80,000 |
| | Forest Protection | 16,80,000 |
| | **Sub-Total** | **17,60,000** |
| 2008-09 | Dev. Of Other WL area | 10,37,000 |
| | R.F.W | 4,00,000 |
| | Nursery | 3,78,000 |
| | Amenities to staff & labour | 3,20,000 |
| | M.M.A.B.Y | 17,21,000 |
| | **Sub-Total** | **38,56,000** |
| 2009-10 | Dev. Of Other WL area | 3,15,000 |
| | Nursery | 10,50,000 |
| | R.D.F | 5,47,000 |
| | Aminities to staff & labour | 3,25,000 |
| | M.M.A.B.Y | 4,00,000 |
| | **Sub-Total** | **26,37,000** |
| 2010-11 | Dev. Of Other WL area | 4,47,000 |
| | Nursery | 1,50,000 |
| | R.D.F | 7,10,000 |

| | | |
|---|---|---|
| | Aminities to staff & labour | 4,60,000 |
| | M.M.A.B.Y | 4,41,000 |
| | **Sub-Total** | **22,08,000** |
| 2011-12 | Dev. Of Other WL area | 36,73,000 |
| | Nursery Maintenance | 2,44,000 |
| | R. F. W | 16,37,000 |
| | Aminities to staff & labour | 8,35,000 |
| | M.M.A.B.Y | 7,53,000 |
| | A.N.R | 2,85,000 |
| | **Sub-Total** | **74,27,000** |
| 2012-13 | Dev. Of Other WL area | 6,00,000 |
| | M.M.A.B.Y | 4,36,000 |
| | Aminities to staff & labour | 4,40,000 |
| | Nursery | 4,63,000 |
| | R.D.F | 12,58,000 |
| | A.N.R | 4,41,000 |
| | **Sub-Total** | **36,38,000** |
| 2013-14 | Dev. Of Other WL area | 6,00,000 |
| | M.M.A.B.Y | 4,36,000 |
| | Aminities to staff & labour | 4,40,000 |
| | Nursery | 4,63,000 |
| | R.D.F | 12,58,000 |
| | A.N.R | 4,41,000 |
| | **Sub-Total** | **36,38,000** |
| 2014-15 | Repairing Roads | 6,25,000 |
| | Re-generation of Silvi works | 1,96,000 |
| | Man Elephant Conflict | 1,00,000 |
| | Man Elephant Conflict | 3,35,000 |
| | R.D.F | 5,60,000 |
| | M.M.A.B.Y | 89,000 |
| | Dev. Of Other WL area | 1,80,000 |
| | **Sub-Total** | **20,85,000** |
| 2015-16 | APFBC | 95,290 |
| | **Sub-Total** | **95,290** |
| 2016-17 | CAMPA | 24,28,682 |
| | APFBC | 20,99,500 |
| | **Sub-Total** | **45,28,182** |
| 2017-18 | CAMPA | 16,87,000 |
| | APFBC | 25,36,552 |
| | CCS (Project Elephant) | 16,24,062 |

| | | |
|---|---|---|
| | **Sub-Total** | **58,47,614** |
| 2018-19 | CSS (Project Elephant) | 19,76,480 |
| | CAMPA | 1,41,51,425 |
| | APFBC | 7,84,200 |
| | Amenities of staff & labour | 1,25,000 |
| | Office expenditure, Maintenance of Building and Roads & Bridges, Timber Operation, Forest Protection, regeneration, consolidation and other expenses, Assam Arunachal Border maintenance work etc, | 49,93,000 |
| | **Sub-Total** | **2,20,30,105** |

**Table 10.1a. Funds allotted to the division for development works during five-year plan.**

| Development agencies | Year | Development programmes | Total funds allocated (`) |
|---|---|---|---|
| **Bamboo Mission (JFMC)** | **2011-12** | Maintenance of plantation of works creation during 2010-11 = 50 Ha at Selaikhati JFMC | Rs 6,25,000/- |
| | **2012-13** | Creation & Maintenance of plantation during 2012-13<br>i) Bhelodanga JFMC = 50 Ha= Rs 6,25,000/-<br>ii) Madhupur JFMC = 25 Ha= Rs 3,12,500/-<br>iii) Bhimajuli JFMC = 25 Ha= Rs 3,12,500/- | Rs 12,50,000/- |
| | **2013-14** | Nil | |
| | **2014-15** | Nil | |
| | **2015-16** | Nil | |
| | **2016-17** | Nil | |
| | **2017-18** | Nil | |
| | **2018-19** | Nil | |
| **NAP (JFMC)** | **2011-12** | National Afforesation Programme Executed by the following JFMC<br>Bhelondanga,Balijan, Rangagorah, Serelia, Sonapur, Salaikhati, Morisuti,Madhupur, Thandapani, Bihmari, Hatipoti, Kalaguri | Rs 18,56000/-<br>Expenditure during the year 2011-12<br>Rs 6,77,000/- |
| | **2012-13** | National Afforesation Programme Executed by the following JFMC<br>Bhelondanga, Balijan, Rangagorah, Serelia, Sonapur, Salaikhati, Morisuti, Madhupur, Thandapani, Bihmari,Hatipoti, Kalaguri | Expenditure during the year 2012-13<br>Rs 3,78,000/- |
| | **2013-14** | Nil | |
| | **2014-15** | Nil | |
| | **2015-16** | Nil | |
| | **2016-17** | Nil | |
| | **2017-18** | Nil | |
| | **2018-19** | Nil | |
| **CAMPA** | **2011-12** | Creation 1.5 ha nursery at Singlijan under Borgang Range | Rs 722272.00 |

| | | | |
|---|---|---|---|
| | **2012-13** | Nil | |
| | **2013-14** | Construction works ACF qtr, Fr-I Quarter, Fgd Barreak and roads etc. | Rs 83,39,000.00 |
| | **2014-15** | Solar lighting and maintenance of Eco Task Force at Dikal. | Rs 5,53,900.00 |
| | **2015-16** | Nil | |
| | **2016-17** | Construction of Elephant proof trance from Brahmajan to Bangbil<br>Construction of Fr-I qtr at Kalaguri<br>Creation of 1.5 Ha nursery at Bihmari | Rs 24,28,682.00 |
| | **2017-18** | Construction of Forester 1 qtr at Kalaguri<br>Construction of Elephant proof trance Brahmajan to Bangbil<br>Training programme of nursery under CAMPA<br>Construction of fencing post and erraction of fencing at 1.5 Ha nursery at Bihamari | Rs.16,87,000.00 |
| | **2018-19** | Maintenance of 1.5 Ha Nursery at Rangamuri under Pabhoi Range<br>Maintenance of 1.5 Ha Nursery at Bihmari under Borgang Range<br>Publicity, awareness programme for tree planting<br>Mitigation of Human Elephant Conflict<br>25 Ha AR plantation at Bedeti<br>25 Ha AR Plantation at Rangagorah<br>25 Ha AR Plantation at Hatimara<br>Fencing erection work for 25 Ha AR plantation at Naharjan<br>Fencing erection work for 25 Ha AR plantation at Thandapani | Rs. 1,41,51,425.00 |
| **APFBC** | **2013-14** | ANR plantation at Bedeti<br>MHW plantation at Rangagorah<br>NTFP plantation 5 ha at singlijan (adv. Work creation) | Rs 206850.00<br>Rs 173135.00<br>Rs 51713.00 |
| | **2014-15** | Above 40 ha plantation maintenance | Rs 19400.00<br>Rs 37485.00<br>Rs 12495.00 |
| | **2015-16** | Above 40 ha plantation maintenance | Rs 40280.00<br>Rs 41243.00<br>Rs 13767.00 |
| | **2016-17** | 50 ha block plantation (100 days programme) at Rangajan adv work creation. | Rs 20,99,500.00 |
| | **2017-18** | 50 ha block plantation , Balance amount of fencing material Mainteance of 50 Ha Block plantation. | Rs 25,36,552.00 |
| | **2018-19** | Maintenance of 50 Ha Block Plantation | Rs. 7,48,200.00 |

# CHAPTER 11

# PAST SYSTEMS AND MANAGEMENT

## 11.1 General History of the Forest

Till 1874, the Forests of Assam were under the administration of the Bengal Division. The province of Assam was then divided into two Divisions- Lower Assam and Upper Assam. Inspite of the wide geographical distribution of Assam, only two Assistant Conservator of Forests were posted in Assam. Later, the Bengal government appointed 4 ACFs with additional staff for widening the administrative jurisdiction of the Forest Department. Later 6 ACFs were posted in charge of the 6 Forest Divisions. In January, 1873, Gustaw Mann, ACF was appointed, ACF I/C of Assam, which is the beginning of the era of Assam Forest Department. In 1874, the Chief Commissioner for the state of Assam was formed and the Forest Department was transferred from Bengal administration and was placed under Chief Commissioner of Assam. On establishment of the Forest Department, the strength of Forest Department comprised of 1 DCF, 2 ACF, 2 Sub ACF, 881 subordinates. In the same year 5 Forest Division was created - Goalpara, Guwahati, Tezpur, Golaghat and Cachar Division. The incumbency list of DFO is as in ANNEXURE VII

Tezpur Division comprised of Forest Reserve of Darrang District with headquarters at Bhairabighat. Post creation of the department in 1874, many Reserve Forestswere declared. Increase in plantation, research activities, harvesting of forest produce etc., paved way for further expansion of the Forest Department.

In 1909, Western Circle and Eastern Circle were created and the existing 5 Divisions were further subdivided. In 1930 due to reduction in revenue generation sanctioned strength of 35 of the Imperial Forest Service and Provincial Forest Service Officers reduced and only 1 conservator of Forest held charges for both the Circle from 1934-1935. Due to the closure of Imperial Forest Service in 1932, the future prospect of a number of Provincial Forest Service Officers was seriously affected.The new Forest service was created and a new set of Assam Forest Service Rule-1942 was framed. According to Rule 3 of the Assam Forest Service Rule, 1942, the cadre of the service was fixed with the following posts:

**Table 11.1: Cadre and number of positions as per Assam Forest Service Rule, 1942**

| **Posts** | **Number(s)** |
|---|---|
| Conservator | 2 |
| Divisional Forest Officer (including Working Plan Officer, Forest Utilisation Officer, Silviculturist and Botanical Forest Officer) | 14 |
| Indian List Post | 1 |
| Attached officers (Assistant Conservator of Forests) | 4 |
| Leave and Training Reserve | 3 |
| **Total** | **24** |

In 1947 the creation of the post of junior Conservator of Forests was greatly emphasized from the point of view of efficient management of Assam Forest. The Territorial Divisions in 1947 is presented in Table 11.2.

**Table 11.2: Divisions of Assam Forest Department in 1947**

| Sl. No. | Division | Civil District or Territory |
|---|---|---|
| 1 | Darrang | Darning and Balipara Frontier Tract |
| 2 | Now gong | Nagaon and North Cachar Hills |
| 3 | Sibsagar | Sibsagar and Naga Hills |
| 4 | Lakhimpur | Lakhimpur and Tirap Frontier Tract |
| 5 | Sadiya | Sadiya frontier Tract |
| 6 | Cachar | Cachar and Lushai Hills |
| 7 | Khasi & Jaintia Hills | Khasi & Jaintia Hills |
| 8 | Goalpara West | Goalpara District |
| 9 | Goalpara East | Goalpara District |
| 10 | Kamrup | Kamrup |
| 11 | Garo Hills | Garo Hills |

## 11.2 Past System of Management and their Results

In the year 1850, forest management in Assam was visualized for the first time when the collector of Kamrup suggested the Commissioner of Assam that a tax should be levied on timber felled instead of letting the timber trade remain uncontrolled and leaving the ordinary fiscal officers to levy unauthorized case as they were in the habit of doing at that time. The tax proposed was 2.5 annas for each. In addition, the Collector also proposed to establish at the same time a check on the felling so as to ensure natural reproduction of the forest and to prevent deterioration of the forest.

In the year 1874, the then Tezpur Division was formed with an area of 179.6 square mile of Reserve Forests embracing the reserve forests of present Nagaon District also. The Reserve Naduar was constituted in 1876-1877.In the meantime, Gohpur reserve were constituted in the year 1921-1922 the central Range headquarter was shifted to Amaribari. During 1922-23 Tezpur Saw Mill finally closed down. In 1937-38 the coup system of marking under selection and improvement felling was introduced for evergreen forest also where the stocking was good. In September 1973 a consolidation plantation scheme was compiled by Barua with a view to control all the artificial regeneration in the Division and good plantation were raised from that year onward.

### 11.2.1 Jacobs Working Plan

On expiry of Borua's scheme, which was operative from 1935-1940 and which pertains to the R.F under present Darrang West Division the Working Plan for reserves of Darrang Division by Jacob

was introduced. Proper study on important areas was done and defined to prescription to work out and regenerate the forest were laid down. All the economically important areas and compact patches were stock mapped and enumerated. Individual plans were aimed to deal Sal and all other important trees separately. In this working plan as many 10 working circles were constituted but only those working circles which were related to present Sonitpur East Division have been described below in brief.

- **Pansopa Working Circle**: An area of 1,350 acres of Behali reserve with stock of Pansopa (*Michelia montona*) was brought under this working circle. Selection - cum - improvement felling was fixed at 102 and the felling cycle was 17 years. Against 800 Pansopa prescribed for removal only 145 were removed during the plan period. But the regeneration of Pansopa etc. are found very satisfactory now.

- **Kathalsopa Working Circle**: Fixing rotation at 75 years and felling circle at 17 years the Kothalsopa (*Bachylanax speciocarpa*) Forests of Gohpur reserve was brought under this working circle. The system was selection cum- improvement and the yield was regulated by number of trees.

- **Sal improvement Working Circle**: The Sal bearing areas of Balipara, Singrimara, Singri Hills, Garumari and patch of Gohpur was brought under this working circle and were divided into three felling series. The system was improvement felling with assisted natural regeneration of Sal along the fringes of Sal forests where stocking of Sal was not satisfactory. Rotation was fixed at 140 years to produce 6 feet girth Sal. The yield was regulated by areas outlined in the stock map but marking fell short of the prescription of the plan. Earlier forced burning andassisted natural regeneration of 5 acres Sal plantation werealso prescribed to create annual clear felling in non Sal area in Garumari reserve.

- **Softwood Working Circle**:The softwood bearing area of Naduar and Balipara reserve were brought under this working circle. Selection cum-improvement system with compensatory plantation was prescribed. Under this circle Simul was the main species regarding controlling the yield as well as regeneration. The rotation of Simul at 6 feet girth was fixed 45 years. The felling circle was 9 years. One acre of compensatory plantation for every 15 trees marked for felling with a minimum of 50 acre in suitable area was prescribed. But the felling was short of prescription and only 130 acres of Simul plantation was created against prescribed 500 acres during the plan period.

- **Mixed Evergreen and Decidous Working Circle**:This working circle includes a major area of reserves of Darrang Division as working circle area under previous working circle were not included in this working circle. No enumeration was done in detail but enumeration and inspection was done in patches The system of exploitation with minimum girth limits for all species were prescribed and the yield was regulated by number of trees of different species.Compensatory plantations of suitable species was prescribed at the rate of one acre for over 20 trees on any species marked for felling. But during the plan period 800 acres of plantation was created against 3815 numbers of trees marked for felling.

- **Plantation Working Circle**: The working circle was constituted with the remaining evergreen,deciduous, riverine and Savannah forest which were found to be extremely poorly stockedand were considered to regenerate quickly so as to attain best stock in short duration of time.The system was clear felling and planting. No rotation was fixed and the yield was regulated by 1/10$^{th}$ of the areas allotted to each felling series. Altogether there were 15 felling series.

### 11.2.2 Interregnum

The working plan for Darrang Division covers the period from 1940-41 to 1950-51 as complied by Jacob's plan was revised by the Islam for the period from 1961-62 to 1977-78 which already expired on 30/9/78. Thus for a long period the working plan of Darrang was not revised and no record was found in favour of extending the working plan of Jacob for any further period.

In November 1952 the Reserves of North Lakhimpur Sub-Division were transferred to Darrang Division prior to which they were under the DFO, Lakhimpur Division with head quarter at Dibrugarh. The reserve of North Lakhimpur Sub Division were not managed by any plan or scheme.

Islam, while revising the working plan for Darrang Division embraced the reserve of North Lakhimpur Sub-Division also as they were under Darrang Division and made prescription for these reserve also.

In October 1971 the reserve falling under North Lakhimpur sub-Division but administrated by DFO Darrang Division were then again handed over to DFO Lakhimpur Division with headquarters at North Lakhimpur Town created in October 1971 consequent on the creation of separate Dibrugarh District and Lakhimpur District and North Lakhimpur being the head quarter of the later.

### 11.2.3 M M Islam Plan (1961-62 to 1976-77)

This plan was introduced after the expiry of Jacob's plan. The main considerations which dictated the prescription of Islam's plan are as follows –

- Improvement of the growing stock and attainment of Forest.
- Establishment of regeneration of better species and gradual replacement of open types of Forests with plantation of better species
- To ensure maximum sustained yield of Bonsum and other useful species to meet the demand of locality and for trade.
- To ensure sustained supply of Simul and other softwood species to meet the requirement of match Industry.
- To meet the supply of firewood for the local use as well as Military Stations.
- To provide grazing in suitable locality
- Preservation of soil and water

Further, the plan prepared detail stock maps of all the growing stock and classified the Forests into the following types –

- Evergreen and Semi evergreen forest
- Mixed deciduous Forests
- Sal Forests
- Riverine Forests
- Savannah Forests
- Bamboo
- Cane

The evergreen and semi evergreen forests were further classified into the following types –

- Sia Nahor Forests
- Bonsom Amari Forests
- Nahor Forests
- Mekahi Forests
- Jutuli Forests
- Hollock Forests

The following Working Circle were prescribed under this plan –

- Bonsum-Amari working Circle
- Sia Nahor Working Circle (Operation in N. Lakhimpur Range)
- Local Trade Working Circle
- Sal Improvement Working Circle
- Miscellaneous Working Circle
- Plantation Scheme

### 11.2.4 K.C. Das Plan (1980-81 to 1994-95)

K.C. Das Plan was the last plan of this Division which expired in 1994-95. This plan was compiled and approved for fifteen years i.e. 1980-81 to 1994-95. It was found that the field work for the completion of the plan was was started in 1980. However, the field situation as reflected in the plan has undergone tremendous change by the end of the plan in 1994-95. The object of management of the plan was 'Conservation of the existing woodlands, improvement of the growing stock and extension of the woodlands wherever feasible. The following working circles were constituted –

- **Mixed Evergreen Hardwood Plantation Working Circle**: The actual yield/outturn during the plan period could not be assessed due to insufficient data. Due to heavy encroachment the plantations raised in the Division do not exist. However, the basic objective of constitution of this working circle could not be achieved due to rampant encroachments in the PRFs.

- **Softwood Working Circle:** The data on the operation of the circle are not available. The plantation raised with the fast growing species do not exist due to rampant encroachment.
- **Matchwood Plantation Working Circle:** The area under fellng series under this working circle has been encroached. The Panpur RF has been included in the 6th addition to Kaziranga National Park and Gohpur RF is completely encroached. So the management objectives could not be attained.
- **Evergreen Selection Working Circle:** The assessment of the prescriptions given this working cicle could not be assessed. The matured trees prescribed for operartion in NAmeri Block were included in Nameri National Park.The operation of trees in Behali RF was carried out.
- Simul Overlapping Working Circle

## 11.3 Special Works of Improvement Undertaken

Number of works have been taken up on this account. These are summarized in the following section.

### 11.3.1 Communications

Principal rivers in the Division are Brahmaputra, Borgang, Buroi and Dubia. Rivers are not used for transportation of timber. Forest Roads are majorly used for protection duty. The National highway no 52A renamed as NH 15runs on an average 10-12 Km south of the main belt of the reserve and all the roads from the reserves or passing through reserves terminate there. There are many roads leading to Arunachal Pradesh through the Reserve Forest. Some partof road i.e. from national high way to the south boundary of Reserve Forest are constructed and maintained by Assam P.W.D and the remaining portion is constructed/maintained by Assam Forest Department. Arunachal Pradesh government has carried out several road constructions inside Behali RF in violation of Forest Conservation Act 1980. Notice to the effect has already been served to concerned departmental head. Details of existing road network and its status is given in Annexure VII.

Broad gauge line has opened from Rangia to Naharlagun in Arunachal Pradesh and Lakhimpur. Main Stations in Biswanath Chariali and Gohpur. However, the line is not opened for Timber Transport. Neither there is any source for supply of Timber form Sonitpur East Division.

All Forest Roads are maintained by Forest Department. All Forest roads are gravelled. Most of The Forest roads in Naduar and Biswanath Reserve Forests caters to need of Forest Villages and few of them links encroachment settlements. The roads mentioned against Borgang Range are crucial for Forest protection and maintained.

### 11.3.2 Buildings

There are 56 buildings under Sonitpur East Divisions constructed between 1980and 2014. However, the older buildings are not in a habitable state. Total 9 buildings are damaged, 1 partially damaged and 20 needs minor/major repairs. List of building is shown in Annexure VIII. The proposed buildings is shown in Table 11.3.

**Table 11.3: New proposals for Forest Staff Quarter/Forest Camps in the Sonitpur East Division, Assam**

| Range | Name of Building | Location |
|---|---|---|
| Borgang Range | Re-Establishment of Kulaguri Forest Camp | Kulaguri |
| | Barrack at Naharjan | Naharjan |
| | Forest Rest House at Dikal | Dikal |
| | Renovation of Borgang Forest IB | Borgang |
| | Barrack | Hathimora |
| | Singlijan Beat Office building | Singlijan |
| | Borgang Range Office Building | Borgang |
| | Borgang RO quarter | Borgang |
| | Thandapani Forest Camp | Thandapani |
| | Garage | Borgang |
| Division Forest Office Campus | Renovation of Office of DFO, Sonitpur East | Biswanath Chariali |
| | Staff Qtr | |
| | Range Officer Quarter | |
| Pabhoi Range | Borjharoni Forest Camp | Borjharoni |
| | Range Officer Quarter | |
| Diplonga | Panpur Elephant Depredation Camp | |
| | Bordekorai Elephant Depredation Camp | |
| | Range Officer Quarter | |

### 11.3.3 Water Supply and Lighting Facility

The Dikal Forest Protection Camp, Naharjan Forest Protection Camp, Radhasoo Forest protection camp, Hathimora Forest camp, Thandapani Forest Camp and Hathi depot have Solar lighting facility. During 2015-16 Radhasoo FPC, 5 KVA Silent genset is installed, 1.5 hp submersible water pump and 150watt LED flood lights are installed. Electrical connection was given to Bedeti Beat in December 2014.

During 2015-16 Rongaghora Beat Jet Pump with water storage tanks are installed for meeting the needs of Forest Staff. All forest camps have sufficient ground water supply. In Dikal, Naharjan and Radhasoo water table drops during winter. However, installed Tara Pump are sufficient to meet requirement of staff. At Radhasoo FPC, Manual Rotary Boring was done till depth of 130ft and submersible water pump of 1.5 HP was installed to meet the water requirement of staff. Tara Pumps are installed at Naharjan, Bedeti, Dikal. Hand Tube wells are installed at Hathi depot and Hathimora.Proposals for LED Solar Lightings are already submitted for all interior Forest Camps.

11.4 Past Yield, Revenue and Expenditure

The past yield is recorded from Working Plan of Darrang East Division (1980-1981 to 1994-1995). Table 11.4 presents data on outturn from forests between 1980-1981 and 1995-1996.

**Table 11.4: Annual outturn of forest produce from Darrang Division between 1980-1981 and 1995-1996**

| Year | Logs (in $m^3$) | Poles in RM | Sawn Timber (in $m^3$) | Firewood (in $m^3$) | Stone (in $m^3$) | Cane (in bundles) | Thatch (in bundles) | Bamboo (in $m^3$) | Gravel (in cm) | Elephant (in no.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | RF | RF | RF | RF | RF |
| 1970-71 | 6,800 | 1,350 | 680 | 1,870 | 950 | 1,28,150 | -- | -- | 25,800 | -- |
| 1971-72 | 9,870 | 2,450 | 560 | 2,080 | 750 | 1,60,850 | -- | -- | 22,805 | -- |
| 1972-73 | 8,960 | 1,800 | 625 | 3,500 | 810 | 1,99,777 | -- | 12,064 | 39,773 | 113 |
| 1973-74 | 12,670 | 2,200 | 545 | 2,600 | 1,562 | 1,59,170 | 5,58,000 | 26,850 | 48,186 | 81 |
| 1974-75 | 11,500 | 1,600 | 595 | 4,500 | 208 | 37,047 | 8,11,500 | 28,633 | 17,702 | 23 |
| 1975-76 | 5,980 | 1,300 | 610 | 2,200 | 1,475 | | | | | |

## 11.4.1 Past revenue and expenditure

The figures of total expenditure in Darrang Division is furnished below in Table 11.5

**Table 11.5: Statement on past revenue (1970-71 to 1974-75) of Sonitpur East Division**

| Year | Revenue | Expenditure | Surplus or Deficit | Percentage of Surplus or Deficit | Remarks |
|---|---|---|---|---|---|
| 1970-71 | 21,99,474 | 8,98,835 | 13,00,638 | 59.12% | Pior to 1970-71 Darrang Division comprises the area of part of present Lakhimpur Division i.e present North Lakhimpur Sub-Division |
| 1971-72 | 19,28,197 | 10,69,392 | 58,804 | 44.53% | |
| 1972-73 | 18,08,668 | 9,33,586 | 8,75,082 | 48.44% | |
| 1973-74 | 18,17,836 | 9,45,803 | 8,72,033 | 47.97% | |
| 1974-75 | 17,31,238 | 12,44,052 | 4,87,158 | 28.13% | |

Annual Timber sale on tender from Sonitpur East Division for the year 2008-09 to 2014-15 (In terms of cubic metre) is presented in Table 11.6.

### 11.4.1.1. Volume of outturn recovered (from illegal felling), revenue thereof and expenditure incurred in sectioning, debarking to depot etc.

The volume of outurn recovered w.e.f 2008 to 2018 is tabulated in Table 11.4.1. The annual timber sale by volume is given in Table 11.4.1a. The sale volume is higher than average during 2015-16 due to clear felling of roadside trees felling during widening of National Highway during 4 lanning project . The outturn also includes siezed timber from interstate illegal transport and from other Divisions .

**Table 11.4.1: Volume of out turn recovered in Division for the last 10 year period (2008-09 to 2017-18).**

| Year | Volume (cu.m.) | Government value (`) |
|---|---|---|
| 2008-09 | 79.56 | 318080 |
| 2009-10 | 256.00 | 1023488 |
| 2010-11 | 136.739 | 495549 |
| 2011-12 | 469.712 | 1253687 |
| 2012-13 | 110.941 | 290418 |
| 2013-14 | 81.449 | 331830 |
| 2014-15 | 78.777 | 294278 |
| 2015-16 | 175.11 | 204468 |
| 2016-17 | 46.005 | 123432 |
| 2017-18 | 176.496 | 705631 |
| 2018-19 | 118.935 | 80808 |

**Table 11.4.1a :Annual Timber sale by volume on tender from Sonitpur East Division for the year 2008-09 to 2018-19**

| Year | Volume (in $m^3$) |
|---|---|
| 2008-2009 | 241.576 |
| 2009-2010 | 815.521 |
| 2010-2011 | 365.195 |
| 2011-2012 | 493.791 |
| 2012-2013 | 181.535 |
| 2013-2014 | 119.529 |
| 2014-2015 | 565.224 |
| 2015-2016 | 3815.651 |
| 2016-2017 | 534.374 |
| 2017-2018 | 469.772 |
| 2018-2019 | 161.47 |

## 11.4.2. Statement of revenue and expenditure from 2008-2009 to 2017-2018

The forest department generates revenue through sale of wind fallen trees, timber seized from forest offences and trees felled due to widening of roads or other developmental works. Further, revenue is generated from minor minerals such as sand, gravel and boulder etc.

All mahal operations and government permit were stopped due to due to lack of Environmental clearance from State Environmental Impact Assessment Authority of Assam. **Assam Minor Mineral Concession Rules 2013** was notified vide No. PEM 83/2009/Pt-1/627 Dated the **16th March 2013** and subsequently all notified Minor Mineral Contract area were put up for sale on open tender. Thus, it is expected that revenue generation shall increase once all minor mineral contract area is settled after due environmental clearance from State Environment Impact Agency.

**Table 11.4: Revenue and expenditure of the last 10 year period with effect from 2008-09 to 2017-18 under Division.**

| Year | Revenue (In Rs) 8782/103/101/800 | Expenditures | |
|---|---|---|---|
| | | Non-Plan Expenditure (In Rs) | Plan Expenditure (In Rs) |
| 2008-2009 | 33,28,000.00 | Rs 27,55,000.00 | Rs 64,33,700.00 |
| 2009-2010 | 70,44,000.00 | Rs 19,73,000.00 | Rs 45,07,560 |
| 2010-2011 | 62,88,000.00 | Rs 23,85,000.00 | Rs 36,20,500.00 |
| 2011-2012 | 58,87,000.00 | Rs 25,71,000.00 | Rs 46,54,083.00 |
| 2012-2013 | 25,60,250.00 | Rs 26,83,800.00 | Rs 65,07,183.00 |
| 2013-2014 | 10,09,000.00 | Rs 31,49,400.00 | Rs 66,60,157.00 |
| 2014-2015 | 15,37,000.00 | Rs 25,71,500.00 | Rs 16,82,610.00 |
| 2015-2016 | 1,34,02,406.00 | Rs 22,77,000.00 | Rs 18,00,000.00 |
| 2016-2017 | 7,46,94,059.00 | Rs 30,36,000.00 | Rs 13,96,600.00 |
| 2017-2018 | 7,54,69,915.00 | Rs 25,69,000.00 | Rs 39,13,063.00 |

# CHAPTER 12

# STATISTICS OF GROWTH AND YIELD

## 12.1 Statistics of Growth

In the Working Plan of this division by M.M. Islam, IFS (1961-62 to 1976-77) data on the rate of growth of Sal has not been recorded. Further, it has been mentioned in para 389 and 390 that 4,031 Sal trees and 8,940 poles were sacrificed due to heavy storm damage of 1957 and military operation of 1960 from Balipara RF in addition to 983 Sal trees from Singlimara. The plantation plots (except from1942) were generally of 2 acres, which could not be identified now. The data/recorded in the Jacob's plan for Sal for the division could not be relied upon since the same have been advised to be used in so far as they are related to trees over 3'-6' in girth originally.

### 12.1.1 Plantation Crop

From the growth measurement carried out during the field works in the plantation of known age for different species in the Sonitpur East Division, the average diameter was found out and plotted against the age (graph III) The average diameter of various species in the Division is presented in Table 12.1a.

Figure 12.1 : Graph showing the mean annual increment (m.a.i.) and current annual increment (c.a.i.) of *Morus laviegata* (Bola) in Sonitpur East division.

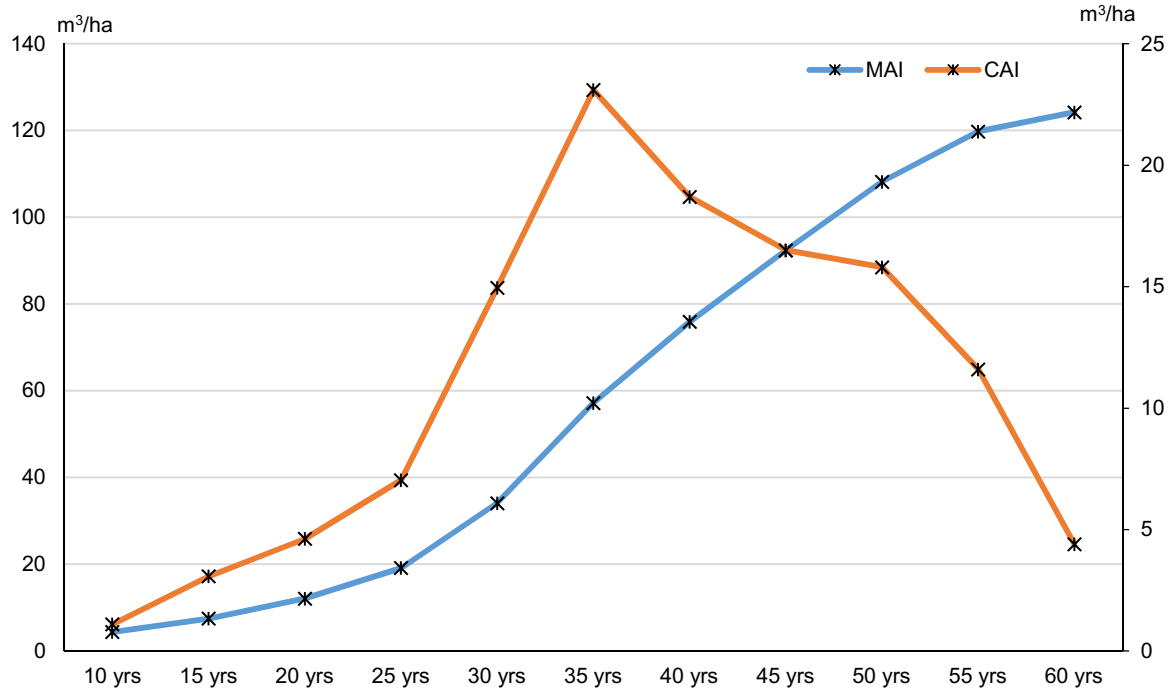
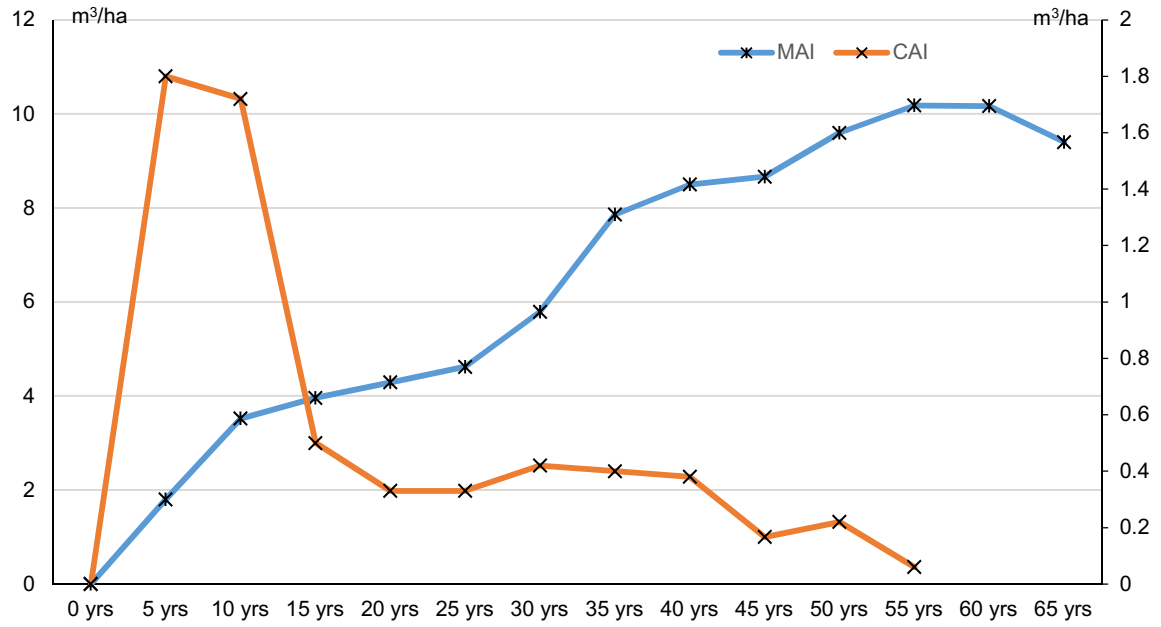



Figure 12.2 : Graph showing the mean annual increment (m.a.i.) and current annual increment (c.a.i.) of *Terminalia myriocarpa* (Hollock) in Sonitpur East division.




Mean Annual Increment (m.a.i.) is the volume of the tree divided by its age. It is difficult to measure increment every year, so trees are usually measured after every 5 years, and its mean is called Current Annual Increment (c.a.i.). Figure 12.1 shows m.a.i. and c.a.i. curves plotted against its age of *Morus leviegata*. The m.a.i. shows a smooth curve which rise steadily and reaches its highest point, whereas, the c.a.i. remains above m.a.i. and reaches a peak earlier than m.a.i. The point at which c.a.i. and m.a.i. intersects is the economic rotation of the species. Similarly, figure 12.2 shows m.a.i. and c.a.i. curves plotted against its age of *Terminalia myriocarpa*. The m.a.i. shows rise and reaches its highest point. However, faster rise is observed upto 10 years and again from 30-35 years of the crop. At other time points the rate of rise is slower. The c.a.i. remains above m.a.i. and reaches a peak earlier than m.a.i. The intersection points is at a much earlier age than the normally anticipated years perhaps is due to acute anthropogenic disturbances within the *Terminalia* stand.

**Table 12.1a: Average diameter of different species growing in Sonitpur East Division, Assam**

| Age (in year) | Sal | Hollock | Sopa | Teak | Ajar | Pichola | Remarks |
|---|---|---|---|---|---|---|---|
| 5 | 2.00 | 3.0 | 7.0 | 5.6 | 2.4 | 3.0 | |
| 10 | 6.0 | 6.6 | 14.8 | 12.0 | 5.2 | 6.2 | |
| 15 | 11.6 | 11.0 | 20.0 | 18.0 | 7.8 | 9.2 | The figures underlined are |
| 20 | 16.1 | 15.0 | 24.2 | 23.0 | 10.4 | 12.0 | taken from the extended |
| 25 | 20.4 | 19.0 | 27.8 | 27.8 | 13.0 | 14.2 | rotation on the curve and |
| 30 | 24.0 | 22.6 | 29.8 | 32.4 | 15.0 | 16.4 | hence do not represent |
| 35 | 26.2 | 27.6 | | 37.6 | 18.4 | 18.6 | the actual diameter |
| 40 | 28.00 | 28.3 | | 40.8 | 21.8 | 21.2 | |
| 45 | | 30.2 | | 44.6 | | | |

The average height measured during the field work in plantations of known age were similarly plotted against the age and a number of curves (Graph IV) were obtained. The average height at different age of various species is furnished in Table 12.1b.

**Table 12.1b: Average height of different species in the Sonitpur East Division, Assam**

| Age (in year) | Sal | Hollock | Sopa | Teak | Azhar | Pichola |
|---|---|---|---|---|---|---|
| 5 | 1.5 | 2.3 | 5.0 | 4.3 | 1.0 | 1.4 |
| 10 | 2.7 | 4.8 | 14.2 | 8.5 | 1.8 | 2.5 |
| 15 | 3.9 | 8.3 | 20.0 | 12.3 | 2.5 | 3.4 |
| 20 | 8.5 | 4.0 | 25.0 | 15.6 | 3.1 | 4.0 |
| 25 | NR | 14.0 | 28.2 | 18.7 | 3.5 | 4.7 |
| 30 | NR | 20.3 | 30.7 | 21.1 | 4.1 | 5.6 |
| 35 | NR | 24.8 | NR | 22.5 | 5.3 | 6.8 |
| 50 | NR | 28.3 | NR | 23.5 | 7.9 | 8.0 |

## 12.2 Statistics of forest carbon stock

The forest carbon content in different compartmentsis given in Table 12.2a.

**Table 12.2a: Compartment wise total carbon content (tons) of Sonitpur East Division, Assam**

| Reserve Forest | Compartment | Carbon Content (tons) |
|---|---|---|
| Behali Reserve Forest | SER3C1 | 4,523.45 |
| | SER3C10 | 10,423.11 |
| | SER3C11 | 9,815.98 |
| | SER3C12 | 7,825.28 |
| | SER3C13 | 7,753.66 |
| | SER3C14 | 3,496.08 |
| | SER3C15 | 21,466.82 |
| | SER3C16 | 3,237.71 |
| | SER3C17 | 3,643.71 |
| | SER3C18 | 15,202.34 |
| | SER3C19 | 4,159.10 |
| | SER3C2 | 1,203.61 |
| | SER3C20 | 10,013.72 |
| | SER3C21 | 2,934.86 |
| | SER3C22 | 1,786.29 |
| | SER3C23 | 4,071.79 |
| | SER3C25 | 862.23 |
| | SER3C3 | 5,887.62 |
| | SER3C4 | 2,300.69 |
| | SER3C5 | 8,600.75 |
| | SER3C6 | 6,050.15 |
| | SER3C7 | 8,083.43 |
| | SER3C8 | 9,518.34 |
| | SER3C9 | 2,794.50 |
| Biswanath Reserve Forest | SER2C1 | 7,384.87 |
| | SER2C11 | 821.53 |
| | SER2C12 | 3,114.50 |
| | SER2C16 | 2,685.36 |
| | SER2C17 | 881.83 |
| | SER2C2 | 521.12 |
| | SER2C4 | 2,579.57 |
| | SER2C5 | 1,451.46 |
| | SER2C8 | 1,083.71 |
| Gahpur Reserve Forest | SER5C1 | 32.23 |
| | SER1C13 | 4,544.05 |
| | SER1C14 | 411.35 |
| | SER1C21 | 956.49 |
| | SER1C8 | 749.45 |
| Singlijan Reserve Forest | SER4C1 | 16,384.37 |

# PART II

# FUTURE MANAGEMENT

# CHAPTER 1
# BASIS OF PROPOSAL

The working plan of Sonitpur East Division is a technical document prepared to manage the forest under Sonitpur East Division on sustainable basis. The overall objective of the working plan is to increase area under forest cover, enhance biodiversity, improve growing stocks and maintain the environmental stability in the areas under the Division. The working plan is aimed at meeting the national and global needs in general and necessity of the local people. With ever increasing population and encroachment of about 80% of the Reserve forest area in Sonitpur East Division, the primary objective of management of forest covered by this working plan would be conservation and protection of the exisiting woodlands, improvement of growingstock and extension of the woodlands wherever feasible.The protection of Behali Reserve Forest and improving the connectivity with corridor Sixth addition of Kaziranga National Park. The objectives are framed within the ambit of National Forest Policy1988. Sustainable management of forests and its biodiversity by keeping in mind ecological, economic and social dimensions is the key priority. For plan preparation and implementation of the plan it is necessary to examine the relevant policies, Laws, Rules, Court orders and various administrative orders issued by the Government of India and Assam, so that all the prescriptions are brought under the umbrella of the existing policy framework.

## 1.1 The National Forest Policy

The National Forest Policy was first enunciated in 1894 and was revised in 1952, after independence. It was again revised in shape of the National Forest Policy 1988, presently in force.

The basic objectives and thrust areas enshrined in the National Forest Policy 1988 are given as under:

- Maintenance of environmental stability through preservation, restoration of the ecological balance that has been adversely disturbed by serious depletion of forests.
- Increasing productivity of forests to meet essential national needs.
- Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, which represents the remarkable biodiversity and genetic resources of the country.
- Checking the soil erosion and denudation in the catchment area of the rivers, lakes and reservoirs in the interest of soil and water conservation for mitigating flood and droughts and for retardation of siltation of reservoirs.
- Increasing the forest/tree cover in the country through massive afforestation and social forestry programmes, especially, on all denuded, degraded and unproductive lands.
- Meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations.

- Encouraging efficient utilization of forest produce and maximizing substitution of wood.
- Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on the existing forests.
- The principal aim of the Forest Policy is to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life forms, human, animals and plants. The derivation of direct economic benefit is secondary to this principal aim.

Essentials of Forest Management embodied in the National Forest Policy 1988 are mentioned below:

- Existing forests and forest lands should be fully protected and their productivity improved. Forests and vegetative cover should be increased rapidly on hill slopes, in catchments of the rivers, lakes, reservoirs, ocean shores, on semi-arid, arid and desert tracts.
- For conservation of biodiversity, network of national parks, sanctuaries, biosphere reserves and other protected areas should be strengthened and extended adequately.
- Provision of sufficient fodder, fuel and pasture, especially, in areas adjoining to forest is necessary in order to prevent depletion of forests beyond sustainable limit.
- Minor forest produce provides sustenance to the tribal population and other indigenous population residing in and around the forests. Such produce should be protected, improved and their production should be enhanced with due regard to generation of employment and income.
- Schemes and projects which interfere with forests on the steep slopes, catchments of rivers, lakes and reservoirs, geologically unstable terrain and other ecologically sensitive areas should be severely restricted.
- No forest should be permitted to be worked without the approved working plan, which should be in keeping with the National Forest Policy and directions of the Hon'ble Apex court.
- The rights and concessions enjoyed by the tribal and other rural poor living within and near the forests should be fully protected. Their domestic requirements of fuel wood, fodder, minor forest produce and construction timber should be the first charge on forest produce.
- Inculcate in the people, a direct interest in forests and make them conscious of the value of forests, wildlife and nature in general through forest extension, education and training.

## 1.2 National Forestry Action Plan

Having about 2.5% of world's geographic area, India at present is supporting 16% of world's human population and 18% of cattle population. About 41% of forest cover of the country has already been degraded and dense forests are losing its crown density and productivity continuously. A large number of India's livestock population graze in the forests causing serious damage to soil, ground flora, including regeneration, and productivity of the forests. The use of forests beyond its carrying capacity and encroachments are the main cause of continuous degradation of forests.

To reverse the process of degradation and for sustainable development of forests, the Government of India has prepared National Forestry Action Plan (NFAP), a comprehensive strategic programme. These programmes are as follows:

- Protect Existing Forest Resources
- Improve Forest Productivity
- Reduce Total Demand of Forest Produce
- Strengthen Policy and Institutional Framework
- Expand Forest Area

Strategy:

- For sustainability and productivity of forests, the production to be increased at least 3 to 5 $m^3$ per ha per year by promoting appropriate silvicultural treatments.
- Hygiene of forests to be improved through suitable silvicultural practices.
- Efforts to be made to bring one-third geographic area of the country under forest and tree cover by plantations on all categories of wastelands and agro forestry.
- Plantations on non-forest wastelands to be done mostly with fuel wood species as 70% of the wood produced from forests are used as fuel wood. Species of pulpwood and other industrial wood may be encouraged in farm forestry.

## 1.3 National Wildlife Action Plan

Ministry of Environment and Forests, Govt. of India has formulated National Wildlife Action Plan (2002-2016) based upon the decision taken in the 21$^{st}$ meeting of the Indian Board of Wildlife held on January 2002. National Wildlife Action Plan outlined the strategies and action points for conservation of wildlife.

Strategy:

- Strengthening and Enhancing the Protected Area Network,
- Effective Management of Protected Areas,
- Conservation of Wild and Endangered Species and Their Habitats,
- Restoration of Degraded Habitats outside Protected Areas,

- Control of Poaching, Taxidermy and Illegal Trade in Wild Animal and Plant Species,
- Monitoring and Research,
- Human Resource Development and Personnel Planning,
- Ensuring People's Participation in Wildlife Conservation,
- Conservation Awareness and Education,
- Wildlife Tourism,
- Domestic Legislation and International Conventions, and
- Enhancing Financial Allocation for Ensuring Sustained Fund Flow to the Wildlife Sector.

## 1.4 Court Judgments and Related Committees

Hon'ble Supreme Court passed an Order in Writ petition (202 of 1995) in the matter of "Godavarman Thirumulpad" V/s Union of India. The order speaks about the felling of trees in all forests is to remain suspended except in accordance with the working plans of the State government, as approved by Central government. Hon'ble Supreme Court passed an order on 22.09.2000 in Inter-Locutary application No 424 saying that regeneration of forest should be commensurate with felling carried out under a working plan. To achieve this, it must be ensured that no felling be carried out without allocating necessary fund to regenerate the felled areas. In the event of failure in regeneration or any shortfall in carrying out regeneration operation no further felling shall be undertaken until the failure/shortfall is made up.

Following the directions of Hon'ble apex court in their order dated 22.09.2000 in IA No 424; a core group was constituted to decide the extent of felling. As per these Orders, felling are to be carried out by the State Governments only after obtaining the permission from core group constituted by the Ministry of Environment and Forests, New Delhi.

## 1.5 Peoples' Participation through JFM

Joint Forest Management approach was adopted for degraded forest area of the State vide GR dated 16 March 1992. The programme was extended to Good Forest areas vide Govt. Resolution dated 25/4/2003. The latest revision in G.R. has been made on 5th October 2011 and 10$^{th}$ July 2012. All JFM activities should be in consonance with the broad prescriptions of the Working Plan. The Micro plans are to be dovetailed with the prescriptions of the Working Plan.

## 1.6 The Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 and the Amendment, 2012

After the enactment of this Act, the administration of the forest will be greatly influenced, as this act recognizes several individual as well as the community rights over the forest land and its produce. All the provisions of this Act will have to be taken into consideration while managing the forest.

## 1.7 The Biological Diversity Act, 2002

This Act aims to provide for Conservation of biological diversity and sustainable use of biological resources. These issues are reflected in various Working Circles and the prescriptions made there under

- Assam Forest Regulation 1891 (Amended 1995).
- The Assam Wildlife Protection Rule 1997.
- Forest Conservation Act 1980.
- The Biological Diversity Act-2002.
- Assam Bio-diversity Rule-2010.
- The Wood Based Industries (Establishment and Regulation) Rules 2000.
- The Cattle Trespass Act 1871.
- The Assam Forest (Removal and storage of produce) Regulation Act-2000.
- The Assam (Control of Felling and Removal of trees from Non-forest Land) Rules 2002.
- The Assam Joint (Peoples Participation) Forestry management Rule-1998.
- The Assam Minor Mineral Concession Rules-2013.
- Other Special Acts/ Regulation/ Rules the Forest Department under Indian Penal Code, Criminal Procedure Code on arrest/ forwarding/ investigation of the offences.

## 1.8 Objectives of Management

The national goal is to have a minimum of one-third total geographical area of the country under tree cover. Effort should focus for consolidation and preservation of the existing forest cover and increase their productivity. The specific general objectives of this working plan include:

- Conservation and protection of Semi Evergreen forests of Behali Reserve Forests and Singlijan Reserve Forests and consolidation of forest area in Naduar, Biswanath and Behali Reseve Forests.
- Settlement of rights if any under Scheduled Tribes and Other Traditional Forest dwellers Act 2006 and delineating existing forest areas in Reserve Forests.
- To Promote healthy relationship with fringe forest villagers by intensification of Joint Forest Management activities and addressing their livelihood issues
- To Conserve and improve quality of growing stockin fringe areas of forest.
- To Protect and Conserve Behali and Singlijan Reserve Forest as important wildlife habitat.
- To promote ecotourism activities in Behali Reserve Forest and Naduar Reserve Forest areas.

- To Ensure that there is no further encroachment from Arunachal Pradesh in inter state border areas.

### 1.8.1 Dynamics of forests and stands

The gradual development of tree and stand structures influences other life processes in the forests. Given that stand structure influences a broad range of ecosystem functions, we concentrate on its effect on structural dynamics, growth and yield.The Forests of Sonitpur East Division largely constituted by evergreen and semi evergreen forest.

The important value index curve (Figure 13.1.1a) worked out clearly shows that, ***Mesua ferrea, Tetrameles nudiflora, Castanopsis indica, Lagerstroemia speciosa, Bauhinia purpurea Magnolia insignis, Stereospermum chelonoides, Magnolia pterocarpa, Sterculia villosa,Pterospermum acerifolium, Gmelina arborea, Bombax ceiba*** etc.are other important species.

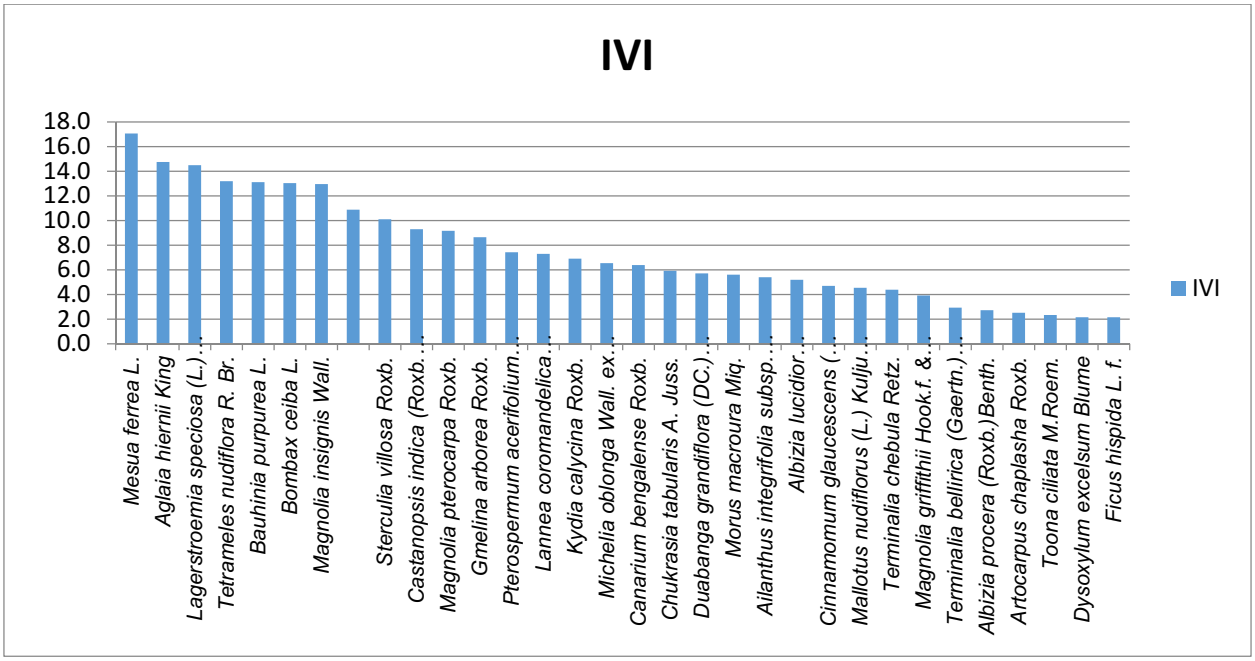



**Figure 1.1: Importance value index of Sonitpur East Division**

In order to attain the above objective, the method of treatment would be –

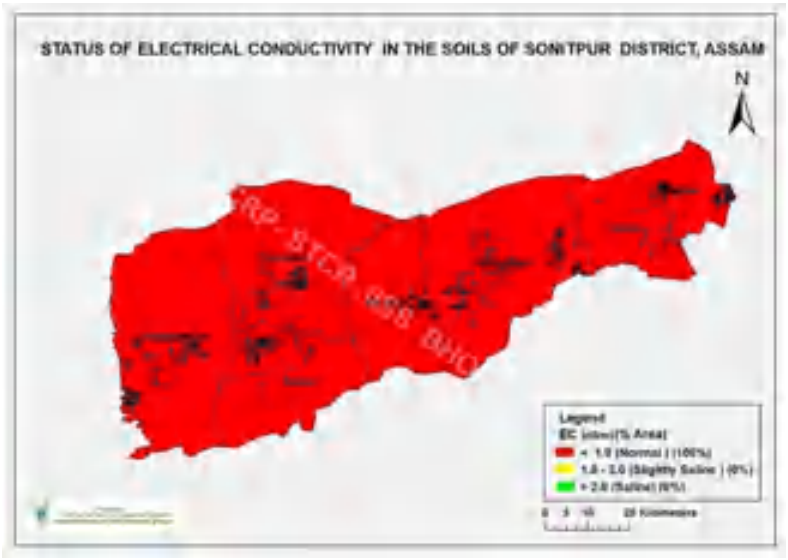
- Assisted Natural Regeneration and Artificial Regeneration in specifically earmarked blocks in the Semi Evergreen Forests is proposed under Plantation and Improvement Working Circle.
- Compartments adjoining the villages and having dependence on forest for livelihood needs shall be brought under Joint Forest Management Working Circle and NTFP Working Circle.

- Allthe compartments of Behali and Singlijan Reserve forests shall be allotted to Wildlife Working Circle and Forest Protection Working Circle.
- Settlement of rights under ScheduledTribes and Other Traditional Forest Dwellers Act 2006 and bringing existing land under Community and Forest Rights Act Working Circle.

## 1.9 Forests and Soils

Healthy soil is a one vital component of the forest ecosystem. Soils apart from providing anchorage, water and nutrients its helps regulate important ecosystem processes, nutrient uptake, decomposition. Soils provide an important filtering and buffering action that protects the forest ecosystem from pollution and damage. Soil is one of the major source or sink of carbon dioxide and other greenhouse gases. Reducing soil erosion is beneficial for maintaining fertility. Soil microorganisms helps in retention, breakdown and incorporation of organic matter and influence soil structure and porosity. Soil microbial activity is directly linked to carbon and nutrient cycles and breakdown of pollutants. The Soil fertility Map as in Fig. 1.2, Fig 1.3, Fig 1.4.

Fig 1.2. and Fig 1.3



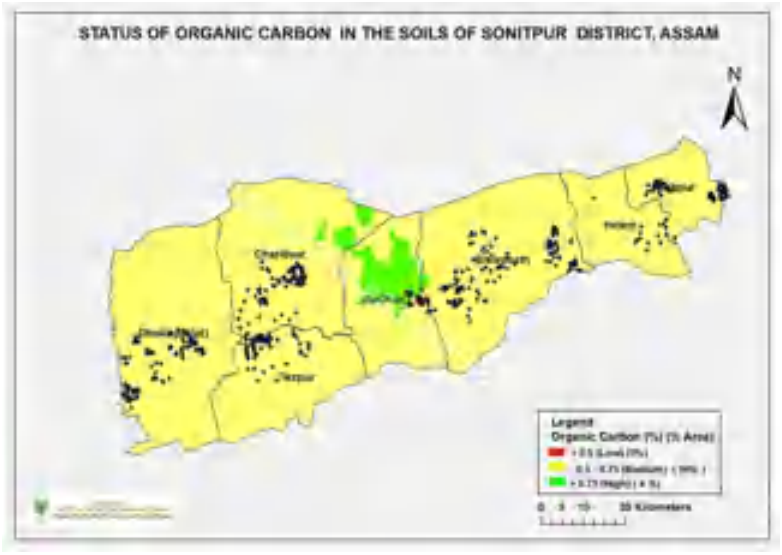



Fig 1.3.

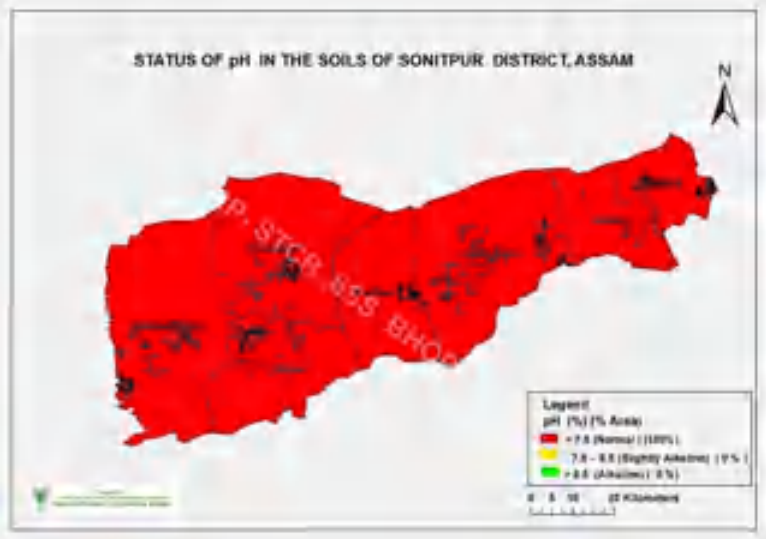
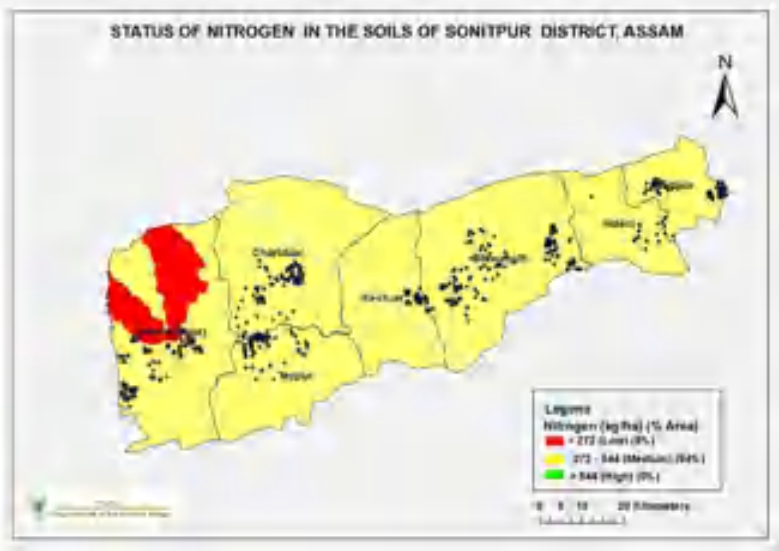



Fig 1.4




A decline in levels of soil organic matter can lead to an increase in the susceptibility of soil to compaction, lower infiltration rates, and perhaps increased run-off or erosion. Climate change projections of rising temperatures could accelerate mineralization rates and soil carbon loss. Existing anthropogenic pressure on the Division in the means of encroachment, illegal felling and illegal firewood collection, illegal grazing, along with the erratic precipitation and sudden high surface runoff from the Khasi and Jaintia hills are further washing away the top soil almost very quickly. All these effects will have implications for the nutrient and carbon balance of the forest soils in the Division. The present working plan of the Sonitpur East Division through sustainably managed tree cover, treatments in the form of regeneration proposes to control soil erosion and conserve soil moisture for

enhancing the population of soil microbes for soil fertility rebuilding. For improving forest soils through the working plan for Sonitpur East Division the following will be ensured –

- The quality of forest soil should be protected for its physical, chemical and biological properties.
- Soil's productive potential should be safeguard through enhancing soil fertility in the Division.
- All planned and managed departmental operations to avoid damage to soil structure and function, in cases where damages occur, restoration measures should be undertaken immediately to mitigate adverse effects.
- The environment adjacent to forests should not be subject to adverse effects due to water run-off, contamination or erosion arising from forest management practices.
- Cultivation affects run-off and accelerates soil erosion and causes loss of soil carbon and increasing greenhouse gas emissions thereby reducing soil carbon stocks. Cultivation and drainage pose a particular risk of depleting the organic content of humus containing soils through soil drying and oxidation, so cultivation should not be allowed inside the reserve forest.
- Movement of heavy machineries should not be allowed inside the RF's to avoid soil compaction. It should be ensured that soil compaction due to any anthropogenic causes be avoided, restoration measures like planting of suitable flora to restore and mitigate adverse effects be initiated.
- Sites near the roads and settlements, encroachment areas, weather conditions should be taken into consideration to carry out any operations.
- Clearfelling is strictly prohibited in the Division.
- Forest roads and drainage is to be designed and functions independently from the main forest drainage network.
- Burning of forest residues is to be discouraged.
- Stand structures and silvicultural approaches across the forest needs to be maintained.
- Watershed management approach, to be adopted for protection in the forest Division.

### 1.9.1 Forests and water

Forest have important role on stream flow. Forest influences energy and precipitation distribution affect rates and transpiration, evaporation and soil freezing and patterns. The evaporation of precipitation intercepted by tree surfaces reduces the rate of transpiration, thereby reducing the loss of soil moisture transportation during wet conditions. The proportion of time that canopies are wet can thus strongly influence total annual losses of water by evapotranspiration. The process of evapotranspiration affects streamflow by reducing the volume of water available for run-off and by increasing the ability of the soil to temporarily store and delay runoff.

Forested watersheds offer higher-quality water than watersheds under alternative land uses, if only because virtually all the alternatives agriculture, industry and settlement - are likely to increase the amounts of pollutants entering headwaters. Quality can also be higher because forests sometimes help to regulate soil erosion and reduce sediment load, although the extent and significance of this function will vary. Undisturbed forest with understorey, leaf litter and organically enriched soil is the best watershed land cover for minimizing erosion by water. Impacts of forests are influenced by many factors including the age and species of the trees, the amount of watershed under forest, soil, climate and forest management practices. The contributions of forests in providing clean water depend to a large extent on individual conditions, tree species and age, soil types, climate, management regimes and needs from the catchment.

Rainfall, being the primary source of all water. Disposal of rainwater by the vegetation through interception by the plant canopy and its infiltration into the soil, parts of which go to deep percolation, to streamflow and to channel flow, influences the moisture regime both within and outside the soil profile. Removal of timber reduces groundwater transpiration and rainfall interception, which often leads to increased runoff within zones devoid of trees as a result of impermeable surfaces in the watershed due to soil compaction and reduced soil water storage capacity. Infiltration rates vary through different forest floors. The presence of abundant leaf litter on the forest floor results in high infiltration rates as compared to other land uses.The infiltration rate is lower under agricultural land as compared to other land uses, while under forest land it is highest. Keeping this in consideration it is essential that forest of this Division is so managed that the hydrological regime is improved.

### 1.9.2 Forest biodiversity

The forest of Sonitpur East Division is an important repositories of terrestrial biological diversity in the whole state of Assam. The forest of this Division offer very diverse habitats for plants, animals and micro-organisms. Biological diversity is the basis for a wide array of goods and services provided by forests. Forest biological diversity is one of the seven thematic elements of the concept of Sustainable Forest Management approved by the General Assembly of the UN in 2007, together with the Non-Legally Binding Instrument on All Types of Forests. Presence of biological diversity in the forest, the working plan advocates that The Biological Diversity Act 2012 be strictly followed to provide conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental thereto. For biodiversity conservation and preservation, following strategy will be adopted –

- Promotion of native species to develop habitat unique to the Division.
- Initiate research to understand the growth and dynamics of endemic species found.
- Conducting biodiversity assessments and monitoring of density, abundance, richness and diversity of species per unit area.

### 1.9.3 Climate and forests

The amounts of biomass and carbon seem simply to reflect the extent of forests and their growing stock. A more meaningful understanding emerges in the context of the global carbon cycle, climate change and related international agreements such as the United Nations Framework Convention on Climate Change (UNFCCC). Since half the dry weight of biomass is carbon.

The expanse of forest resources is the foremost thematic elements characterizing sustainable forest management. The overall goal of maintaining adequate forest cover and stocking of various forest types and characteristics including on other areas as trees outside forests to sustain the social, economic and environmental objectives related to forestry in the Division. The primary goal through this working plan is to reduce unplanned deforestation and forest degradation and restore and rehabilitate any degraded forest, manage forest sustainably and enhance the carbon sequestration in the forest of Sonitpur East Division thereby contributing to moderating the global climate. the proportion of land area under forests is also used in the Millennium Development Goals indicator process (United Nations, 2005). However, as was observed in Forest Resource Assessment (FRA) 2000 carried out by Food and Agriculture Organization, the significance of forest area as a single indicator of forest development has often been overemphasized, particularly in the public debate, where other aspects of forest resources feature less prominently. The most commonly quoted result from global forest resources assessments continues to be the global net loss of forest area. However, it is important to note that many other parameters and scales must be considered in determining the relevant trends in the extent of forest resources. Growing stock and carbon storage may be considered equally important parameters, as they indicate whether forests are degraded and to what extent they mitigate climate change. Further, the net loss of forest area is not in itself sufficient to describe land-use dynamics that include both loss of forests due to deforestation and natural disasters and gains in forest area from planting or natural expansion.

The forests occupying niche areas of the Division, are affected by climate change e.g. changes in temperature and rainfall patterns, etc. Although the impact may be beneficial such as growing adapted short rotation forestry species however existence of unique habitat for specific endemic flora and fauna that thrives in the Division, it is perceived that the impact will be a great concern. Though forests also influence climate and the climate change process. They absorb carbon in wood, leaves and soil and release it into the atmosphere when burned, for example during forest fires or the clearing of forest land.

The Kyoto Protocol entered into force in the same year that this assessment was carried out. The protocol and the UNFCCC oblige all member countries to regularly assess and report national greenhouse gas emissions, including emissions and removals of carbon reflected as stock changes in forests. Inter Governmental Panel on Climate Change (IPCC) has created guidelines, methods and default values for all parameters needed to assess carbon stocks and their changes in forests. It has thus furnished all countries with the means of estimating and reporting carbon stocks, greenhouse gas emissions and removals, irrespective of the availability of country-specific data. Striving for synergies and for streamlined country reporting to international organizations, FAO incorporated the IPCC guidelines on assessment of carbon stocks in forests into its guidelines for country reporting for FRA

2005. Reporting on carbon stocks in forests under the UNFCCC, the Kyoto Protocol and to FAO may overlap, but are not necessarily identical.

For FRA 2015, countries reported carbon stocks for the years 1990, 2000, 2005, 2010 and 2015. The UNFCCC mandates reporting carbon stock changes. However, in one of its methods, IPCC estimates net emissions of carbon as the difference between periodic carbon stocks. In a further difference, UNFCCC members report on 'managed forests' only. The convention does not define 'forest' or managed forest. However, IPCC considers managed forests as "all forests under direct human influence" or "forests subject to the process of planning and implementing practices for stewardship and use aimed at fulfilling relevant ecological, economic and social functions" (IPCC, 2003). Given this broad definition, like many countries the Division may classify all their forests as managed forests. However, only by assuming both a steady state of biomass in 'unmanaged forests' and identical definitions of 'forest' will carbon stock changes be the same under the two reporting systems. Even in this case, estimates of the total carbon stock may still differ, depending on whether all forests are included or not in reporting under the UNFCCC. Quantifying the substantial roles of forests as carbon stores, as sources of carbon emissions and as carbon sinks has become one of the keys to understanding and modifying the global carbon cycle. Global forest resources assessments have the potential to contribute to or substantiate estimates of the magnitude of stocks and flows by scientific bodies such as IPCC. Simultaneously, they complement and facilitate international reporting by countries on greenhouse gas emissions and removals under the UNFCCC.

Forest area provides the first indication of the relative importance of forests in a Division. Forest area is relatively easy to measure, and this variable has therefore been selected as one of the 48 indicators for monitoring progress towards the Millennium Development Goals agreed by the United Nations (particularly Goal 7 - Ensuring environmental sustainability). Estimates of forest area change over time provide an indication of the demand for land for forestry and other land uses. It also illustrates the impact of significant environmental disasters and disturbances on forest ecosystems. Growing stock is a measure of the volume of stemwood in a given forest area ($m^3$) provides information on existing wood resources but also a basis for estimating the amount of carbon contained. For the Sonitpur East Division through this working plan it is planned that the growing stock will be enhanced by at least 30 per cent during the plan period thereby providing enormous scope for enhancing carbon storage.

### 1.9.4 Socio-economic considerations and generation of forest based employment opportunities and livelihood options

Management of forests should be more people centric and oriented to provide the goods and services from forests on a sustained basis. This is to ensure maintenance of ecological services and harvest of usufructs. The working plan of Sonitpur East Division is prepared in consonance with the general planning, which is village based. The working plan proposes one exclusive overlapping working circle for the socioeconomic upliftment of the bonafide forest village population. Effort has been put through this working plan to generate forest based employment opportunities and livelihoods generation for the bonafide forest

village people and JFMC's. There are three other working circle including one overlapping circle. These working circles ensures involvement of people for plantation and protection of the forest in the Division. Efforts have been laid in this working plan to improve the socioeconomic conditions of the people from all aspects.

### 1.9.5 Tools for integrated development

The need to include sustainable forest management, balancing productivity and offtake with efforts to conserve biodiversity, maintain vital forest functions, and continue supplying various social and economic benefits, across various scales is the prime challenge**.** The working plan for Sonitpur East Division encompasses adoption of best practices, application of modern tools including RS/GIS technologies for assessment of the forest, application of tree improvement and genetic resources for the development of forest genetic base, resources programmes for monitoring through the tools for integrated development. Involvement of the local communities in decision making taking a holistic watershed approach for meeting the goal of sustainable forest is a key component in the working plan. Specific areas to be covered in this working plan for achieving the objectives include –

- Adoption of new and powerful tools, including remote sensing and the use of geographic information systems (GIS). Forests to be mapped in detail using a combination of remote and on-the-ground measurements.
- System dynamics modelling to address complex socioecological issues on firewood.
- Manage the forest of this Division in a more biodiversity-friendly manner
- Guidelines on best silvicultural practices to be developed for the Division.
- Recognizing, in part, local people's rights to manage forests to meet diverse needs and to combat illegal logging, smuggling, collection of forest resources. Best fit schemes for certifying management practices intended to promote, among other things, sustainable harvesting of non timber forest products, including timber.
- Chain-of-custody schemes for tracking the products from source to the user.
- Market based valuing the forests of this Division for the goods and services that they provide (*values in use*), not just for what they are (*non-monetary existence values*).
- Incentives through tools like REDD+, carbon offsetting, for sustainable management of forest.

REDD+ evolved in response to a growing recognition of the need to preserve the standing forest stocks and promote growth of forests to sequester carbon. It is expected to focus on biodiversity conservation and community participation (Lal et al., 2011). Reducing emissions from deforestation has received much political and scientific attention since the issue was first placed on the agenda of the United Nations Framework Convention on Climate Change (UNFCCC) in 2005. The issue of drivers of deforestation and degradation is perhaps the most relevant yet most understudied theme requiring interdisciplinary analysis. Since there is an urgent need to better understand the links between land-use change processes, their drivers, the involved actors, the related carbon emissions and impacts, and the necessary REDD+ activities, the study of drivers of deforestation and degradation will benefit from an interdisciplinary approach.

### 1.10 Methods of Treatment to be Adopted

A brief account on the ecological and silvicultural requirements for sustainable management of different identified forests, keeping in view the stakeholder's requirements, aspects of biotic factors, legal status of forests, drivers of unsustainability, etc., is as follows.

**Treatments prescribed**:

1. To develop all necessary infrastructure to support the plantation and carryout improvement of RF area
2. Deal with Man Animal Conflict in proactive manner involving both short term and long term measures.
3. Involve the villagers in conservation and protection of forests and wildlife, and to create opportunities for their livelihood.To motivate the villagers not to collect the forest produces from the forests but to collect the same from the assigned JFMC areas as per JFM mechanism.
4. To develop Eco Tourism over the entire area, including parts of Arunachal Pradesh, with a Landscape management approach, and by creating JFMCs.
5. Consolidate the Forest land after implementation of Forests Rights Act 2006.

## 1.11 Constitution of Working Circles

To ensure that the above objectives of managementare fulfilled, the following working circles are formed –

- **Joint Forest Management (JFM) Working Circle.**
- **Plantation and improvement Working Circle**
- **NTFP and Bamboo Working Circle (Overlapping)**
- **Community and Forests Rights Working Circle**

- **Forest Protection Working Circle (Overlapping)**
- **Wildlife Management Working Circle(Overlapping)**

### 1.11.1 Justification for constitution of the working circles:

The forest composition and distribution according to the Champion and Seth's classification in this Division is as follows:

- JFM Working Circle: This Working Circle will comprise of the degraded areas of the Reserve Forests adjacent to the Forest villages and other revenue villages. There are 33 number of JFMCs which were constituted during the year of 2004-05 and 2006-07 in the fringe villages of the Reserve Forest under Sonitpur East Forest Development Agency. Almost 80% of the reserve forests are encroached and there is huge anthropogenic pressure on the existing forest patches. Therefore it is imperative that community support for protection of exisiting forest in need of the hour. The illegal fellings and concerted effort on parts of illegal doers can be effectively countered with help of community support. JFMC per se does not open new vistas of development for fringe villagers but then it provides opportunity for establishing a bridge between Forest Department and fringe forest villagers. Unlike development departments we cannot maintain developmental schemes in villages neither its our mandate but such JFMC helps forest staff to forge bonding with villagers. Such opputunity should not be missed. It is provided that new JFMCs should be opened wherever needed based on proper appraisal. Also defunct JFMCs should be closed. Effort should also be taken to rejuvenate defunct and potential JFMCs.
- Plantation Working Circle:Since the small patch of Behali RF, Singlijan RF and northern belt of Biswanath and Naduar RF is left unencroached it was felt that the working circle should focus on two aspects. Firstly the improvement areas for regeneration, conservation and protection of indigenous species like Bola, Khokhan, Barhamthuri etc. Secondly new plantations in low density areas of Behali, Singlijan, Biswanath and Naduar RF. In improvement areas the dead dying and wind fallen trees would be removed followed by protection of regeneration areas and ANR. The working circle would be non overlapping and exclusively aimed at conservation and regeneration of indigenous species of Behali RF and creation of Plantations with species of high ecological value and low commercial timber value.
- NTFP and Bamboo Working Circle: The collection of medicinal plants continues in discreet manner by forest fringe villagers. There is absolutely no record of recorded removals of minor forest produce from the forests. But certain species are sold in local markets like Hillikha, Amlokhi, Bhomora, Dioscorea and Ghankachu . Though not all species are collected entirely from Forest area. The working circle is aimed at streamlining removal of minor forest produce. Any such removal should be backed up by scientific harvesting plan. Only JFMC members should be used for such recorded removal if any. The reserve forests have certain bamboo and cane brakes in past as

evident from past working plans. Such natural Bamboo areas other than behali RF should be promoted for Bamboo only. The strategy for this circle would be mostly restocking of Bamboo with commercially valuiable species. The working circle is aimed at regulating unrecorded removal of NTFPs from RF area and restocking natural Bamboo areas with commercially valuable species.

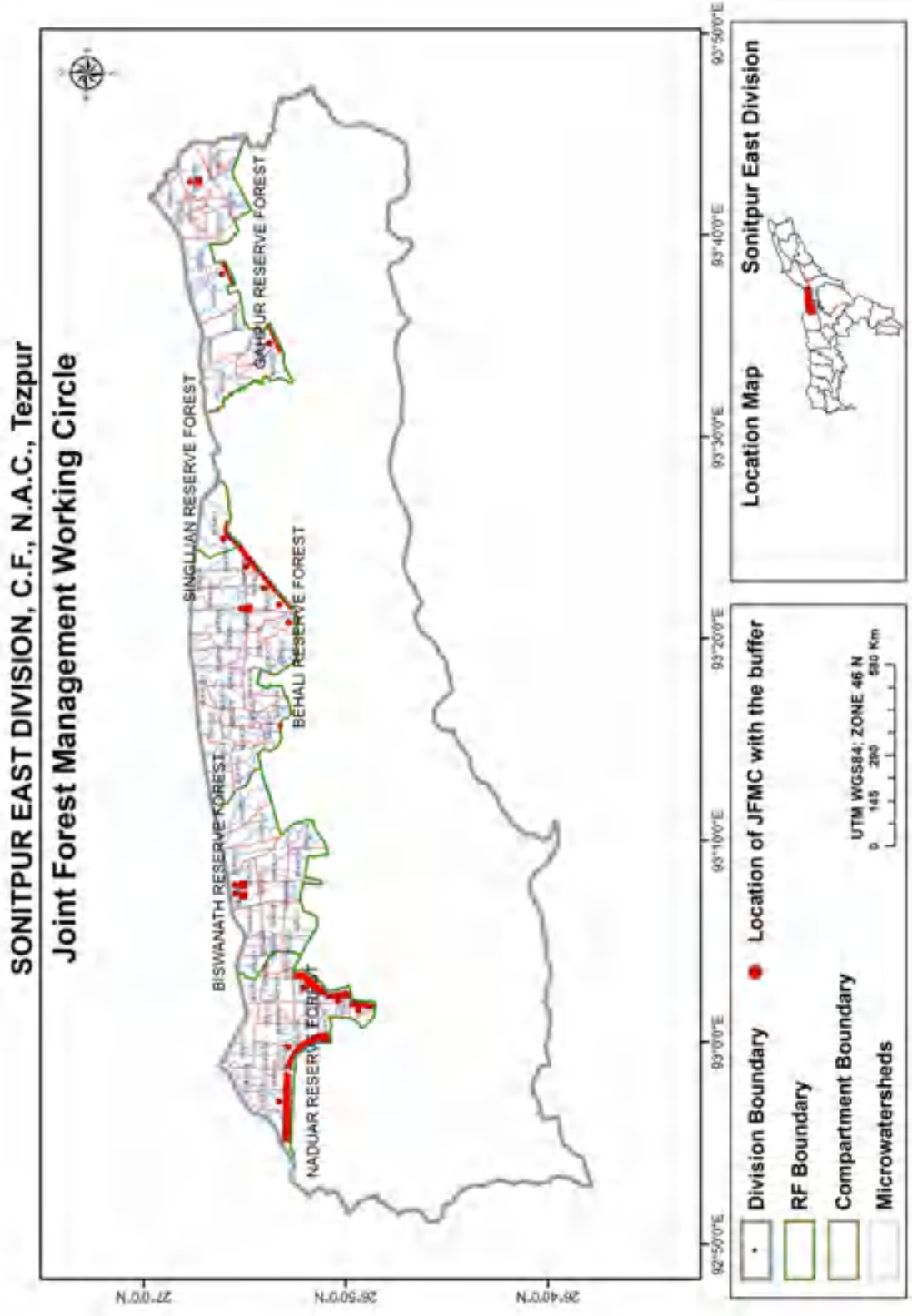
- Community and Forests Rights Working Circle: This working circle is very important as large area within Reserve Forest was brought under Forest Rights Act 2006. However the implementation of Act was never complete as on field demarcation of allotted land was never carried out. The plan period should be utilized for consolidation of forest land and delineation of boundary between RF area and allotted area. Therefore the working circle was necessary.
- Forest Protection Working Circle: This Working Circle includes all the forest areas under this Division. There is significant encroachment that has occurred in the Sonitpur East Division. Area of 9,288 ha and 6,717 ha are under encroachment in Biswanath RF and Behali RF respectively. All such encroached areas are proposed to be brought under this Working Circle. Extensive protection measures have to be adopted under this Working Circle not only to protect the existing forests but also to clear the encroached area for recreating forests. This is the most important working circle as 80% Forest area is under encroachment and timber related illegalities is on rise in fringe forest villages.
- Wildlife Management Working Circle: Wildlife protection is an important aspect of the Division. Situated in the proximity of both Kaziranga and Nameri National Parks, the protection of wildlife requires utmost consideration. Moreover, the entire Division falls under the Sonitpur Elephant Reserve. The circle was necessitated by rising numbers of incidences of man animal conflict in the Forest Division vis-a vis shrinking forest area.

# CHAPTER 2

# JOINT FOREST MANAGEMENT WORKING CIRCLE

## 2.1 Name of the Working Circle

**Figure 2.1: Map of joint forest management woking circle in Sonitpur East Division, Assam**



## 2.2 General constitutents of the working circle

The National Forest Policy, 1988 emphasized that domestic requirements of the tribal and other poor people living within and near the forest for fuel wood, fodder, NTFP and construction timber should be the first charge on forest produce and the holders of customary rights and concession in forest areas should be motivated to identify themselves with the protection and development of forest from which they derive benefits. In pursuance to the National Forest Policy the Ministry of Environment and Forests decided to ask the State Governments to adopt the JFM system for the protection and rehabilitation of degraded forest. The Govt. Resolution No.SIF-1091/199/F-11, dated March 16, 1992. JFM approach was adopted for degraded forest areas of this state and now new guidelines have been issued vide G.R.No.MSC/2000/C. NO. 143/F-2, dated 25.4.2003.

JFM is a concept under which Forest Department and Village committees jointly protect and manage the forest. The starting point of JFM has to be the realization of the need of JFM both by Forest Department and the local people. JFM is a concept under which Forest Department and village committee jointly protect and manage the forest. Environment should be developed so that JFM realizes the need of JFM both by Forest Department and the local people.

Generally, the scarcity of forest products such as fuel wood, fodder etc. as a result of degradation of forest on which the local communities depended, forces the people to think of steps for the protection and improvement of degraded forests. The people are usually reluctant to participate in JFM where sufficient forest areas are still available to meet their requirements. On the part of Forest Department, the problems in protecting forest without the help of local people make the Forest Department staff realize the need of JFM. The JFM program succeeds where the initiative comes from the people's side and it usually fails where it is forced from Forest Department side as a govt. driven and target oriented program. Villagers themselves are required to voluntarily participate in the program. JFMC is to be formed in each village. Each JFMC constitutes a Managing Committee consisting of members elected from general body and ex-officio members representing concern Govt. Department at village level and with local forester as the member secretary. The managing committee is a responsible to implement the decision of general body with regard to the execution of JFM works in partnership with Forest Department Memorandum of Understanding (MOU) is signed between Forest Department and managing committee clearly specific the duties and responsibilities of both parties. Entitlement of JFMC members to the share in forest produce is subject to the fulfillment of conditions of MOU.

The members of the JFMC will help in protection and development of forests and they will receive in turns of share in the usufructs at output from the forest areas assigned to such committee. The JFM area will be managed and according to the micro plans prepared by members of the JFMC. Micro plans develop baseline and propose activities, its estimates and probable convergence of schemes for development of the JFM/ forest village and development of forest. This has to be sustainable, should cater to needs of local communities and the same time, the silvicultural requirements of the forest are to be made properly. Later the Govt. of India also advised the State

Govt. to take up the JFM in well stocked areas on experimental basis and accordingly guidelines dated 25th April, 2003 mentioned above have authorized the forest department in the state in this respect. Summary of these guidelines is as follows –

- Good forests within 2 km from a village are to be covered under the program on experimental basis and stage by stage other villages containing good forest are to be brought under it.
- JFM is to be implemented with the help of fringe forest local self government and forest produced available is to be provided on priority to meet bonafide local needs.
- Non forest land available in the village, which has agreed to participate in the program, may be brought under the scheme if villagers and the Panchayat agree to do so.
- Help of institution, NGO, environmental experts, if any available locally, may be solicited.
- The program underlines conservation of forests and wildlife and therefore any activity/agreement etc. that is not in accordance with the Forest (Conservation) Act, 1980 should not be incorporated in the micro plan.
- All JFM activities should be in conformation to the silvicultural prescriptions of the working plan.

## 2.3 Objectives of the Working Circle

The broad objective of this working circle is to qualitative and quantitative improvement of the existing stocks of the forest of this Division by regeneration and gap filling. Specific objectives are given below –

- To promote healthy relationship between forest staff and fringe villagers for conservation and protection of forest.
- To ensourage participation of fringe villagers and forest villagers in forest protection activities
- To support the livelihoods needs of the forest fringe communities through improved natural resource management with community participation.
- The whole area in this working circle consists of miscellaneous species viz,*Pansopa, Hollock, Amari, Gomari, Oxi, Bogipoma, Phulgomari, Simul, Satiana, Outenga, Bhelu, Tengaparuli, Dimoru.* Compartment nos SER3C16, SER3C15, SER3C18, SER3C13, SER3C11, SER4C1 has canopy density of more<10%-40%. Grazing pressure is very high. Fuelwood consumption is also very high. Adjoining the compartments described above are villages Sereliapathar, Serelia Forest Village, Bedeti Forest Village, Kalaguri Forest village, Kalaguri(Non-residential) forest village, Behali Tea Estate, Monabari Tea Estate, Rongagorah Tea estate, and Bedeti Tea estate.

## 2.4 Legal Position

The JFMCs are under Sonitpur Forest Development Agency. The CEO of Sonitpur FDA is DFO Sonitpur East Division. Sonitpur FDA is a. registered society under Socities Registration Act. The Societies Registration Renewal is pending while the plan was being written.

## 2.5 Blocks and Compartment Allotment Areas

Blocks, compartment and the area to be covered in this working circle is provided in Table 2.1.

Table 2.1. Compartments Alloted to JFM Working Circle

| Name of the RF | Compartment No. | Area Alloted for Plantation | Area Alloted for Protection | Remarks |
|---|---|---|---|---|
| BEHALI | SER3C 26 | 50 | 50 | |
| | SER3C 24 | 50 | 50 | |
| | SER3C 22 | 50 | 50 | |
| | SER3C 18 | 50 | 50 | |
| | SER3C 21 | 50 | 50 | Thandapani FV JFMC is in middle of Com No SERC 3C 21 |
| | SER3C 8 | 50 | 50 | |
| **Sub Total** | | **300** | **300** | |
| BISWANATH RESERVE FOREST | SER2C 8 | 100 | 100 | Along Northern Boundary of Biswanath RF Bhimajuli FV and Madhupur FVJFMC |
| **Sub Total** | | **100** | **100** | |
| NADUAR RESERVE FOREST | SER1C 6 | 50 | 50 | The area is heavily encroached therefore the JFMCs need to put extra effort for carrying out plantations |
| | SER1C 4 | 50 | 50 | |
| | SER1C 3 | 50 | 50 | |
| | SER1C 19 | 50 | 50 | |
| | SER1C 18 | 50 | 50 | |
| **Sub Total** | | **250** | **250** | |
| Singlijan Reserve Forest | SER 4C 1 | 50 | 50 | |
| **Sub Total** | | **50** | **50** | |
| GOHPUR RESERVE FOREST | SER 5C 1 | 20 | NIL | The JFMC Area allotted and JFMC is required for Man Animal Conflict and they are Forrst Villages established under Forest Village Rules |
| | SER 5C 5 | 20 | NIL | |
| | SER 5C 11 | 20 | NIL | |
| **SUB TOTAL** | | **60** | **Nil** | |
| **Grand Total** | | **760** | **700** | |

- **Note:** *400 meters along the southern boundary shall be allotted for JFMC Plantation as well as Protection purposes.*
- *The JFMC in Biswanath RF shall be allotted area as far away from northern Boundary close to Built up areas(encroached area)*
- *JFMC in Gohpur RF have very less area for Plantation which should be identified from exisiting Blanks in the respective compartment.*

## 2.6 Analysis of the Flora and Fauna:

The principal species found in these forests are *Morus laevigata* (Bola), *Duabanga sonneratoides* (Khokan), *Mesua ferrae* (Nahor), *Michaelia* spp. and *Magnolia* spp, Bamboo, *Albizia odoratissima (Koroi), Chukrassia tubularis (Bogipoma), Talauma hodgsonii (Borhamthuri), Terminalia myriocarpa (Hollock), Dillenia indica (Outenga), Endospermum chinense (Phulgomari) and Salmalia malabarica (Simolu), Magnolia montana* (Pansopa), *Amoora wallichii* (Amari), *Dillenia pantagyna*

(Oxi), *Mesua ferrea* (*Nahor), Tetrameles nudiflorae (Bhelu), Stereospermum personatum (Tengaparuli) and Ficus carica (Dimoru'*s). Big, small bamboos and cane brakes are found in varying proportions in the RFs under this working circle. During inventory works carried out in these forests it is found that the growing stock is adequate in all areas free from encroachment. The status of regeneration is poor, seedlings of almost all the species is scanty indicating number of seedlings lower than that of the adult population. The average basal areas are much less.

## 2.7 Associated Regulations and Measures

National Forest Policy, 1988, Indian Forest Act 1927, Assam Forest Policy, 2004 under IFA, 1927, Indian Biodiversity Act, 2002, Assam Forest Regulation Acts (Amended 1995), Forest Conservation Act 1980, Assam Biodiversity Rule 2010, The Cattle Trespass Act 1871, The Assam Forest (Removal and storage of produce) Regulation Act-2000, The Assam (Control of Felling and Removal of trees from Non-forest Land) Rules 2002, The Schedule tribe and other traditional Forest Dwellers (Recognition of Forest Rights) Acts 2006. Always start working form the ride to valley approach. After eviction, immediately planting is to be carried out. Preference for vegetative measures followed by other engineering measures. Caution to be taken to maintain the hydrological regime and compaction of soil. Participatory measures need to be taken for the measures proposed.

## 2.8 Methods of Treatment

The JFMCs under this working circle shall be assessed and graded before any plantations etc.

### 2.8.1. Appraisal of functioning of JFMCs

**Table 2.2 Exisiting JFMCs and their GPS Coordinates:-**

| | | | |
|---|---|---|---|
| **PABHOI RANGE** | | | |
| Madhupur | 26°55'28.20"N, 93°07'35.1"E | Bhimajuli | 26°55'27.20"N, 93°07'23"E |
| **DIPLONGA RANGE** | | | |
| Selaikhati Karbi | 26°48'59.00"N, 92°58'23.50"E | Hatipoti | 26°52'45.8"N, 92°58'18.8"E) |
| Selaikhati Bangali | 26°50'10.10"N, 92°02'07.50"E | Morisuti | 26°52'59.2"N, 92°56'09.0"E |
| Selaikhati Kachari | 26°51'05.5"N, 92°02'28.50"E | | |
| **BORGANG RANGE** | | | |
| Bihmari | 26°54'15.7"N, 93°23'22.6"E | Serelia | 26°52'52.2"N, 93°20'17.6"E |
| Kolaguri | 26°53'29.35"N, 93°22'14.92"E | Kolaguri NR | 26°53'34.8"N, 93°22'09.9"E |
| Thandapani | 26°55'10.4"N, 93°21'29.9"E | Bhelowadanga | 26°55'53.9"N, 93°25'59.8"E |
| Rangagorah | 26°53'11.35"N, 93°15'41.48"E | | |
| **GOHPUR BEAT** | | | |
| Alupara | 26°57'42.300"N, 93°42'39.900"E | Balijan | 26°53'47.62"N, 93°33'42.95"E |
| Sonapur | 26°56'7.720"N, 93°38'34.510"E | | |

### 2.8.1.1.Gradation of JFMC

All exisiting JFMCs should be graded as per gradation criteria proposed below:

**Proposed Criteria for Gradation of JFM( Adapted from Forest Dept West Bengal):**

**Grade A**: Regeneration of forest with revival of species, both flora and fauna, that were at the verge of extinction Crown density above 0.8, No illicit felling, No encroachment/or eviction of encroachment by the JFMC members, Active Participation of JFMC in fire control, if any JFMC received share out of timber produce as a part of their contribution for forest protection for at least two times. Coordination among JFMC and FD for implementation of forest development Works.

**Grade B** Regeneration of forest with Crown density between 0.6 - 0.8, Active participation of JFMC members in controlling illicit felling, fire, encroachment, received timber share for minimum one time. Coordination with forest department for implementation of forestry relatec\d works

**Grade C** Regeneration of forest with crown density between 0.4 -0.6 Occurrences of illicit felling, fire and or encroachment with lesser involvement of JFMC members to control them, Received timber share for one time only or not. FD faces difficulty in implementing forestry related works by involving the JFMCs

**Grade D** Not much of change in the status of forest from Pre JFM condition Crown density less than 0.4 Regular occurrences of Illicit felling Passive role of JFMC in fire and or encroachment control Did not receive any timber share. FD faces problem to involve JFMCs in implementation of forestry related works.

**Based on gradation of JFMC, their should be different approach towards each JFMC**

**Grade A**: Documentation of JFMC work needs to be done and other JFMCs members can be brought here for training and exposure visit. Issue ID cards for JFMC Executive members. Involve them in Antidepredation duties and Forest Protection Duties. Encourage ROs to compulsorily use only JFMC members in operations inside forest

**Grade B**: Forest Staff needs to intesify involvement with JFMC and Livlihood training programmes, income generation activities etc can be done here. ID cards can be issued to JFMC Executive members

**Grade C**: Identify community leaders and send them to other states , districts and JFMCs for training programme. Conduct frequent workshops, seminars. Steps towards Capacity building of JFMC members needs to be taken There is need to put in extra effort for rapprt building between Villagers and Forest Staff.

**Grade D**: Identify community leaders and send them to other states , districts and JFMCs for training programme. Conduct frequent workshops, seminars. Increased effort to reach out to the Villagers

### 2.8.1.2. 360 Degree Assessment Survey

Questionaire based survey can be done by Range Officer through concerned Beat Officer and the entire findings should be summarized. Such findings should be taken into consideration before Selection of JFMCs shall be based on scoring parameters suggested below. Maximum Score shall be 80. JFMCs scoring below 80 should not be get preference.

Table 2.3.

| S No | Criteria | Parameters | Score | Source of Information |
|---|---|---|---|---|
| 1 | For Existing JFMC | Completion of planned, attendance at meeting, accounts keeping, group cohesion etc | 50 | Evaluation by DFO and local representative of local NGO based on questionnaire based survey and office records* |
| 2 | Level of Poverty | 50% & above HH are BPL | 10 | SECC Data/ Census Data |
| | | 40 to 49% HH are BPL | 8 | |
| | | 30 to 39% HH are BPL | 5 | |
| | | Below 29% HH BPL | 1 | |
| 3 | Level of dependency of the community on forest resources | Forest dependency high( proxy indicator as 50% or more of the total village population is marginal worker) | 5 | SECC Data/ Census Data and Forest Offence Records and report from RO/BO |
| | | Forest dependency medium(proxy indicator as below 25% and 50% of the total village population is marginal worker) | 3 | |
| | | Forest dependency medium(proxy indicator as below 25% of the total village marginal worker) | 1 | |
| 4 | Incidences of cattle on humans, crop raiding by wild animals | High | 5 | HEC or Human Animal Conflict data and Questionnaire based survey |
| | | Medium | 3 | |
| | | Low | 1 | |
| 5 | Cases of illegal tree felling, poaching etc | High | 5 | Based on report from RO and BO |
| | | Medium | 3 | |
| | | Low | 1 | |
| 6 | Relative Location of Village | Common boundary shared with RF is more than 2km | 5 | Data assembled from Division office Toposheet |
| | | Common boundary shared with RF is less than 2 Km | 3 | |
| | | Village is located 500 meter away RF boundary | 2 | |
| | | | | |

**2.8.2. ASSAM FOREST AND BIODIVERSITY CONSERVATION PROJECT SOCIETY (AFBCPS) ANNEX JFMC AND EDC OPERATIONAL MANUAL** as in Annexure-IX shall be adopted as manual for the JFMC administration and Management which shall guide the JFMC members for carrying out different tasks .The handbook will guide them during managing the JFMC and administer their power and processes. The JFMC Manual shall be 'binding instrument' for the entire Plan period and the JFMC areas unless otherwise mentioned in the rules, Government Orders and instructions issued by Assam FD and GoA will be applicable.

This manual is meant for the JFMC members and Forest Staff. The JFMC members are selected from amongst the beneficiaries who are known as “Forest User Groups. The manual will guide them to create knowledge base, educate and perform.

**2.8.2.1. Need to Establish Maintenance Fund for JFMCs**: A majority of forest development activities in the of State are undertaken with the support of externally or internally supported projects. After the completion of the Project, special arrangement for maintenance of assets created under the Project are not available. It is therefore, necessary to create a fund that can be used in the post project period for the maintenance of project assets, and also help in the implementation of the statutory working plans including micro plans. The JFM program seeks the support of local communities for conducting and managing forest development activities.

**Maintenance Fund:** This Maintenance fund is created for the upkeep and conservation of assets created under schemes for the purpose of JFM. Since the JFM program is based on the support of local people for conducting and managing forest development activities, the Maintenance fund is created out of contributions/grants by the local villagers or laborers. The amount to be voluntarily contributed towards this fund is decided by the Gaon Panchayat with mutual consent. This fund can also be created in the name of Corpus Fund, provided there is certain amount of the project set apart from the beginning for use in subsequent upkeep of the created assets of the project, when project ceases to operate. Sometimes it is entirely borne from project and sometimes borne partially from the project and partially out of the cash/voluntary labor contributed by the project beneficiaries. The objective is the same in both the cases.

2.8.2.2. **Operation of Corpus/Maintenance Fund:** The JFMC will create this fund out of grant or contribution by the local residents/labourers. In case this Fund is created by voluntary contribution by labourers, it will be mandatory for the other villagers who have not made labor contribution, to provide financial contributions. The total fund amount collected by the JFMC will be deposited in bank/post office in the form of a Fixed Deposit. The term period for this fixed deposit will be same as the remaining period of the Scheme. In the post project period, this fixed deposit may not be utilized until necessary. This fund can be utilized after the approval of the Executive Committee for works related to conservation of assets only. After the expense has been made, it will be necessary to get the approval of the JFMC and gram sabha. The expense accounts of the Maintenance fund should be properly recorded and the account should be operated as per the provisions of the Government order.

2.8.2.3. **Corpus Fund:** This is a special fund which should be created by JFMCs for management and operationalization of income generating activities. The amount for this fund will be deposited in a nationalized bank near to the area and the account for the same will be opened in the name of the JFMC..

2.8.2.4. **Operation of Corpus Fund:** This fund will be used as per the provisions of the MoU signed between the JFMC and the Forest Department. The fund will be used for the maintenance of JFM activities under the technical guidance of the forest department. These works may be included in Micro Plan. It will be necessary to follow the rules for incurring expenses out of this fund and it cannot be utilized for any purpose other than those specified. The minimum majority of the Executive Committee

can decide the utilization of the Corpus fund amount. This expense would have to be approved by the general assembly of the JFMC.

The necessary expenses to be incurred from the fund can be withdrawn only with the joint signatures of the JFMC member secretary and treasurer/ President. The Member Secretary will maintain the accounts for f the fund.

**2.8.2.5. Audit of Corpus Fund:** The first audit of the corpus fund account records will be conducted by the Internal Committee set up by the JFMC for this purpose. The DFO can also form a committee for the purpose of this audit. This committee may include representatives from the forest department, local NGO and JFMC. During the internal audits of the forest divisions there is a provision for auditing the account of 5% of the total JFMCs.

### 2.8.3. Income Generation Activities and Formation of Self help Groups

JFMCs can decide for several income generation activities for alternative livelihood particularly low income group of community. They can make Self Help Groups (SHGs) and the front line staff of the forest department can assist them to form the groups.

Villagers living in and around forest areas are mostly from poor and backward communities. Mostly these people are from SC, ST and other backward classes; mostly these people live in Kachha houses where facilities such a portable drinking water and sanitation are not adequately available. Only one member of the household is earning. One member of the family is addicted to alcohol or is suffering from chronic ailments. For such a family it is difficult to arrange two meals a day. Therefore, their livelihoods, living style and petty requirements are made through freely available forest resources. Thus, these people are responsible for degradation of forest resources. In order to reduce dependence of these people on forest resources by ensuring them alternate livelihood, SHG groups are formed so that they can earn money to meet their daily requirements by pursuing some economic activity. SHGs also help them to inculcate habit of savings for bad days from own savings rather than incurring loan from money lender and being in a perennial debt trap.

2.8.3.1. **Self Help Groups (SHGs)**: The guidelines in "A Handbook on Forming Self Help Group, National Bank for Agriculture and Development" may be uncruplously followed for formation and regulation of SHGs. The SHGs show us how unity is strength. They show us how self-help could be the best help. It is useful if we can encourage and help poor people to form SHGs. They save very small amounts of money. They lend these small amounts to each other in the SHGs. They also try to solve many of their problems together.

2.8.3.2. **Role of forest front line staff in formation of SHGs**: Forest frontline staff could explain benefits of forming a group to the villagers He could help in mobilizing members and organizing initial meetings Provide guidance and motivation to president and other members of the groups Help/ assist group in forming formal/ in formal rules and maintenance of books of records if required, Help linking the group with other government organizations working in the area for motivation and guidance Rotation of leadership among different members in each of the meeting to ensure active participation of all the members Help from social development officials could be taken for forming women self-help groups. Ensure adequate marketing system for produce of the group Continuous review of the activities undertaken by the group and guidance from the specialized as required

**2.8.3.3. Convergence with Govt of India and Govt of Assam Schemes:** Efforts may be taken by DFO to tie up with National Rural Livelihood Mission for formation of SHGs and impart skill trainings for rural youths.

**2.8.3.4.Training on various alternative livelihood activities for the JFMCs:** Once the JMFC is formed they should be exposed to different training programmes to enhance the skill and capacity of the members for the holistic development of the area. The different capacity building training programmes which the JFMC members should undertake would be as follows:

**Introduction of alternative energy sources**. The fuel wood dependency both for bonafide domestic use as well as for commercial sale to semi-urban areas has played havoc with the regeneration of the forests. This resulted in conversion of productive fringe forests into highly degraded state. Therefore, it is very well understood that until the alternate fuel resources are made available to JFMC members for their bonafide requirements it is just impossible to stop fuel-wood collection from the forests. To reduce the consumption of fuel wood in JFMCs households improved biomass chullas (with roughly 48% fuel efficiency), 5 liter pressure cookers, rice husk based bio-briquette machines could be introduced by the forest department.

**Hands on training on cultivation of MFPs, medicinal plants, pasture development for fodder and plantation of fruit trees/ orchards** .The economy of the JFMCs is very much depended on the collection as well as sale of the medicinal and aromatic plants. The forest area allotted to the JFMCs with blanks available for the afforestation. Thus in order to boost the economy of the JFMCs an afforestation scheme of high-tech MFP/ Medicinal Plant Plantation could be introduced in the degraded forest area of different states. Under this scheme, plantation could be raised with grafted amla, hilika and baheda and many other locally available species. In case of successful plantation many JFMCs could be benefited.

**Training on Animal husbandry and poultry farming**. A number of programmes are available in the state animal husbandry department for improvement of the cattle and poultry farming. The State forest Department could coordinate with the state animal husbandry department for training and capacity building of the JFMC members on animal husbandry and poultry farming. This could enhance their scope for the additional income and better livelihood opportunities. The prospective training for the JFMCs on this sector could be as follows: Focus on reducing scrub cattle & stall feeding to reduce grazing pressure on the forests Introduction of Azolla fodder to each household Rice husk in each household should be urea treated Artificial Insemination, vaccination & castration in collaboration with Vet. Dept. Loan from CF Revolving Fund for providing milch cattle. Training on dairy development and skill development of SHGs in preparation of milk products and management of their own society JFMCs could be trained on dairy development since almost all the JFMC members possess livestock.
Training on other activities like weaving, knitting, printing, book binding (if communities have interest/ have traditional practice) There is no list for income generating or non-income generating activities that the SHGs can take up. But the following list provides non-forestry activities that the SHG could be linked up with: Spices preparation unit Sewing, tailoring, spinning and weaving unit Doll and toy making Rope making, bamboo basket making and other products Grain bank Handloom and small

scale enterprises etc. Making of jam, jelly, processed juice from available fruits Value added products from NTFPS like amla and, medicinal plants at a higher price

**Training on Ecotourism involving SHGs/ JFMCs**. Ecotourism is a form of tourism that involves visiting natural areas—in the remote wilderness or rural environments. According to the definition, ecotourism is responsible travel to natural areas that conserves the environment and improves the well-being of local people. There are seven main characteristics of ecotourism, which are: Involves travel to natural destinations Minimizes impact Builds environmental awareness Provides direct financial benefits for conservation

*(Adapted from Joint Forest Management A Handbook For Front Line Staff of Forest Department & JFMC members, Published by Ministry of Environment & Forests Under JICA funded project "Capacity Development for Forest Management & Training of Personnel", ID-P199)*

### 2.8.4. Record of Existing Plantations Created by JFMCs in various schemes

**Scheme: National Afforestation Programme (NAP)**

**Year 2004-05**

Table 2.4.

| Sl No. | Name of the JFMC | Name of the RF | Name of the Range/Beat | Activities undertaken | Area in Ha | | Remarks | GPS Coordinates |
|---|---|---|---|---|---|---|---|---|
| 1 | Morisuti JFMC | Naduar R F | Diplonga | Plantation (Advance Work) | ANR | 5 | Plantation activity carried out for 170 ha. (Advance work) and Amount incurred Rs. 1300000/- including overhead EPA and others for the year 2004-05 | 26°52'59.20"N 92°56'9.00"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 2 | Hatipati JFMC | Naduar R F | Diplonga | Plantation (Advance Work) | ANR | 5 | | 26°52'45.80"N 92°58'18.80"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 2 | | |
| 3 | Selaikhati JFMC | Naduar R F | Diplonga | Plantation (Advance Work) | ANR | 5 | | 26°50'20.88"N 93° 1'39.24"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 2 | | |
| 4 | Madhupur JFMC | Biswanath RF | Pabhoi | Plantation (Advance Work) | ANR | 5 | | 26°55'2.20"N 93° 7'46.10"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 5 | Kolaguri JFMC | Behali RF | Borgang | Plantation (Advance Work) | ANR | 5 | | 26°53'34.80"N 93°22'9.90"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 6 | Thandapani JFMC | Behali RF | Borgang | Plantation (Advance Work) | ANR | 10 | | 26°55'10.40"N 93°21'29.90"E |
| | | | | | AR | 10 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 7 | Bihmari JFMC | Behali RF | Borgang | Plantation (Advance Work) | ANR | 10 | | 26°54'15.70"N 93°23'22.60"E |
| | | | | | AR | 10 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 5 | | |
| 8 | Sonapur JFMC | Gohpur RF | Gohpur Beat | Plantation (Advance Work) | ANR | 5 | | 26°56'7.72"N 93°38'34.51"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Mixed | 5 | | |
| | TOTAL | | | | | 170 | | |

Table 2.5.

| Sl No. | Name of the JFMC | Name of the RF | Name of the Range/Beat | Activities undertaken | Area in Ha | | Remarks | |
|---|---|---|---|---|---|---|---|---|
| 1 | Morisuti JFMC | Naduar R F | Diplonga | Creation and advance work | ANR | 5 | Plantation activity carried out for 170 ha. (Creation) and 160 ha (Advance work) Amount incurred Rs. 1800000/- including overhead EPA and others for the year 2005-06 | 26°52'59.20"N 92°56'9.00"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 2 | Hatipati JFMC | Naduar R F | Diplonga | | ANR | 5 | | 26°52'45.80"N 92°58'18.80"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 2 | | |
| 3 | Selaikhati JFMC | Naduar R F | Diplonga | | ANR | 5 | | 26°50'20.88"N 93° 1'39.24"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 2 | | |
| 4 | Madhupur JFMC | Biswanath RF | Pabhoi | | ANR | 5 | | 26°55'2.20"N 93° 7'46.10"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 5 | Kolaguri JFMC | Behali RF | Borgang | | ANR | 5 | | 26°53'34.80"N 93°22'9.90"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 6 | Thandapani JFMC | Behali RF | Borgang | | ANR | 10 | | 26°55'10.40"N 93°21'29.90"E |
| | | | | | AR | 10 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 7 | Bihmari JFMC | Behali RF | Borgang | | ANR | 10 | | 26°54'15.70"N 93°23'22.60"E |
| | | | | | AR | 10 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 5 | | |
| 8 | Sonapur JFMC | Gohpur RF | Gohpur Beat | | ANR | 5 | | 26°56'7.72"N 93°38'34.51"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 5 | | |
| | TOTAL | | | | | 170 | | |
| | | | | | | | | |

Year 2009-10
Table 2.6

| Sl No. | Name of the JFMC | Name of the RF | Name of the Range/Beat | Activities undertaken | Area in Ha | | Remarks | |
|---|---|---|---|---|---|---|---|---|
| 1 | Morisuti JFMC | Naduar R F | Diplonga | 1. 1st and 2nd year maintenance of 170 ha plantation created in 2005-06<br>2. Creation of 160 ha. Plantation<br>3. Creation of 80 ha. Plantation. | ANR | 5 | Plantation activity carried out for 170 ha. (1st and 2nd year maintenance) and 160 ha (Creation) and 80 ha (Creation) Amount incurred Rs. 2000000/- including overhead EPA and others for the year 2005-06 | 26°52'59.20"N 92°56'9.00"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 2 | Hatipati JFMC | Naduar R F | Diplonga | | ANR | 5 | | 26°52'45.80"N 92°58'18.80"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 2 | | |
| 3 | Selaikhati JFMC | Naduar R F | Diplonga | | ANR | 5 | | 26°50'20.88"N 93° 1'39.24"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 2 | | |
| 4 | Madhupur JFMC | Biswanath RF | Pabhoi | | ANR | 5 | | 26°55'2.20"N 93° 7'46.10"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 5 | Kolaguri JFMC | Behali RF | Borgang | | ANR | 5 | | 26°53'34.80"N 93°22'9.90"E |
| | | | | | AR | 5 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 6 | Thandapani JFMC | Behali RF | Borgang | | ANR | 10 | | 26°55'10.40"N 93°21'29.90"E |
| | | | | | AR | 10 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 4 | | |
| 7 | Bihmari JFMC | Behali RF | Borgang | | ANR | 10 | | 26°54'15.70"N 93°23'22.60"E |
| | | | | | AR | 10 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 5 | | |
| 8 | Sonapur JFMC | Gohpur RF | Gohpur Beat | | ANR | 5 | | 26°56'7.72"N 93°38'34.51"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 5 | | |
| 9 | Serelia JFMC | Behali R F | Borgang | | ANR | 5 | | 26°52'52.20"N 93°20'17.60"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 5 | | |
| 10 | Balijan JFMC | Gohpur R F | Gohpur Beat | | ANR | 5 | | 26°53'47.62"N 93°33'42.95"E |
| | | | | | AR Bamb | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 5 | | |
| 11 | Bheludanga JFMC | Behali R F | Borgang | | ANR | 5 | | 26°55'53.90"N 93°25'59.80"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 5 | | |
| 12 | Rangagorah JFMC | Behali RF | Borgang | | ANR | 5 | | 26°53'11.35"N 93°15'41.48"E |
| | | | | | AR | 5 | | |
| | | | | | Bamboo | 5 | | |
| | | | | | Mixed | 5 | | |

JFMC Activities details under Sonitpur East FDA, Biswanath Chariali

**Scheme: National bamboo Mission (NBM)**
**Table 2.7.**

| Sl No. | Name of the JFMC | Name of the RF | Name of the Range/Beat | Year | Activities undertaken | Area in Ha | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | Thandapani JFMC | Behali RF | Borgang | 2006-07 | Bamboo Plantation | 20 | 26°55'10.40"N 93°21'29.90"E |
| 2 | Bhelowadanga | Singlijan RF | Borgang | 2006-07 | Bamboo Plantation | 40 | 26°55'53.90"N 93°25'59.80"E |
| | | | | | | **Total 60** | |
| 3 | Madhupur JFMC | Biswanath RF | Pabhoi | 2007-08 | Bamboo Plantation | 50 | 26°55'28.20"N 93° 7'35.10"E |
| 4 | Rangagorah JFMC | Behali RF | Borgang | 2007-08 | Bamboo Plantation | 50 | 26°53'11.35"N 93°15'41.48"E |
| | | | | | | **Total 100** | |
| 5 | Thandapani JFMC | Behali RF | Borgang | 2008-09 | Bamboo Plantation | 25 | 26°55'10.40"N 93°21'29.90"E |
| 6 | Serelia JFMC | Behali RF | Borgang | 2008-09 | Bamboo Plantation | 25 | 26°52'52.20"N 93°20'17.60"E |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7 | Selaikhati JFMC | Naduar RF | Diplonga | 2008-09 | Bamboo Plantation | 25 | 26°50'20.88"N 93° 1'39.24"E |
| 8 | Madhupur JFMC | Biswanath RF | Pabhoi | 2008-09 | Bamboo Plantation | 25 | 26°55'28.20"N 93° 7'35.10"E |
| | | | | | | **Total 100** | |
| 9 | Selaikhaiti JFMC | Biswanath RF | Pabhoi | 2010-11 | Bamboo Plantation | 50 | 26°50'20.88"N 93° 1'39.24"E |
| 10 | Bhimajuli JFMC | Biswanath RF | Pabhoi | 2010-11 | Bamboo Plantation | 50 | 26°55'27.20"N 93° 7'23.00"E |
| | | | | | | Total 100 | |
| 9 | Bhelowadanga | Singlijan RF | Borgang | 2012-13 | Bamboo Plantation | 50 | 26°55'53.90"N 93°25'59.80"E |
| 10 | Madhupur JFMC | Biswanath RF | Pabhoi | 2012-13 | Bamboo Plantation | 25 | 26°55'28.20"N 93° 7'35.10"E |
| 11 | Bhimajuli JFMC | Biswanath RF | Pabhoi | 2012-13 | Bamboo Plantation | 25 | 26°55'27.20"N 93° 7'23.00"E |
| | | | | | | **Total 100** | |
| 12 | Madhupur JFMC | Biswanath RF | Pabhoi | 2008-09 | Nursery creation | 0.25 | 26°55'28.20"N 93° 7'35.10"E |

JFMC Activities details under Sonitpur East FDA, Biswanath Chariali
**Scheme: National bamboo Mission (Restocking)**
**Table 2.8**

| Sl No. | Name of the JFMC | Name of the RF | Name of the Range/Beat | Year | Activities undertaken | Area in Ha | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | Bhelowadanga | Singlijan RF | Borgang | 2007-08 | Bamboo clum management, mulching, soil working, plantation in vacant patches, protection from grazing animals etc | 100 | 26°55'53.90"N 93°25'59.80"E |
| 2 | Bihmari JFMC | Singlijan RF | Borgang | 2007-08 | | 150 | 26°54'15.70"N 93°23'22.60"E |
| 3 | Selaikhaiti JFMC | Biswanath RF | Pabhoi | 2007-08 | | 150 | 26°50'20.88"N 93° 1'39.24"E |
| 4 | Bhimajuli JFMC | Biswanath RF | Pabhoi | 2007-08 | | 100 | 26°55'27.20"N 93° 7'23.00"E |
| 5 | Madhupur JFMC | Biswanath RF | Pabhoi | 2007-08 | | 50 | 26°55'28.20"N 93° 7'35.10"E |
| | | | | | | Total 550 | |
| 6 | Bhimajuli JFMC | Biswanath RF | Pabhoi | 2008-09 | | 25 | 26°55'27.20"N 93° 7'23.00"E |
| 7 | Selaikhaiti JFMC | Biswanath RF | Pabhoi | 2008-09 | | 25 | 26°50'20.88"N 93° 1'39.24"E |
| 8 | Madhupur JFMC | Biswanath RF | Pabhoi | 2008-09 | | 25 | 26°55'28.20"N 93° 7'35.10"E |
| 9 | Bhelowadanga | Singlijan RF | Borgang | 2008-09 | | 25 | 26°55'53.90"N 93°25'59.80"E |
| | | | | | | Total 100 | |

JFMC Activities details under Sonitpur East FDA, Biswanath Chariali
**Scheme: National bamboo Mission (Maintenance of Plantation)**
**Table 2.9**

| Sl No. | Name of the JFMC | Name of the RF | Name of the Range/Beat | Year | Activities undertaken | Area in Ha | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | Thandapani JFMC | Behali RF | Borgang | 2007-08 | Maintenance | 20 | 26°55'10.40"N 93°21'29.90"E |
| 2 | Bhelowadanga | Singlijan RF | Borgang | 2007-08 | Maintenance | 40 | 26°55'53.90"N 93°25'59.80"E |
| | | | | | | Total 60 | |
| 3 | Madhupur JFMC | Biswanath RF | Pabhoi | 2008-09 | Maintenance | 50 | 26°55'28.20"N 93° 7'35.10"E |
| 4 | Rangagorah JFMC | Behali RF | Borgang | 2008-09 | Maintenance | 50 | 26°53'11.35"N 93°15'41.48"E |
| | | | | | | Total 100 | |
| 7 | Bhelowadanga | Singlijan RF | Borgang | 2013-14 | Maintenance | 50 | 26°55'53.90"N 93°25'59.80"E |
| 8 | Madhupur JFMC | Biswanath RF | Pabhoi | 2013-14 | Maintenance | 25 | 26°55'28.20"N 93° 7'35.10"E |
| 9 | Bhimajuli JFMC | Biswanath RF | Pabhoi | 2013-14 | Maintenance | 25 | 26°55'27.20"N 93° 7'23.00"E |
| | | | | | Total | 100 | |

## 2.9 Prescriptions:

Activities prescribed under Joint Forest Management includes–

### 2.9.1. Apprasisal of Exisiting JFMC's and gradations

17 exisiting JFMCs may be graded as per procedure described in Section 2.9.1.1. Before implementation of any new scheme/programme or including the 17 JFMCs in any new projects, they may be subjected to 30 degree evaluation as per procedure described.

Only revenue villages may be considered for opening up of new JFMCs. It may be ensured that no encroachers or any RF area undder encroachement is brought into the folds of JFMCs. Range Officer to ensure.

**2.9.2. Plantation Activities**: The plantations created since 2005-06 where survival percentage is very poor owing to non receipt of maintenance fund on time and poorly framed plantation estimate where provision of proper fencing is not their. Such plantations careated should be carefully assessed and categorized into 10-35% survival, 36-40% and 41% and above. The Plantations which have 10-35% survival should be immediately brought under Plantation by JFMCs.

760 Ha new creations are envisaged during plan period. The area for 760 Ha plantations shall be demarcated from allotted compartments. The exisiting plantation site which have failed due to various reasons shall be again taken up for frsh plantation. New creations and maintenance of plantation shall be as under:

Table 2.10

| | 2021-22 | | 2022-23 | | 2023-24 | | 2024-25 | | 2025-26 | | 2026-27 | | 2027-28 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area Alloted for Plantatio | Creation in Ha | Maintenance in Ha | Creation in Ha | Maintenance in Ha | Creation in Ha | Maintenance in Ha | Creation in Ha | Maintenance in Ha | Creation in Ha | Maintenance in Ha | Creation in Ha | Maintenance in Ha | Creation in Ha | Maintenance in Ha |
| **760** | **280** | **0** | **280** | **280** | **100** | **560** | **100** | **660** | **0** | **760** | **0** | **480** | **0** | **200** |

Table 2.11a

| | | | 2021-22 | | 2022-23 | | 2023-24 | |
|---|---|---|---|---|---|---|---|---|
| **Name of the RF** | **Compartment No.** | **Area Alloted for Plantation** | **Creation in Ha** | **Maint. in Ha** | **Creation in Ha** | **Maint. in Ha** | **Creation in Ha** | **Maint. in Ha** |
| Behali | SER3C 26 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| | SER3C 24 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| | SER3C 22 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| | SER3C 18 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| | SER3C 21 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| | SER3C 8 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| **Sub Total** | | **300** | **120** | **0** | **120** | **120** | **30** | **240** |
| Biswanath | SER2C 8 | 100 | 25 | 0 | 25 | 25 | 25 | 50 |
| **Sub Total** | | **100** | **25** | **0** | **25** | **25** | **25** | **50** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Naduar | SER1C 6 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| | SER1C 4 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| | SER1C 3 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| | SER1C 19 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| | SER1C 18 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| Singlijan | SER 4C 1 | 50 | 20 | 0 | 20 | 20 | 5 | 40 |
| **Sub Total** | | **300** | **120** | **0** | **120** | **120** | **30** | **240** |
| Gohour | SER 5C 1 | 20 | 5 | 0 | 5 | 5 | 5 | 10 |
| | SER 5C 5 | 20 | 5 | 0 | 5 | 5 | 5 | 10 |
| | SER 5C 11 | 20 | 5 | 0 | 5 | 5 | 5 | 10 |
| **Sub Total** | | **60** | **15** | **0** | **15** | **15** | **15** | **30** |
| **Grand Total** | | 760 | 280 | 0 | 280 | 280 | 100 | 560 |

Table 2.11b

| | | 2024-25 | | 2025-26 | | 2026-27 | | 2027-28 | |
|---|---|---|---|---|---|---|---|---|---|
| **Name of the RF** | **Compartment No.** | **Creation in Ha** | **Maint. in Ha** | **Creation in Ha** | **Maint. in Ha** | **Creation in Ha** | **Maint in Ha** | **Creation in Ha** | **Maint in Ha** |
| Behali | SER3C 26 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| | SER3C 24 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| | SER3C 22 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| | SER3C 18 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| | SER3C 21 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| | SER3C 8 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| **Sub Total** | | **30** | **270** | **0** | **300** | **0** | **180** | **0** | **60** |
| Biswanath | SER2C 8 | 25 | 75 | 0 | 100 | 0 | 75 | 0 | 50 |
| **Sub Total** | | **25** | **75** | **0** | **100** | **0** | **75** | **0** | **50** |
| Naduar | SER1C 6 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| | SER1C 4 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| | SER1C 3 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| | SER1C 19 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| | SER1C 18 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| Singlijan | SER 4C 1 | 5 | 45 | 0 | 50 | 0 | 30 | 0 | 10 |
| **Sub Total** | | **30** | **270** | **0** | **300** | **0** | **180** | **0** | **60** |
| Gohour | SER 5C 1 | 5 | 15 | 0 | 20 | 0 | 15 | 0 | 10 |
| | SER 5C 5 | 5 | 15 | 0 | 20 | 0 | 15 | 0 | 10 |
| | SER 5C 11 | 5 | 15 | 0 | 20 | 0 | 15 | 0 | 10 |
| **Sub Total** | | **15** | **45** | **0** | **60** | **0** | **45** | **0** | **30** |
| **Grand Total** | | 100 | 660 | 0 | 760 | 0 | 480 | 0 | 200 |

| | | 2028-29 | |
|---|---|---|---|
| **Name of the RF** | **Compartment No.** | **Creation in Ha** | **Maint. in Ha** |
| Behali | SER3C 26 | 0 | 5 |
| | SER3C 24 | 0 | 5 |

| | | | |
|---|---|---|---|
| | SER3C 22 | 0 | 5 |
| | SER3C 18 | 0 | 5 |
| | SER3C 21 | 0 | 5 |
| | SER3C 8 | 0 | 5 |
| **Sub Total** | | **0** | **30** |
| Biswanath | SER2C 8 | 0 | 25 |
| **Sub Total** | | **0** | **25** |
| Naduar | SER1C 6 | 0 | 5 |
| | SER1C 4 | 0 | 5 |
| | SER1C 3 | 0 | 5 |
| | SER1C 19 | 0 | 5 |
| | SER1C 18 | 0 | 5 |
| Singlijan | SER 4C 1 | 0 | 5 |
| **Sub Total** | | **0** | **30** |
| Gohour | SER 5C 1 | 0 | 5 |
| | SER 5C 5 | 0 | 5 |
| | SER 5C 11 | 0 | 5 |
| **Sub Total** | | **0** | **15** |
| **Grand Total** | | 0 | 100 |

### 2.9.2.1.Plantation Models for Fuelwood Plantation and Medicinal Plantations

| S.No. | Particulars of works |
|---|---|
| A | **ERECTION OF FENCING** |
| | (a) Erection of full Chain-linked Goat Proof fencing (4' ht. with 10 Gauge, 3" dia link) to be fitted on Pre-cast RCC pillars* at 1.8 mt. apart including transportation of fencing materials to site |
| C | **ADVANCE WORK** |
| | Site selection, surveying, demarcation, jungle cutting, burning etc |
| | Preparation and acquisition of polypot saplings in the field nursery for planting 1100 Nos. Seedlings/ ha at the rate of spacing 3m X 3m |
| | **Preparation of polypot saplings in the field nursery for vacancy filling while planning for raising nursery the mortality should be accounted.** |
| | a) 25% mortality expected during 1st year (to be planted in the field during the 2nd year) ,i.e., 277 Seedlings/ ha |
| | b) 20% mortality expected during 2nd year (to be planted in the field during the 3rd year) ,i.e., 222 Seedlings/ ha |
| | c) 15% mortality expected during 3rd year (to be planted in the field during the 4th year),i.e., 166 Seedlings/ ha |
| | d) 10% mortality expected during 4th year (to be planted in the field during the 5th year),i.e., 111 Seedlings/ ha |
| | Line alignment, carriage of stacking materials and fixing the stacking |
| D | **CREATION & 1st YEAR MAINTENANCE** |

Soil working, carriage of stumps, polypot seedling and planting at the plantation site including, dibbling of seeds wherever necessary to complete raising of plantation with all necessary operation @ 4**0** DLs/ ha

Provision for 5 weedings, mulching and fire protection works

Upkeepment of plantation, and making of inspection path, repairing of fence etc. on day to day basis

**E** **2nd YEAR MAINTENANCE**

5 weedings, fire protection works

25% Vacancy filling by 1 year old seedlings from nursery

Upkeepment of plantation, and making of inspection path, repairing of fence etc. on day to day basis

Maintenance and protection of field nursery and watch and ward for the plantation area

**F** **3rd YEAR MAINTENANCE**

4 weedings, fire protection works

20% Vacancy filling by 2 year old seedlings from nursery

Protection work, cattle watching, upkeepment of plantation, and making of inspection path, repairing of fence etc. on day to day basis

Maintenance and protection of field nursery and watch and ward for the plantation area

**G** **4th YEAR MAINTENANCE**

4 weedings, fire protection works @15 dls/ha/weeding

15% Vacancy filling by 2 year old seedlings from nursery

Upkeepment of plantation, and making of inspection path, repairing of fence etc. on day to day basis

Maintenance and protection of field nursery and watch and ward for the plantation area

**H** **5th YEAR MAINTENANCE**

Climber cutting, weeding & other silvicultural works and fire protection works

10% Vacancy filling by 2 year old seedlings from nursery

Maintenance & fencing post replacement

Upkeepment of plantation, and making of inspection path, repairing of fence etc. on day to day basis

Watch and ward for the plantation area

### *2.9.2.2.* Medicinal Plants Plantation: Plantation Techniques for Bel, Outenga

a) **Bel:** It is a small to moderate sized tree ; branches armed with strong axillary spine 1-3 cm long. Bark dark grey, slightly corky, leaves alternate, 3- foliate, rarely 5- foliate. Flowers greenish-white, sweet scented. Fruits globose, grey or yellowish, shell woody. Seeds numerous, oblong, compressed, with a woolly mucous testa, embedded in a clear mucilage and a mass of yellow or orange-coloured sweet aromatic mealy pulp.

**Mode of propagation :** Seeds and vegetative. The seed does not retain viability for long and regeneration by root-suckers appears to be the chief mode of propagation in nature.

Seed Propagation :

Seed Collection : The seeds should be obtained from fruits collected off the trees and not from the ground ,Ripe fruits are collected during March-May. The rind is opened to release seeds. Separated seeds are washed thoroughly until the mucilage is completely removed and then dried in the sun for a few days.

**Sowing Method :**The seeds being perishable and recalcitrant, cannot withstand storage for long and have to be sown immediately, after collection , in raised or flat beds. Seeds can also be soaked in water for about 12 hours and then dibbled into poly bags or beds.

Germination : Germination is initiated in 10 to 15 days and lasts for about 20 days.

Germination Percentage : About 56 to 80 %

**Nursery Duration :** It takes 3 to 12 months to be come plan table size.

**Transplanting and aftercare** : The seedlings are ready for planting out in the next season. As the growth is slow in the seedling stage, it may be desirable to retain seedling with undergrowth for another 1 to 2 years, if necessary. Entire planting is done in pits of convenient size. Protection should be provided against cattle and goats grazing and also against certain insect larvae, which bore and breed in the fruits of defoliated trees

**Medicinal uses :** Fruits, roots and leaves are used . Ripe fruit pulp is laxative and is reported to be good for the heart and in dyspepsia. Unripe fruits are reported to be useful in diarrhea, dysentery and stomachalgia. Roots are reported to be useful in cases of seminal weakness, uropathy, swellings, intermittent fever and gastric irritability in infants. Root bark is reported to be useful in hypochondriasis, melancholia and palpitation of heart and stomach pain. Leaf juice extract is applied externally in abscess.

**Harvesting:** The Bel will be managed both for roots as well as fruits and leaves. The fruits will be collected from 150 ha area from tress planted at 4m x 4m spacing. The collection of fruit will be done annually after fruiting starts. The leave collection will be done both from all the Bel plants.

Root extraction will be done in one third of area planted with Bel in 1m strip after third year onwards by uprooting the plants. This will lead to age gradation of three years after one rotation.

b) **Paruli:** A large deciduous tree with a spreading canopy growing to a height of 9-18 m. It is identified by gray bark with light yellow blaze. The leaves are 30-45 cm long with 7-9 leaflets, petiole and young leaves are bluish violet in colour. Flowers are yellowish with red veins and are in branches. Corolla pale or dark purple, puberulous lobes rounded, crisped crenate pods are about 20 cm long. Curved, pendulous and brown when ripe. Seeds are many and possess membranous wings.

**Mode of propagation :** Seeds.

**Seed collection:** Fruits mature in March-May. Fruits are plucked from the trees before dehiscing and then dried in the sun. The fruit dehisces to release the membranous seeds. Ripe seeds are collected and dried in the sun and the seeds are separated. Seeds can be stored in paper packets, but looses viability completely after one year of storage. Seeds number 27,000 per kilogram.

Pretreatment: Seeds are soaked in water for 24 hours.

**Sowing Method:** Seeds are dibbled in raised beds 15 x 15 cm apart. Sowing in the nursery is done in April-May. The seeds are to be lightly covered by a layer of soil. The beds should be watered sparingly. Germination duration: Germination starts after 12 days and is completed in 15 days.

Germination percent: Germination percent is about 60 or even 70 percent.

**Transplanting and aftercare** : Seedlings are transplanted after they attain a height of 5 cm, in the month of July. One year old seedlings are planted in the field in 45 cm3 pits.

**Medicinal uses :** Parts used: Root, Flowers and Root Bark. The roots of this species are known as "Paarul mool" in trade. It is reported to be used to treat intermittent fevers, inflammatory affections of the chest, affections of the brain, dropsy and dyspepsia. The root bark is a constituent of the well known Ayurvedic formulation "Dasmula". Flowers are reported to be given with honey to control hiccup.

**Harvesting:** This species will be managed for roots . Root extraction will be done in one third of area planted with this species in 1m strip after third year onwards by uprooting the plants. This will lead to age gradation of three years after one rotation.

c) **Bhatgilla**: Mode of propagation : Seeds and vegetative , Seed propagation: Seed collection: Ripe pods are collected from December onwards, before they dehisce. Seeds are separated from the ripe pods, after drying in the sun.

**Pretreatment:** They are soaked in water for 24 hours before sowing. Sowing: Seeds are dibbled in raised beds. Germination: Germination takes place in 5 to 7 days. Germination percentage: Germination is 80 to 90 %

**Transplanting and aftercare :** The seedlings are ready for transplanting after 3 months. The planting can be done in 45 cm3 pits at a spacing of 6 x 6 m. The root suckers which have started sprouting well are transferred to the field.

**Medicinal uses :** Parts used: Roots, seeds and Fruits. Roots are reported to be used to treat rheumatism, diarrhoea and dysentery. Seeds are reported to be used as a purgative. The leaves made into a decoction is reported to be given in stomachache and rheumatism and are used externally for enlarged spleen. Tender fruits are refreshing and stomachic.It is one of the Dasmoola drugs.

**Harvesting:** This species will be managed for roots . Root extraction will be done in one third of area planted with this species in 1m strip after third year onwards by uprooting the plants. This will lead to age gradation of three years after one rotation.

d) **Hilika:** Tree 10 -15 m. tall. It is identified by dark brown bark exfoliating in irregular woody scales and presence of pair of large glands at the top of the petiole. Leaves pubescent, ovate-oblong, obtuse at apex, rounded at base. Flowers greenish - white, fragrant in terminal spikes. Fruit greenish- yellow, ovoid Stone is very thick, bony, rough, grooved with gum vessels on the wall.

**Mode of propagation :** Seeds and vegetative. Ripen fruits are seen between January and March. Yellow fruits are collected, seeds are dried in shade and stored in gunny bags for a year.

**Pretreatment :** Freshly fallen ripe fruits are collected and allowed to ferment in cow dung lurry for two weeks or more till the seeds show signs of germination. Another method is to de-pulp as soon as fruits are collected, the seeds are then soaked in tepid water for 4-6 days.

**Sowing Season** : Seeds are either sown in nursery beds in March -April or directly sown on the field in June-July. March-April (Nursery) & June -July (Direct).

**Sowing Method** : Pretreated seeds are sown on the nursery beds in lines of 20 cm apart and seeds 5 cm apart lines. Direct sowing in the garden can also be taken. The

seeds are dibbled at 1 m. apart and covered with soil about 1-1.5 cm. deep. Nursery be well shaded against the sun.

Spacing : 20 25 cm.

Germination percentage : about 60 % .

Germination: Seeds take 10 to 30 days to germinate.

**Transplanting and aftercare:** Transplanting in case of nursery raised seedlings or saplings is done in June-July when the plants are about one year old. Transplanting of seedling or planting stumps is done in pits of 45 cm3 or crow-bar holes at a spacing of 10 2 10 m after the start of rains About 18 percent of the transplants established themselves. Regular watering is necessary.

Medicinal uses : The fruits are laxative and reported to be for treating wounds, ulcers, inflammations, gastropathy, flatulence, jaundice, skin diseases, leprosy, intermittent and cardiac disorders. The fruit pulp is used in dentifrices.

**Harvesting:** The fruits are collected biannually.

e) **Baheda:** A lofty tree often with buttresses. Bark smooth, yellowish-brown with shallow vertical fissures. Branches monopodial .Leaves crowded towards at the end of branchlets, alternate, broadly elliptic, to obovate, obtuse, thick, coriaceous, glabrous Flowers greenish-yellow, sessile on slender, axillary short, pedunculate spikes. Fruit is a fleshy drupe obovoid or subglobose with grey velvetty wooly hairs and a hard thick wall. One seeded and surrounded by a green tissue.

**Soil:** It grows on a wide range of soils provided moisture in the soil is not deficient. Best growth is seen in deep ,moist ,sandy loam with good subsoil drainage.

Mode of propagation : Seed and vegetative.

**Seed Collection :** Light green or white flowers with a strong odour of honey appear between April-June, Fruits ripen between November to February .Fruits are collected from healthy trees, de pulped seeds are dried in sun and stored .Seeds are viable for a year but their germination percent will be reduced to 40 or 50 percent.

**Pretreatment:** Seeds are soaked in water for 24 hours for better germination. Fermentation or cow dung slurry treatment for two weeks or more until the seeds show sprouting is also recommended. As a pretreatment ,immersion in hot water (80° to 100° C ) and then allowing it to cool followed by soaking for 24 hours is also employed.

Sowing Season :

March -April (Nursery) & June-July (Direct).

**Sowing Method :** Direct sowing of seeds or by planting out nursery raised seedlings. Soaked seeds are sown on the nursery beds in lines of 20 cm apart and seeds 5 cm apart lines. Direct Sowing in the garden can also be taken up in June-July at the start of rains. The seeds are dibbled at 1 m apart and covered with soil about 1 cm-1.5 cm deep.

Spacing : 20 x 2 5 cm.

Germination : Germination takes about 10 to 40 days.

Germination Percentage : 65 to 70 % .

**Transplanting and aftercare** : Transplanting in case of nursery raised seedlings or saplings is done in June-July when the plants are about 3 to 4 months old. About 52 % plant establish successfully. Regular weeding and watering is necessary. When seedlings are 3 to 5 cm tall they are shifted to polybags.

**Medicinal uses:** The fruits are used as a purgative. The oil extracted from the seeds is applied to the hair and for rheumatic swellings. The fruit pulp finds use in ophthalmia. The

fruits are useful in cough, bronchitis, insomnia, vomiting, skin diseases, leprosy, fevers, ulcers and general debility. The mature fruit and dry fruit is constipating and is useful in diarrhea and dysentery

**Harvesting:** The fruits are collected annually

**f) Giloy**, *Tinospora Cordifolia* Miers. Family – Menispermanceae

A large extensively spreading, perennial woody climber with succulent stems. Leaves simple, alternate, cordate-ovate; flowers unisexual dioecious, yellow. Fruit of 3 shortly stalked subglobose drupes.

**Common Names:** Guduchi, Amrita, Gurach, Tinospora.

Part Used: Stem.

**Nursery Raising and Planting**: The plant is cultivated by stem cutting in the month of May-June. It requires some support preferably Neem and Mango trees, such plants are supposed to possess better medicinal values.

**Manures, Fertilizers and Pesticides:** The medicinal plants have to be grown without chemical fertilizers and use of pesticides. Organic manures like, Farm Yard Manure (FYM), Vermi-Compost, Green Manure etc. are proposed to be used as per requirement of the species. To prevent diseases, bio-pesticides would be applied (either single or mixture) from Neem (kernel, seeds & leaves), Chitrakmool, Dhatura, Cow's urine etc.

**Harvesting/Post Harvesting Operation**: Mature plants are collected, cut into small pieces and dried in shad.

**Yield**: Approximately 8-10 q./ha.

**2.9.2.3**. **Firewood Plantation:** hoice of Species for Firewood Plantation: Modar( Erythrina Sp), Albizia Lucida( Siris) and Firewood Plantation, NTFPand Medicinalplants cultivation can be undertaken by JFMC members.Firewood plantation shall meet their demands for fuelwood.

**2.9.2.4. Entry Point Activities:** Entry point activities like community halls, improvement of village road, well, extension of Village School and Solar lighting facility, Solar elephant proof fencing etc. can be proposed.

**2.9.2.5.Capacity Building through Alternative Livelihood Programmes ( as mentioned above):** Training programmes for Mason, Electrician, Heavy Machinery Drivers, Beauty Parlours, Computer Training for desktop publishing etc. can be organised for youths. Skill development programmes can reduce pressure on forest.

Other Miscellaneous Regulations:Preparation of microplan. Active participation to be encouraged in preparing the micro-plan,which emphasizes the local needs and demands. Proper implementation of microplan after approval must be ensured.

**2.19.3. Training Programmes and formation of SHGs**

The SHG formation shall be as per Guidelines issued by NABARD and linked up with various Government welfare schemes. Local Block Development officials or project managers of Govt Schemes shall be involved.

### 2.9.4. Management of JFMCs as per APFBC Manual for JFMC

As mentioned earlier the entire operation and management of JFMCs shall be as per the APFBC manual.

## 2.10. Estimated Revenue and Expenditure in the Working Circle

The expenditure for creation of plantation shall be as per approved norms of Assam Forest Department. And any other expenditure towards capacity building training etc or creation of assets in entry point activities shall be as per availability of fund and microplans. The Revenue generation from medicinal plant is not possible to derive at this point. The same shall be assessed after JFMC is included in any exisiting scheme or new scheme. The cost of raising plantations and maintenance is given in Table 2.12a and Table 2.12b.

Table 2.12a. Estimated expenditure for creation and maintenance of plantations in JFMC Working Circle(2021-25)

| | 2021-22 | | 2022-23 | | 2023-24 | | 2024-25 | |
|---|---|---|---|---|---|---|---|---|
| **Area Alloted for Plantation** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** |
| **760** Ha | **280** | **0** | **280** | **280** | **100** | **560** | **100** | **660** |
| Amount In Rs | 14707840 | 0 | 14707840 | 5281920 | 525280 | 10563840 | 525280 | 65745300 |

Table 2.12b. Estimated expenditure for creation and maintenance of plantations in JFMC Working Circle(2025-20)

| | 2025-26 | | 2026-27 | | 2027-28 | | 2028-29 | |
|---|---|---|---|---|---|---|---|---|
| **Area Alloted for Plantation** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** |
| **760** Ha | **0** | **760** | **0** | **480** | **0** | **200** | **0** | **100** |
| Amount In Rs | 0 | 11447320 | 0 | 6554020 | 0 | 2740900 | 0 | 1070400 |

# CHAPTER 3

# PLANTATION AND IMPROVEMENT WORKING CIRCLE

## 3.1 Name of the working circle:

Plantation Working Circle.The detail map of this Working Circle is shown in Fig 3.1.

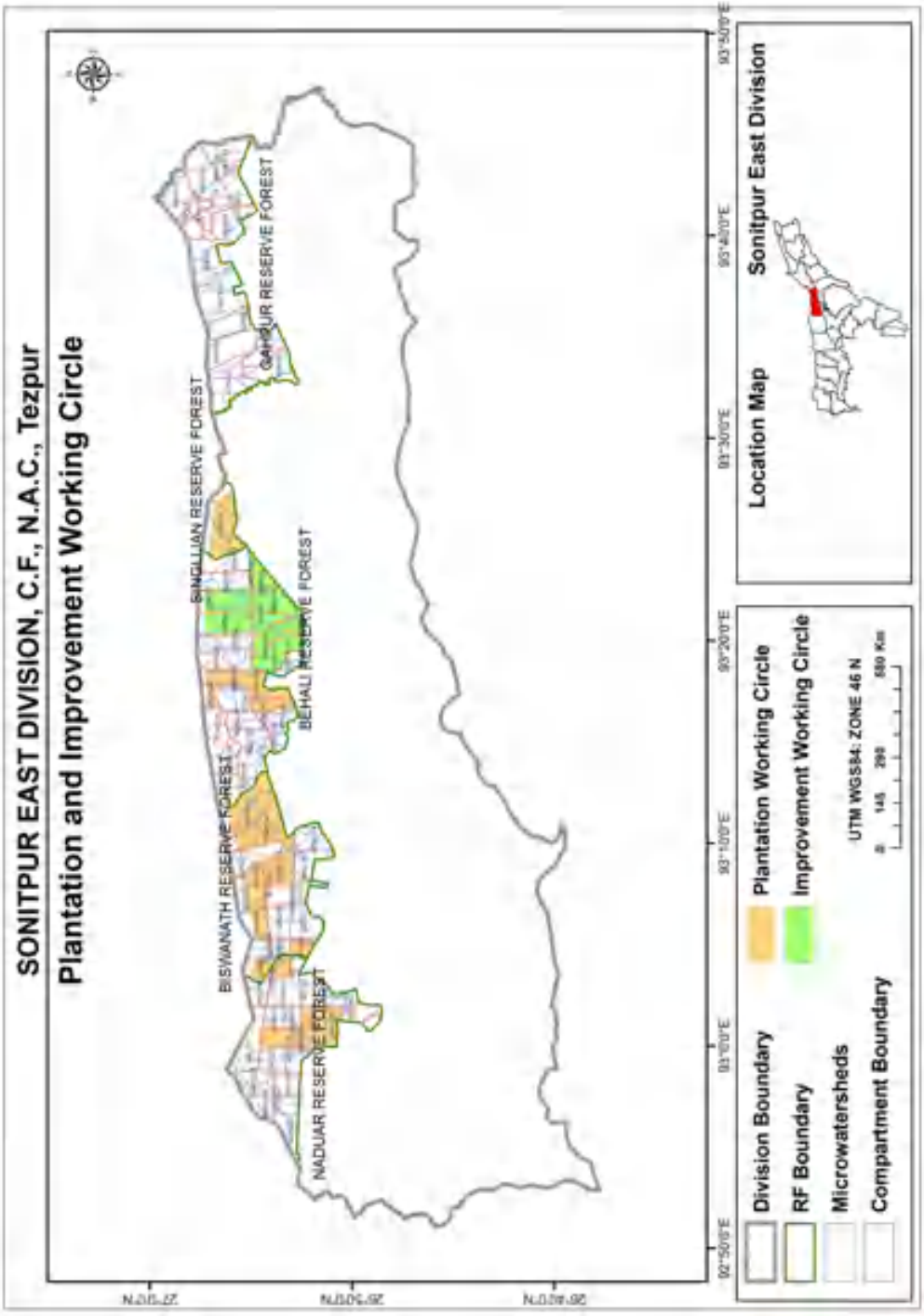



**Figure 3.1: Map of plantation working circle of Sonitpur East Division**

## 3.2 General constitutents of the working circle

This working circle includes all those moist, dry deciduous forest and semi evergreen areas consisting mainly of degraded forests. These areas have mostly been worked in the past under selection working system for removal of timber and firewood. These are areas with or without rootstock, situated either in foothills or in plains, where the soil depletion is considerable. Soil condition is good but these areas have lost their capacity to sustain good vegetation capable of regenerating itself because of excessive anthropogenic activities. All the blanks close to encroachments, fallow lands, degraded forests are included in this working circle. It extends to the whole of the division. The total area is calculated after field visit and also by interpretation of satellite images and by analysing plantation and natural forest inventory data and by interaction with the regular field staff.

Number of regenerated adults per hectare is shown in Fig 3.2. The status of regeneration is poor, seedlings of almost all the species is scanty indicating number of seedlings lower than that of the adult population. The average basal areas are much less. So, it is proposed not to take up felling

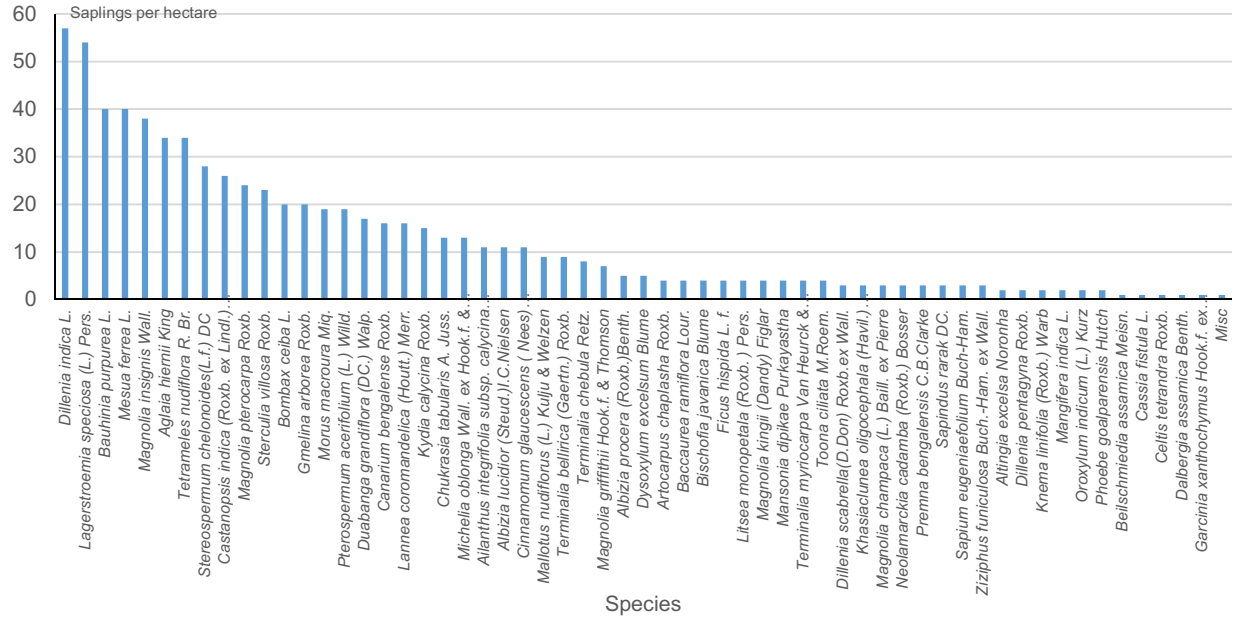



**Fig 3.2a: Graph showing number of saplings per hectare regeneration in Sonitpur East division**

of green trees in these forests. However, removal of dead and fallen trees followed by regeneration in the gaps has been prescribed in this working circle.

The Working Circle has been constituted taking into consideration the present status of plantations in the Division. Following compartments are placed under this Working Circle–

- Poorly stocked areas with canopy density between 0.4 and 0.5 or less
- Poor regeneration status in general
- High dependence of local communities on forests for fuelwood and foder.
- Degraded compartments due to illegal fellings in the past.

## 3.3 Objectives of the working circle

The broad objective of this Working Circle is to improve the stocks of the forest of this Division through plantation, to fill the gaps and regeneration of the species in areas where earlier plantations have not survived. Specific objectives are given below –

1. To maintain environmental stability through preservation and restoration of ecological balance.

2. To conserve natural flora and fauna.

3. To check soil erosion and denudation in the catchment areas of rivers flowing across these forests.

4. To maintain or improve natural forest structure and growth in non-degraded areas for maintaining ecological balance

5. To increase the productivity of natural forests and to make degraded forest areas productive.

6. Consistent with the above objectives, to ensure sustainable use of forests to meet the needs of the people by salvaging the dead and fallen material.

7. By avoiding green felling, to improve the regeneration status and representation of all age gradations of many species so as to get sustained yield from these forests in the future.

8. To promote native and indigenous species like Bola, Khokan, Nahor, Sopa, Bamboo etc.

10. To promote afforestation of open and degraded patches of forests

## 3.4. General condition of flora and fauna

Areas allotted to this Circle are those which are part of Behali and Singlijan RF, which are relatively free from encroachment and consists of miscellaneous forest formations. The terrain is uneven and soil is prone to erosion with loss of forest cover. The principal species found in these forests are *Morus laevigata* (Bola), *Duabanga sonneratoides* (Khokan), *Mesua ferrae* (Nahor), *Michaelia* spp. and *Magnolia* spp, Bamboo, *Albizia odoratissima (Koroi), Chukrassia tubularis (Bogipoma), Talauma hodgsonii (Borhamthuri), Terminalia myriocarpa (Hollock), Dillenia indica (Outenga), Endospermum chinense (Phulgomari) and Salmalia malabarica (Simolu), Magnolia montana* (Pansopa), *Amoora wallichii* (Amari), *Dillenia pantagyna* (Oxi), *Mesua ferrea* (*Nahor), Tetrameles nudiflorae (Bhelu), Stereospermum personatum (Tengaparuli) and Ficus carica (Dimoru*'s). Big, small bamboos and cane brakes are found in varying proportions in the RFs under this working circle. During inventory works carried out in these forests it is found that the growing stock is adequate in all areas free from encroachment.

## 3.5.1. Blocks and compartment allotment areas for Improvement

For the convenience of operation, improvement working series are proposed. This is considered appropriate as the availability of dead and fallen material is limited and the areas are prone to illegal

felling and smuggling. An abstract of the allotment of areas to the two Improvement working series is given below:

**Name of the working series Area in hectares**

- Rangagora-Hathidepot plantation improvement working series. 1200 Ha
- Bedeti-Golbil-Hathimora plantation improvement working series. 900 Ha

**Total area** **2100 Ha**

Each of these blocks is an annual coupe. The details of area and time schedule are given in the following

**Table 3.2: Proposed area (Ha) for Improvement of Sonitpur East Division.**

| Range | Name of RF | Compartment No | Extent in Ha | Improvement Working Circle(Ha) |
|---|---|---|---|---|
| Borgang Range | Behali RF | | | |
| | RangagoraHathidepot Series | SER3C2 | 869.23 | 200 |
| | | SER3C3 | 403.87 | 200 |
| | | SER3C5 | 489.09 | 300 |
| | | SER3C6 | 598.48 | 200 |
| | | SER3C7 | 449.42 | 300 |
| | | | **Sub Total** | **1200** |
| | BedetiGolbilHathimora Series | SER3C8 | 518.5 | 250 |
| | | SER3C10 | 570.53 | 250 |
| | | SER3C11 | 401.68 | 200 |
| | | SER3C13 | 650.91 | 200 |
| | | | **Sub Total** | **900** |
| | | **TOTAL** | | **2100** |

3.5.2. Blocks and compartment allotment areas for Plantation

**Table 3.5: Table showing blocks and compartment allotment areas in Plantation working circle.**

| Name of the RF | Compartment No. | Plantaion Type | Area in ha |
|---|---|---|---|
| BEHALI | SER3C18 | ANR | 100 |
| | SER3C15 | ANR | 50 |
| | SER3C16 | ANR | 100 |
| | SER3C13 | ANR | 50 |
| Sub Total | | | 300 |
| BISWANATH RESERVE FOREST | SER2C1 | Block Plantation | 450 |
| | SER2C11 | Block Plantation | 20 |
| | SER2C12 | Block Plantation | 25 |
| | SER2C16 | Block Plantation | 25 |
| | SER2C17 | Block Plantation | 25 |
| | SER2C4 | Block Plantation | 100 |
| | SER2C5 | Block Plantation | 100 |
| | SER2C8 | Block Plantation | 50 |
| Sub Total | | | 795 |
| | SER1C12 | Block Plantation | 225 |
| | SER1C13 | Block Plantation | 225 |
| | SER1C 8 | Block Plantation | 100 |
| | SER1C 14 | Block Plantation | 100 |
| Sub Total | | | 650 |
| SINGLIJAN RESERVE FOREST | SER4C1 | Block Plantation | 100 |
| SUB TOTAL | | | 100 |
| **Grand Total** | | | **1845** |

## 3.5.3. Prescriptions for Improvement Areas

## 3.5.3.2. Year Wise Allotment of areas for Improvement operation

| 2020-21 | | 2021-22 | | 2022-23 | | 2023-24 | | 2024-25 | | 2025-26 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Imrprov. Opns | ANR | Imrprov. Opns | ANR | Imrprov. Opns | ANR | Imrprov. Opns | ANR | Imrprov. Opns | ANR | Imrprov. Opns | ANR |
| 300 | 0 | 350 | 300 | 425 | 350 | 475 | 425 | 450 | 475 | 100 | 450 |

**The yearwise areas allotted for improvement operation is as above followed by allotment of same area for ANR.**

**Table 3.6. Yearwise allotment of areas(In ha) under Improvement and ANR in consecutive year**

**Year 2020-21 to 2022-23**

| | | Year | 2020-21 | | 2021-22 | | 2022-23 | |
|---|---|---|---|---|---|---|---|---|
| | COMPTS | Total Area (In Ha) | Imrprov. Opns | ANR | Imrprov. Opns | ANR | Imrprov. Opns | ANR |
| RangagoraHathidepot Series | SER3C2 | 200 | 50 | 0 | 50 | 50 | 25 | 50 |
| | SER3C3 | 200 | 25 | 0 | 25 | 25 | 50 | 25 |
| | SER3C5 | 300 | 50 | 0 | 50 | 50 | 75 | 50 |
| | SER3C6 | 200 | 25 | 0 | 25 | 25 | 50 | 25 |
| | SER3C7 | 300 | 50 | 0 | 50 | 50 | 75 | 50 |
| | **Sub Total** | **1200** | **200** | **0** | **200** | **200** | **275** | **200** |
| BedetiGolbilHathimora Series | SER3C8 | 250 | 25 | 0 | 50 | 25 | 50 | 50 |
| | SER3C10 | 250 | 25 | 0 | 50 | 25 | 50 | 50 |
| | SER3C11 | 200 | 25 | 0 | 25 | 25 | 25 | 25 |
| | SER3C13 | 200 | 25 | 0 | 25 | 25 | 25 | 25 |
| | **Sub Total** | **900** | **100** | **0** | **150** | **100** | **150** | **150** |
| | **Total** | **2100** | **300** | **0** | **350** | **300** | **425** | **350** |

**Year 2023-24 to 2025-26**

| | Year | 2023-24 | | 2024-25 | | 2025-26 | |
|---|---|---|---|---|---|---|---|
| | COMPTS | Imrprov. Opns | ANR | Imrprov. Opns | ANR | Imrprov. Opns | ANR |
| RangagoraHathidepot Series | SER3C2 | 50 | 25 | 25 | 50 | 0 | 25 |
| | SER3C3 | 50 | 50 | 50 | 50 | 0 | 50 |
| | SER3C5 | 50 | 75 | 75 | 50 | 0 | 75 |
| | SER3C6 | 50 | 50 | 50 | 50 | 0 | 50 |
| | SER3C7 | 75 | 75 | 50 | 75 | 0 | 50 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Sub Total** | **275** | **275** | **250** | **275** | **0** | **250** |
| BedetiGolbilHathimora Series | SER3C8 | 50 | 50 | 50 | 50 | 25 | 50 |
| | SER3C10 | 50 | 50 | 50 | 50 | 25 | 50 |
| | SER3C11 | 50 | 25 | 50 | 50 | 25 | 50 |
| | SER3C13 | 50 | 25 | 50 | 50 | 25 | 50 |
| | **Sub Total** | **200** | **150** | **200** | **200** | **100** | **200** |
| | **Total** | **475** | **425** | **450** | **475** | **100** | **450** |

### 3.5.3.1. Rules For Marking And Extraction

The following should be borne in mind while marking and extracting dead and wind fallen trees:

1. Only dead and fallen trees should be marked. The Deputy Conservator of Forests should inspect the area and he should check atleast 5%.
2. Marking should be checked 100% by the Range Forest Officer and at least 50% by the Assistant Conservator of forests.
3. Marking should start from the month of September and extraction should be completed before March of the subsequent year under normal circumstances.
4. In case of windfallen the marking and removal operation should be completed within a fortnight.
5. The list of Trees marking no, GPS Coordinates, Location(RF and Range), Photographs and date of detection, date of wind fallen should be recorded and forwarded to Circle Conservator of Forests by DFO for prior approval
6. As far as possible, departmental elephants should be used for dragging.
7. No new roads should be formed and the existing old extraction paths should be used for carting the material.

### 3.5.3.2. Operations For Improvement Areas

The coupe area, after the removal of dead and fallen material, will be taken up for improvement operations. As the forest area is more degraded, the improvement operations will also include raising of plantations wherever required. But the total extent of the area to be treated by gap planting, under planting, tending operations, protection or by their combination in a coupe should not exceed 20% of the coupe area. For this purpose, areas requiring any treatment in the coupe should be identified and marked on the coupe map. For carrying out the improvement operations, the area should be effectively fenced by using barbed wire fencing. Grazing should not be permitted in such areas for a minimum period of 10 years. All the advance works should be completed before the onset of monsoon by aligning the area at suitable espacements depending upon the gaps. In case of patches are covered with weeds, the same may be cleared and where the gaps are bigger alignment at regular espacement may be done. Selection of species should be done to suit the local requirement.

### 3.5.3.3. Selection of local species for ANR

Suitable local miscellaneous species such as *Morus laevigata* (Bola), *Duabanga sonneratoides* (Khokan), *Mesua ferrea* (Nahor), *Michaelia* spp. *Magnolia* spp (Sopa), Bamboo, *Albizia odoratissima (Koroi), Chukrassia tubularis (Bogipoma), Talauma hodgsonii (Borhamthuri), Terminalia myriocarpa (Hollock), Dillenia indica (Outenga), Endospermum chinense (Phulgomari) and Salmalia malabarica (Simolu), Magnolia montana* (Pansopa), *Amoora wallichii* (Amari), *Dillenia pantagyna* (Oxi), *Mesua ferrea* (*Nahor), Tetrameles nudiflorae (Bhelu), Stereospermum personatum (Tengaparuli).*

### 3.5.3.4. Planting Series for ANR in Improvement areas

- **Rongagora-Hathidepot-Dikal Belt:** The entire area in Compartment nos-SER3C5, SER3C3,SER3C7 consists primarily of *Khokan, Bola, Koroi, Bogipoma, Borhamthuri, Hollock, Outenga, Phulgomari and Simolu.* Therefore, above species should be taken up for any new plantation as ANR.
- **Bedeti-Golbil-Hathimora:** The entire area has predominantly Pansopa, Hollock, Amari, Phulgomari, Oxi etc. Therefore, compartment no SER3C16, SER3C15, SER3C13, SER3C11 should be planted with native species only.

### 3.5.3.5.Regeneration

The young recruits of the existing species appear profusely after first few showers of the season. The status of NR in general can be treated as satisfactory in the most areas except for the forest patches adjoining villages that are prone to unregulated grazing. So to help the young recruits of above mentioned species to establish and to further induce the NR, the following prescriptions shall be followed:

i. The areas containing promising NR shall be identified inside the coupe.

ii. The undesirable undergrowth which is preventing or likely to prevent the development of seedling regeneration of the desired species shall be removed.

iii. Identified NR patches shall be properly spaced and tended and rigidly protected from grazing.

iv. Coppice shoots interfering with the development of young seedlings shall be removed.

### 3.5.3.6. Assisted Natural Regeneration in Improvement Areas.

The actual area taken up for ANR shall be based on ground assessment in subsequent years

ANR is proposed with 3 year maintenance

**Particulars of works**

Advance works and creation of Plantation

a. Half Goat Proof fencing with 2 starnds of Barbed Wire fence in entire ANR plot.

b. Soil working, clearing of areas with good regenerations

c. Blank areas to be plantated with 400 Plants/ha

**1st Year maintenance**
a. Cultural operation like climber cutting, soil working, weeding
b. Gap Planting
c. Repair of fencing

**2nd year maintenance**
a. Cultural operation like climber cutting, soil working , weeding
b. Gap Planting
**Total**

**3rd year maintenance**
a. Cultural operation like climber cutting, soil working , weeding
b. Gap Planting
c. Repair of fencing

## 3.5.4. Prescriptions for Plantation Areas

The plantation areas Teak stumps should be avoided as far as possible. All the seedlings should be sufficiently hardened in the nursery before they are brought for planting. All planting works should be completed by the end of June. The seedlings should be given a good soil working. Soil working to the prominent natural seedlings will boost their growth. The success of the planting will depend upon the quality of protection provided to the plantation. Therefore protection measures need to be strengthened. As a matter of fact, if the area can be effectively protected form fire and grazing successively for 3-5 years, tremendous improvement will take place in the site. Along with the planted seedlings, substantial natural regeneration, both of seed and coppice origin, will show up in response to continuous protection measures. Bamboo regeneration will also come up profusely from hitherto suppressed rhizomes. It is reiterated that rigid protection of the treatment area from fire is a must. For this fire lines around the area and criss-cross fire lines within the area may be maintained. The degraded areas consist of *Sopa, Amari, Bola, Khokan* etc. Therefore, the degraded blanks are to be replanted with indigenous species

## 3.5.4.1. Year Wise Allotment of areas for Plantation

Total 1845 Ha area is proposed for Plantation, where 300 Ha is proposed for ANR and 1545 Ha have been proposed for Block plantation(AR). Yearwise plantation targets for the Division is as below.

Table 3.7. Allotment of Areas for Plantation w.e.f 2020-29 in Improvement and Plantation Working Circle

A.

| Year | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 | 2027-28 | 2028-29 |
|---|---|---|---|---|---|---|---|---|---|
| Area(In Ha) | 180 | 235 | 270 | 325 | 185 | 195 | 165 | 160 | 130 |

B.

| | Compartment No. | Plantaion Type | Area in ha | 2020-21 | 2021-22 | 2022-23 | 2023-24 |
|---|---|---|---|---|---|---|---|
| **Behali** | SER3C18 | ANR | 100 | 25 | 25 | 25 | 25 |
| | SER3C15 | ANR | 50 | | 25 | 25 | |
| | SER3C16 | ANR | 100 | | | 25 | 25 |
| | SER3C13 | ANR | 50 | | | | |
| | | **Sub Total** | **300** | **25** | **50** | **75** | **50** |
| **Biswanath** | SER2C1 | Block Plantation | 450 | 50 | 50 | 50 | 50 |
| | SER2C11 | Block Plantation | 20 | | 10 | 10 | |
| | SER2C12 | Block Plantation | 25 | | | | 20 |
| | SER2C16 | Block Plantation | 25 | | | | 20 |
| | SER2C17 | Block Plantation | 25 | | | | |
| | SER2C4 | Block Plantation | 100 | 50 | | 25 | 25 |
| | SER2C5 | Block Plantation | 100 | | 50 | | 50 |
| | SER2C8 | Block Plantation | 50 | | | 25 | 25 |
| | | **Sub Total** | **795** | **100** | **110** | **110** | **190** |
| **Naduar** | SER1C12 | Block Plantation | 225 | 25 | 25 | 25 | 25 |
| | SER1C13 | Block Plantation | 225 | 25 | 25 | 25 | 25 |
| | SER1C 8 | Block Plantation | 100 | | 20 | 20 | 20 |
| | SER1C 14 | Block Plantation | 100 | | | | |
| | | **Sub Total** | **650** | **50** | **70** | **70** | **70** |
| **Singlijan** | SER4C1 | Block Plantation | 100 | 5 | 5 | 15 | 15 |
| | | **Sub Total** | 100 | **5** | **5** | **15** | **15** |
| | | Total | **1845** | **180** | **235** | **270** | **325** |

C.

| | Compartment No. | Plantaion Type | 2024-25 | 2025-26 | 2026-27 | 2027-28 | 2028-29 |
|---|---|---|---|---|---|---|---|
| Behali | SER3C18 | ANR | | | | | |
| | SER3C15 | ANR | | | | | |
| | SER3C16 | ANR | 25 | 25 | | | |
| | SER3C13 | ANR | | | 25 | 25 | |
| | | Sub Total | **25** | **25** | **25** | **25** | **0** |
| Biswanath | SER2C1 | Block Plantation | 50 | 50 | 50 | 50 | 50 |
| | SER2C11 | Block Plantation | | | | | |
| | SER2C12 | Block Plantation | 5 | | | | |
| | SER2C16 | Block Plantation | 5 | | | | |
| | SER2C17 | Block Plantation | | 20 | 5 | | |
| | SER2C4 | Block Plantation | | | | | |
| | SER2C5 | Block Plantation | | | | | |
| | SER2C8 | Block Plantation | | | | | |
| | | Sub Total | **60** | **70** | **55** | **50** | **50** |
| Naduar | SER1C12 | Block Plantation | 25 | 25 | 25 | 25 | 25 |
| | SER1C13 | Block Plantation | 25 | 25 | 25 | 25 | 25 |
| | SER1C 8 | Block Plantation | 20 | 20 | | | |
| | SER1C 14 | Block Plantation | 20 | 20 | 20 | 20 | 20 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Sub Total | **90** | **90** | **70** | **70** | **70** |
| Singlijan | SER4C1 | Block Plantation | 10 | 10 | 15 | 15 | 10 |
| | | Sub Total | **10** | **10** | **15** | **15** | **10** |
| | | Total | **185** | **195** | **165** | **160** | **130** |

### 3.5.4.1.Artificial Regeneration and Choice of the Species :

The limiting factors of a plantation to be successful are listed below. They should be properly addressed before taking up any new plantation activity-

i. Timely plantation targets.

ii. Selection of suitable plantation sites.

iii. Choice of species as per the sites

iv. Analysis and eradication of reasons for previous failures.

v. Timely release of budgetary grants.

vi. Seed procurement from known sources.

vii. Healthy and hardy nursery stock.

viii. Proper depth of trenches or pits.

ix. Proper soil-working.

x. Full protection from biotic-interference. Full Goat Proof fencing with 3 strand barbed wire/ Concertina coils and RCC Pillars for Protection of Plantation and maintenance for minimum of 4 years

The choice of the species to be planted shall depend upon the area suitability of the species and its local demand and shall be decided by the DFO in close consultation with the RO and BO. Local plant species should be preferred.

### 3.5.4.2. Quality planting material and seeds / seedlings

Successful establishment of Plantation is largely dependent on source of seed and sapling. The quality of planting material should be ensured. Thus, emphasis to be laid on proper Seed Sources and Provenances which are to be used. Thus, instead of procuring planting material from unknown sources, seed collection should be done from mother trees of the RFs. Based on calendar of seed setting seeds shall be collected from forest. All Beat and forest camps shall be ordered to collect seeds from forest round the year.

**Table 3.8: Seedsetting and maturing period of selected species**

| Sl.No. | Tree Species/ Vernacular Name | Flowering | Seed Setting | Seed Maturing/ Collection |
|---|---|---|---|---|
| 1. | Bola | Feb-March | June-July | Aug-Sept |
| 2. | Khokan | April-May | Aug-Sept | March-April |
| 3. | Bogipoma | Feb-March | April-May | June-July |
| 4. | Barhamthuri | Feb-March | | June-July |
| 5. | Hollock | March-April | June-July | Feb-March |
| 6. | Outenga | May-June | July-Aug | Feb- March |
| 7. | Phulgomari | Feb-March | April-May | June-July |
| 8. | Simalu | Jan-Feb | March | April |
| 9. | Pansopa | Jan-Feb | June-July | Sept-Oct |
| 10. | Oxi | Jan-Feb | June | Sept |
| 11. | Amari | Jan-Feb | April-May | May-June |
| 12. | Satiana | Sept-Oct | Nov | Dec-Jan |
| 13. | Bhelu | Feb-March | June | Aug |
| 14. | Dimoru | June-July | Aug-Sept | Nov-Dec |

## 3.5.4.3. Preparation of planting area

- January to February is appropriate time for advance work like clearing the area, stump removal followed by burning.
- Fencing the entire plantation area with barbedwire 4-5 strand with wooden post every 2 meters.
- Planting Plan is to be drawn alongwith planting map. For other species pits of 45 $cm^3$ are to be dug with spacing of 3m X2m or 2m X2m.

## 3.5.4.4.Pre-Planting And Planting Operations

i) Pre-planting operations: Site Selection and Demarcation shall be carried out during December month

before the actual planting works are to be taken up.

(a) Soil Working: Proper depth of the pits/trenches as per the plantation model is essential for the early establishment of the seedlings and therefore should be given appropriate attention by the inspecting officers.

(b) Fencing: The area to be planted shall be fenced with a Barbed wire, Chain link fencing with RCC Pillars.

(c) Nursery: Nursery shall be raised well in time using root trainers/ poly pots as per the yearly requirement of the stock. Only good quality seeds of known origin should be used. The DCF should first try to procure good quality seeds of the required species from the mother trees in advance as well as from the seed units of the SIlviculture Division for raising nurseries. Adequate budgetary grants must be provided to the DCF in time so as not to affect the nursery operations. Nursery stock should be a judicious mix of indigenous species valuable to the local community for their daily needs like that

of timber, fuel, fodder, NTFP as well as of bamboo. The stock should be tended with great care so that the seedlings of various species grow into healthy and hardy planting stock and attain sufficient height and age before they are planted out. The sorting and grading of the planting stock should be done on regular basis and only healthy and hardy seedlings of sufficient height and age should be allowed to leave the nurseries for planting in the field.

ii) Planting Operations :

(a) Planting: The planting of miscellaneous species shall be done in the pits/ trenches during the April to July in the next year. It shall be completed within a fortnight from the outbreak of monsoons.

(b) Weedings, Soil-working and Casualty-replacement: Weedings, Soil-working and Casualty-replacement shall be done timely and as per the plantation model adopted. Proper soil-working of the seedlings planted is absolutely essential and therefore close attention should be given to it by the inspecting officials.

## 3.5.4.5.Plantation Models for Plantations

3 X 3 meter spacing is proposed for all block plantations. Maintenance is proposed for 4 years only. Choice of species is as described in previous sections

| S.No. | Particulars of works |
|---|---|
| A | **ERECTION OF FENCING** |
| | (a) Erection of full Chain-linked Goat Proof fencing (4' ht. with 10 Gauge, 3" dia link) to be fitted on Pre-cast RCC pillars* at 1.8 mt. apart including transportation of fencing materials to site |
| C | **ADVANCE WORK** |
| | Site selection, surveying, demarcation, jungle cutting, burning etc |
| | Preparation and acquisition of polypot saplings in the field nursery for planting 1100 Nos. Seedlings/ ha at the rate of spacing 3m X 3m |
| | **Preparation of polypot saplings in the field nursery for vacancy filling while planning for raising nursery the mortality should be accounted.** |
| | a) 25% mortality expected during 1st year (to be planted in the field during the 2nd year) ,i.e., 277 Seedlings/ ha |
| | b) 20% mortality expected during 2nd year (to be planted in the field during the 3rd year) ,i.e., 222 Seedlings/ ha |
| | c) 15% mortality expected during 3rd year (to be planted in the field during the 4th year),i.e., 166 Seedlings/ ha |
| | d) 10% mortality expected during 4th year (to be planted in the field during the 5th year),i.e., 111 Seedlings/ ha |
| | Line alignment, carriage of stacking materials and fixing the stacking |
| D | **CREATION & 1st YEAR MAINTENANCE** |
| | Soil working, carriage of stumps, polypot seedling and planting at the plantation site including, dibbling of seeds wherever necessary to complete raising of plantation with all necessary operation @ 4**0** DLs/ ha |
| | Provision for 5 weedings, mulching and fire protection works |

| | |
|---|---|
| | Upkeepment of plantation, and making of inspection path, repairing of fence etc. on day to day basis |
| **E** | **2nd YEAR MAINTENANCE** |
| | 5 weedings, fire protection works |
| | 25% Vacancy filling by 1 year old seedlings from nursery |
| | Upkeepment of plantation, and making of inspection path, repairing of fence etc. on day to day basis |
| | Maintenance and protection of field nursery |
| **F** | **3rd YEAR MAINTENANCE** |
| | 4 weedings, fire protection works |
| | 20% Vacancy filling by 2 year old seedlings from nursery |
| | Protection work, cattle watching, upkeepment of plantation, and making of inspection path, repairing of fence etc. on day to day basis |
| | Maintenance and protection of field nursery and watch |
| **G** | **4th YEAR MAINTENANCE** |
| | 4 weedings, fire protection works @15 dls/ha/weeding |
| | 15% Vacancy filling by 2 year old seedlings from nursery |
| | Upkeepment of plantation, and making of inspection path, repairing of fence etc. on day to day basis |

### 3.5.4.6. Planting Techniques for *Morus laevigata* Wall ( Bola )

Mulberry comprising the genus *Morus* , family Moraceae is a flowering woody tree of great economic importance in the sericulture industry because of its foliage is used as food for silkworms. Since cross pollination is the rule, enormous heterozygosity occurs in the plant. *Morus* is present in all regions from sea level to altitudes as high as 4000 m , which include, Asia, Europe, North and South America and Africa. In India there are many species of which *Morus alba* and *M. indica* are fully domesticated while M. serrate and *M. laevigata* grow wild in the Himalayas. Among the different species , *Morus laevigata* Wall appears to be a multipurpose tree because of its high quality timber, sweet edible fruits and higher nutritional quality. In Assam, *M. laevigata* is one of the valuable timber species, which occurs in tropical evergreen and mixed deciduous forests in moist localities and thrives best on well drained alluvial soil. It is a light demander and fairly frost tender.

The inflorescence in mulberry is a catkin with pendent or drooping peduncle bearing unisexual flowers. Male catkins are usually longer than the female catkins. Inflorescence of *M. laevigata* is the longest among the inflorescence of mulberry species, with ca. 5-12 cm long in males and ca. 5-6 cm long in females. Male flowers are loosely arranged and after shedding the pollen, the inflorescence dries and falls off. Female inflorescence is usually short and the flowers are arranged compactly. The ovary is single celled and the stigma is bifid. The ovules are pendulous. Pollination is anemophilous. Again leaves of *Morus laevigata* are simple and alternate , when fed to silkworms produce a better cocoon than those fed on *M. alba.*

**Method of propagation :**

**Propagation through seeds** –Planning process to raise a nursery from seeds has to be initiated well ahead of fruiting season, which starts from April to May, so that good quality planting material can be obtained.

**Seed collection and processing –**

***** Seeds are generally available from April to first week of May. However care should be taken to collect the seeds from the trees which are known to be fertile as apparently all the trees are not fertile.

* Fruits are collected by lopping of matured catkins bearing branches.

* After collection they are soaked in water for 24 to 48 hours to allow the decomposition of pulp. Seeds are separated by rubbing it over a wire mesh, washed and dried under shade.

Seed collection period – April to May.

Number of seeds/Kg – 3, 50,000

Seed viability - 5 to 6 months.

Germination percentage – 40

Seedlings obtained / Kg seeds – 1, 40,500

Pre –sowing treatment – Not required

Sowing method –Mother beds

Germination period – 10 -45 days

Nursery management – Care should be taken at the time of sowing of seeds and Watering the beds as there are chances of damage due to very light weight of the Seeds.

**Nursery establishment :**

**Seed sowing in germination bed** –

- Raised standard nursery beds of measuring 10 m x 1.2 m size can be used for raising seed-lings.
- Fill the raised beds with pure river sand and Seeds are sown at the depth of 0.5 cm to 1.0 cm in mother beds or trays.
- Keep the beds moist all the time by regular watering. Watering is done carefully so that seeds are not washed away.
- Make provision for shade over the beds ( using agro shade nets or any other locally available material).
- The germination starts after 10 to 15 days of sowing and continues up to about five weeks.
- Depending on quality of seeds and time of collection, over 40 -50% germination can be achieved.

**Pricking out to polybag/ woven bag** – Seedlings are transplanted after about two months of sowing or four leaves stage when they become about four inches tall.. Bags are filled with a mixture of soil , sand and compost in 1: 1: 1 ratio as potting media for potting the seedlings. Water and weed the polybags regularly as per requirement and make provision for overhead shade .

With good nursery practices the seedlings become ready for plantation after about 4 to 6 months of transplanting. Stump planting is also quite successful in this species.

**Plantation establishment:**

**How to prepare the field for planting-**

- Select a suitable evergreen or mixed deciduous forests area in moist localities to field plant the seedlings of *M. laevigata* .
- Weed the area to remove undergrowth and ground flora.
- Align the plot at a spacing of 2m x 2m. or more.
- The tree can also be raised at spacing of 1.2 m x1.2 m depending on the end –uses of timber.
- Take pits of 30cm x 30cm x 30cm size for planting the seedlings.

**How to field plant seedlings –**

- Field plant the poly –potted seedlings, maintained in the nursery by the onset of pre monsoon showers in May –June.
- Remove the polythene covers without damaging the root system of the seedlings.
- During planting seedling with ball of earth is reported to have given 100 % success.
- Provide little terracing around the field planted seedlings to avoid stagnation of water.

**Disease and pest management** :

A few pest are recorded on the Bola tree viz. root feeders ( *Sternocera aequisignata* and Termites ) and Mealy bug *( Maconellicoccus* sp.) cause damage to seedlings, branches and stems. Damage does not result in death but may deform or suppress tree growth.

*Morus laevigata* is susceptible to various diseases viz., damping off , leaf spot, leaf rust, powdery mildew and leaf blight . Root rot is another serious disease causing considerable damage to Bola plantation.

**Management of the disease –**

- Plantation of saplings from the diseased nursery should be avoided.
- Removal and burning of infected leaves and twigs can be important in plantation by reducing residual inoculum level of the pathogen.
- Application of Carboxin ( 0.2% ) at fortnightly intervals can effectively control the disease in the nursery .
- In case of the root rot disease , some of the management practices like genetic selection of trees ,proper scheduling of pruning and thinning, silvicultural manipulation to improve tree form and sand hygiene can be employed to minimize the damage.

**Plantation maintenance and growth of seedlings –**

- In pure plantations of *Morus laevigata* survival rate of field planted seedlings is around 80 present during the initial six months.
- The growth is rapid in first few years but slow down gradually.
- It coppices and pollards well.
- Grazing and draught are to be prevented in the plantation.

### 3.5.4.7. Other Regulations

Closure to grazing: Coupes shall remain closed to grazing for a period of 5 years from the Ist year of its working.

**Resolving conflict with Micro Plans made under JFM/ FDA**: If any conflict is noticed between the prescriptions given in this WC and the Micro Plan written under JFM, FDA etc. for the same area, then the said area shall be treated in accordance with the special objects of management pertaining to this W.C. and suitable amendments shall be made in the Micro Plan, if necessary.

The Workshops should be organized in each Range to sensitize and train the field staff in implementing the prescriptions of this WP.

## 3.8 Silviculture system

No specific silviculture system is prescribed. Tending, weeding operation is essential. Weeding operations are to be carried out on time.Cleaning and climber cutting is also recommended. Initial 3-4 years of establishment is very important.Plantation area to be fenced.

### 3.9. Estimated Revenue and Expenditure for Working Circle.

The estimated expenditure for creation, maintenance of plantations shall be as per approved estimate of the Assam Forest Department . The approved plantation norms for CAMPA was adopted in this plan for calculation of ANR and Block Plantation.

Table 3.9a. Areas under Improvement working circle allotted w.e.f. 2020-26. For improvement operations 15 Mandays/Ha @ RS 247/- Daily Wage was considered for calculation.

| Year | 2020-21 | | 2021-22 | | 2022-23 | |
|---|---|---|---|---|---|---|
| Operations | Imrprov. Opns | ANR | Imrprov. Opns | ANR | Imrprov. Opns | ANR |
| Area in Ha | 300 | 0 | 350 | 300 | 425 | 350 |
| Amount in Rs | 1111500 | | 1296750 | 43950000 | 1574625 | 56870000 |

Table 3.9b.

For improvement operations 15 Mandays/Ha @ RS 247/- Daily Wage was considered for calculation.

| Year | 2023-24 | | 2024-25 | | 2025-26 | |
|---|---|---|---|---|---|---|
| Operations | Imrprov. Opns | ANR | Imrprov. Opns | ANR | Imrprov. Opns | ANR |
| Area in Ha | 475 | 425 | 450 | 475 | 100 | 450 |
| Amount in Rs | 1759875 | 124492500 | 1667250 | 73851250 | 370500 | 65925000 |

Table 3.10a Year wise allotment of areas for ANR inimprovement working circle

| Year | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 | 2025-26 |
|---|---|---|---|---|---|---|
| Area(In Ha) | 180 | 235 | 270 | 325 | 185 | 195 |
| Amount in Rs | 9455040 | 15739600 | 22011120 | 29604820 | 26794155 | 26889390 |

Table 3.10b Year wise allotment of areas for ANR inimprovement working circle

| Year | 2026-27 | 2027-28 | 2028-29 |
|---|---|---|---|
| Area(In Ha) | 165 | 160 | 130 |
| Amount in Rs | 24154645 | 21764745 | 18102835 |

The areas for ANR shall be selected based on DFOs report after ground assessment.

# CHAPTER 4
# NTFP AND BAMBOO (OVERLAPPING) WORKING CIRCLE

## 4.1 Name of the Working Circle

NTFP and Bamboo Working Circle (Overlapping). The detail map of this working circle is shown in Figure 4.1.

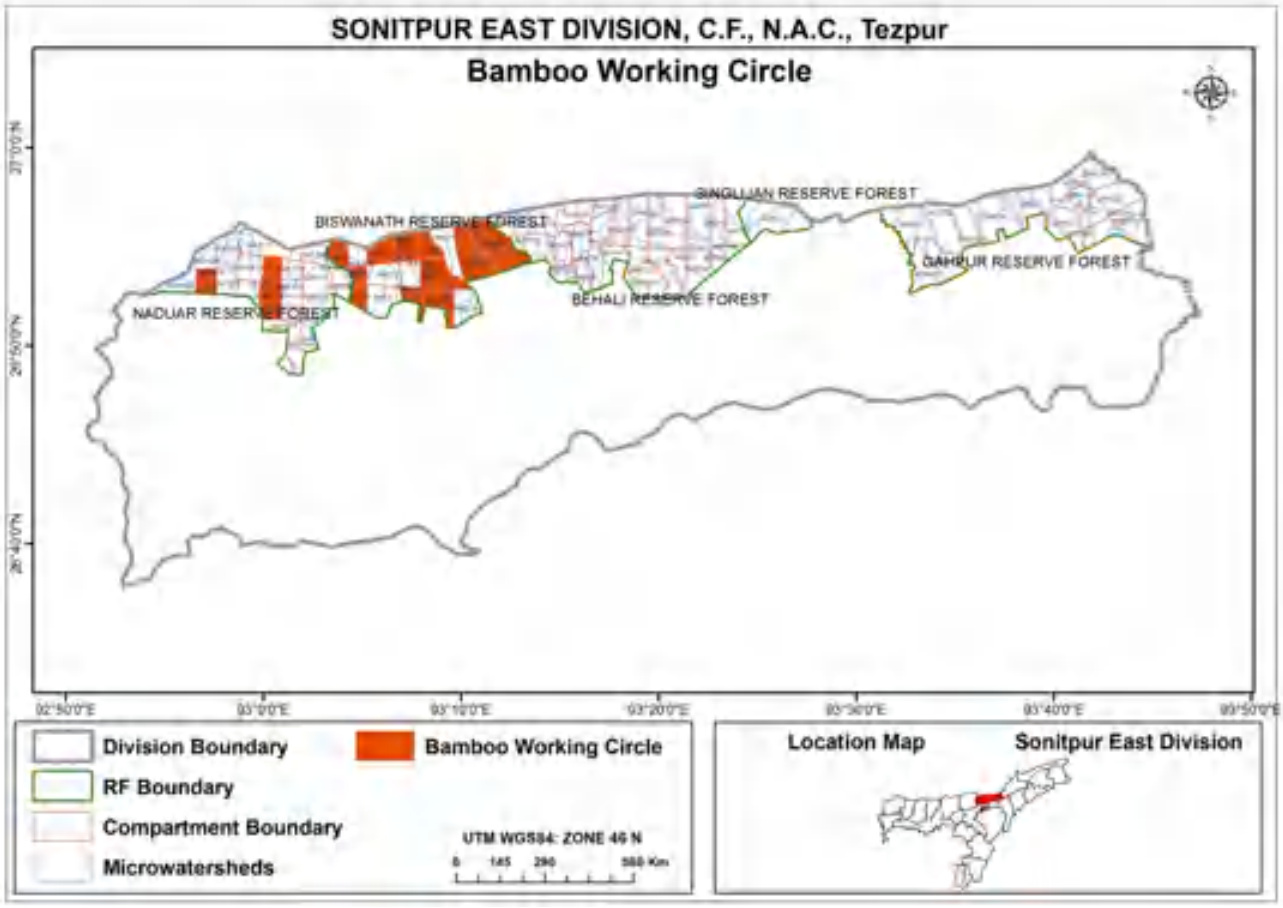



**Figure 4.1a: Map of Bamboo working circle (overlapping) of Donitpur East Division**

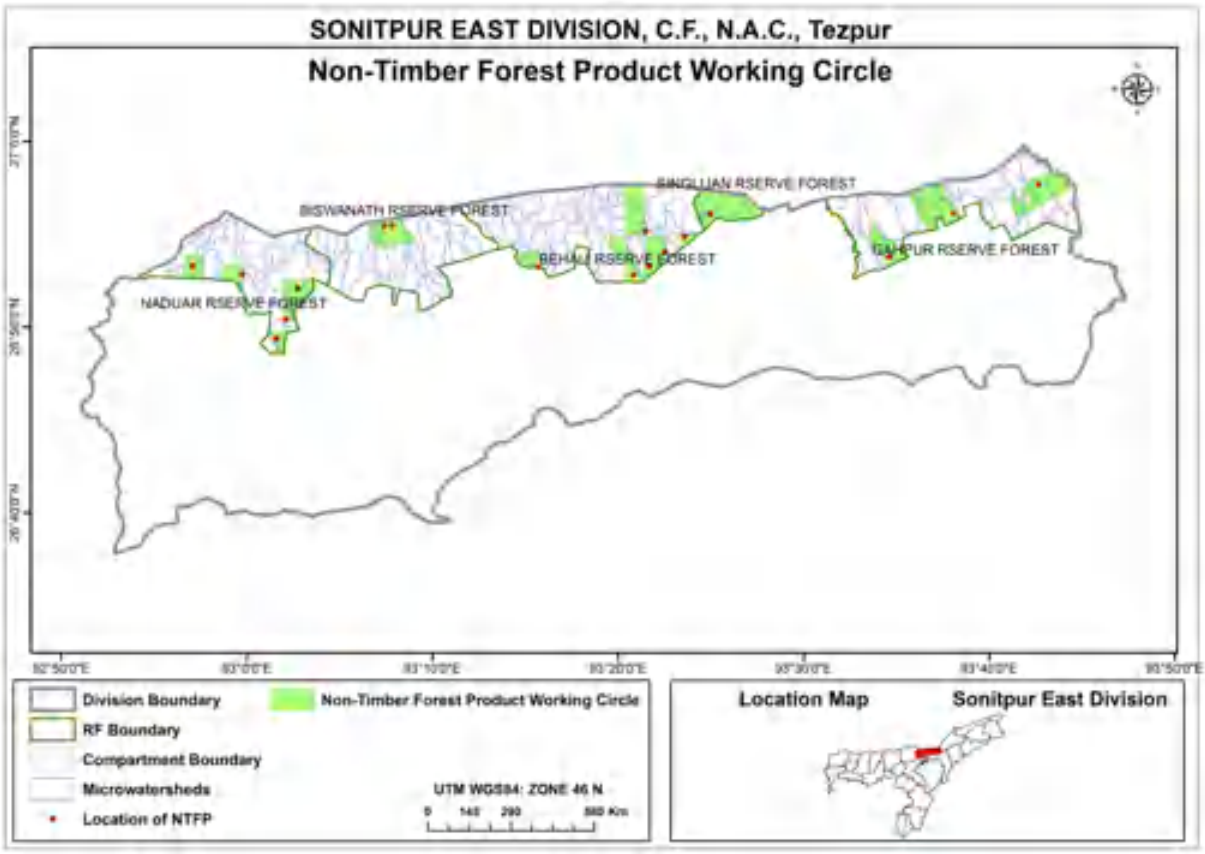



**Figure 4.1b: Map of NTFP working circle (overlapping) of Donitpur East Division**

## 4.2 General Constitutents of the Working Circle

The NTFP & Bamboo working circle shall comprise largely of fringe forest areas or such other areas, are fit for extraction of a particular NTFP at a prescribed ratethat does not lead to the long term decline of the biological diversity so as to maintain its potential to meet the needs and aspirations of present and future generations. NTFPs shall be managed on JFMC areas, fringe forest areas, community forest areas with the help of community after imparting proper training to them regarding time of harvesting, grading and storage for sustainable management and value addition etc.

The Bamboo component of this Working Circle has been constituted taking into consideration the present status of bamboo plantation in the Division.The compartments placed under this working circle are based on folllwoing criterias:

- Original Bamboo area
- Poor regeneration status in general
- Degraded compartments due to illegal fellings in the past.

## 4.3 Objectives of the Working Circle

The broad objective of this working circle is to improve the stocks of the forest of this Division by regeneration and plantation. Specific objectives are given below –

- Sustained use of forests through sustainable collection, harvesting of NTFP adopting sound silvicultural principles.
- Protection, conservation and sustainable extraction of Non Timber Forest Produce for enhancing the livelihood of the fringe villagers and JFMCs.
- The NTFPs of the Division viz., *Phuljharu, Salmurga, Hillikha, Amlokhi, Bhomora, Dioscorea, Ghankachu, Bhatghila* are not exploited commercially.Realization of the commercial potential of these NTFPs alongwith its conservation by preventing over extraction through enhanced and stringent vigilance.
- To increase the extent of minor forest produce plantations and
- To increase the yield of NTFPs by encouraging regeneration and supplementing with artificial regeneration by intensive cultivation.
- To promote Bamboo Plantation in the natural bamboo areas
- To promote afforestation of open and degraded patches of forests.
- To promote Bamboo as fodder for Elephant population

## 4.4 Legal position

Wildlife (Protection) Act, 1972 is applicable for entire Assam. Indian Forest Act 1927 also deals with wildlife. The Wildlife (Protection) Assam Rules, 1980, Bamboo and Rattan Policy, 2003. are applicable. Assam Forest Policy, 2004 under IFA, 1927 hunting of wild animals has been completely banned as per the amendments made to the Wildlife (Protection) Act, 1972 in the year 1991 are in vogue.

## 4.5 Blocks and compartment allotment of areas

50%of the compartments which have been allotted to Plantation and JFM Working Circle will be allotted to this circle.

**Table 4.1: Allotment of areas under the working circle in the Division**

**A. NTFP: The area allotment for JFMC shall be similar to NTFP working circle**

| Name of the RF | Compartment No. | Area Alloted for Plantation | Area Alloted for Protection | Total area allotted for Collection of NTFP by JFMC(In Ha) |
|---|---|---|---|---|
| BEHALI | SER3C 26 | 50 | 50 | 100 |
| | SER3C 24 | 50 | 50 | 100 |
| | SER3C 22 | 50 | 50 | 100 |
| | SER3C 18 | 50 | 50 | 100 |
| | SER3C 21 | 50 | 50 | 100 |
| | SER3C 8 | 50 | 50 | 100 |

| Name of the RF | Compartment No. | Area Alloted for Plantation | Area Alloted for Protection | Total area allotted for Collection of NTFP by JFMC(In Ha) |
|---|---|---|---|---|
| **Sub Total** | | | | **600** |
| BISWANATH RESERVE FOREST | SER2C 8 | 100 | 100 | 100 |
| **Sub Total** | | | | **100** |
| NADUAR RESERVE FOREST | SER1C 6 | 50 | 50 | 100 |
| | SER1C 4 | 50 | 50 | 100 |
| | SER1C 3 | 50 | 50 | 100 |
| | SER1C 19 | 50 | 50 | 100 |
| | SER1C 18 | 50 | 50 | 100 |
| **Sub Total** | | | | 500 |
| Singlijan Reserve Forest | SER 4C 1 | 50 | 50 | **100** |
| **Sub Total** | | | | 100 |
| **Grand Total** | | | | **1300 Ha** |

B. Bamboo: Area Alloted for Bamboo Plantation

| Range | Name of RF | Compartment | Area Alloted(In Ha) |
|---|---|---|---|
| Pabhoi | BISWANATH RESERVE FOREST | SER2C10 | 50 |
| | | SER2C1 | 50 |
| | | SER2C4 | 100 |
| | | SER2C5 | 100 |
| | | SER2 C 8 | 50 |
| | | SER2C11 | 50 |
| | | SER2C12 | 50 |
| | | SER2C13 | 50 |
| | | SER2C16 | 50 |
| | | SER2C17 | 50 |
| | | SER2C3 | 50 |
| | NADUAR RF | SER1C21 | 100 |
| | | SER1C14 | 100 |
| | Total area | | **850 Ha** |

**Table 4.2. Area Under Exisiting Plantation of Bamboo**

| Range | Name of RF | Year of Creation | Compartm-ent No. | Area (In Ha) | Created By | Survival % | Remarks |
|---|---|---|---|---|---|---|---|
| Pabhoi Range | BISWANATH RESERVE FOREST | 2010-11 | **SER1C3** | 50 | Selaikhati JFMC | 40% | Irregular Growth due to destruction by Wild Elephant |
| | | 2012-13 | **SER3C1** | 50 | Bhelodanga | 45% | Irregular Growth due to destruction by Wild Elephant |
| | | 2012-13 | **SER2C3** | 25 | Madhupur JFMC | 40% | Irregular Growth due to destruction by Wild Elephant |
| | | 2012-13 | **SER2C7** | 25 | Bhimajuli JFMC | 40% | Irregular Growth due to destruction by Wild Elephant |

## 4.6 Analysis of the flora and fauna

Areas allotted to this Circle are those which are part of Biswanath and Naduar Reserve Forests, which are free from encroachment and consists of natural bamboo formation. The terrain is

hilly. It has been found that two bamboo species, Jati (Bambusa tulda) and Bhaluka ( Bambusa balcooa) constitute the bulk of the bamboo resource (more than 92%). Other bamboo species in order of occurrence area Bijuli (Bambusa palida) 3%, Bakal (Bambusa nutans) 2.6% and Bethu (Bambusa cacharensis) 1%.

## 4.7 Associated regulations and measures

- The schedule tribes and other traditional Forest Dwellers (Recognition of Forest Rights) Rules, 2007
- The Assam Joint (Peoples Participation) Forestry management Rule, 1998
- Other Special Acts / Regulation/ Rules the Forest Department based on the requirement under Indian Penal Code, Criminal Procedure Code for arrest/ forwarding/ investigation of the offences. The Compliance of all the above Laws/Acts/special acts towards sustainable management of forest.

## 4.8 Strategy

NTFP collection would be restricted to JFMC areas only. The JFMC members will be allowed to collect NTFPs in sustainable manner only. The NTFP area is similar to the area allotted to JFMCs for protection and plantation.

## 4.9 Method of Treatment

All the areas coming under other working circle are included in the NTFP working circle where collection of NTFPs including Gandhi Kachu, Dillenia fruits, bark of bhatgilla( non destructive only), collection of bark of Arjun( non destructive) and Honey collection allowed.

### 4.9.1 NTFP collection by JFMCs

Wherever JFMCs are formed, the collection of NTFP has to be entrusted to JFMCs, so that there can be a stake for the local communities to take interest in their proper collection and protection. No agents, outsider will be allowed to collect NTFPs from the Division.

### 4.9.2 Method of sale

The NTFP items shall be sold in public auction through tender cum auction sale by JFMCs only. The quantities of NTFP items are ascertained from past records and auction rates for each NTFP items shall be fixed on weight basis. The sale will be held in the Village Community Halls in presence of Member Secretary. The entire collection and disposal of NTFP should be done by JFMCs assisted by the department by eliminating the middlemen.

### 4.9.3 Status of NTFP species

No systematic study of NTFP studies has been conducted.The information regarding their distribution, regeneration and productivity is must before a suitable strategy is involved. In the current Working Plan data on these lines should be collected. Apart from the items tendered by the department, local people do collect NTFP items for foodand medicinal purpose. Data on such collections is required to assess the sustainability of removal of those NTFP items.

## 4.10 Status of NTFP Species

No systematic study of NTFP studies has been conducted. The information regarding their distribution, regeneration and productivity is must before a suitable strategy is involved. Data on these lines shall be collected in the tenure of the current Working Plan. Apart from the items tendered by the department, local people do collect NTFP items for food and medicinal purpose. Data on such collections is required to assess the sustainability of removal of those NTFP items.

## 4.11. Silvicultural System

The silvicultural system to be followed is the selection system. Only the silviculturally available non-wood forest produces are to be extracted with due importance to the rotation of the specific plant/tree species. The trees having medicinal value for their fruits, seeds, barks, leaves etc. are to be protected and the vegetative parts are to be extracted scientifically. Plantation of medicinal plants and other highly valuable NTFPs are to be raised following the standard techniques. Natural regeneration in patches of medicinal plants and their NTFPs may be supplemented by artificial planting. The selection of areas is left to the discretion of the territorial DFO who should encourage their plantation and maintenance through JFM committes of the area.

## 4.12. Present System of exploitation

At present, no system is followed to regulate the exploitation of NTFP in the area, neither data is available about the annual extraction of plants and their parts. Although there is no bar on collection of medicinal plants, the local people take it stealithly generally for their local use. Outenga(*Dilenia Sp*) and *Aegle marmelos* fruits are left unexploited, whereas, fruits can be sold through JFMCs. The area should be allocated to the JFM committee of the area for protection, planting and income generation.

**4.12.1. Sustainable Harvesting:** Sustainable harvesting of produce can be assured by

(i) Fixing the time of collection, (ii) Marking the area/for extraction. (iii) Fixing the quantity of extraction,

**(i) Time of collection:** Time of collection of different products can be fixed by arranging the meeting with JFMCs and making them aware about the sustainable harvesting. In this respect proper training to the JFMCs should also be imparted.

**(ii) Marking the Area/boundary:** Certain NTF Products are found in particular compartments and areas only. Therefore those areas should be identified and marked to improve the working.

**(iii)Quantity of extraction:** The extractable quantities of NTFP without causing harm to the plants' population and its regeneration should be evaluated for rare medicinal plants, so that they can survive for the future.

The golden rule for extraction, is however, that only the silviculturally available produces are to be allowed for collection and if any area is found deficient of any species, such species are not to be allowed for collection.

## 4.13. Prescriptions for NTFP

The following prescriptions should be adhered to –

- No collection of NTFP or medicinal plants to be encouraged from areas outside allotted area. However, inventorisation and identification of medicinal plants in the reserve forests would be taken up over the tenure of the current Working Plan.
- Plantations of medicinal plants shall be created in JFMC areas. Such Medicinal plants shall be harvested in a sustainable manner.
- Training programmes shall be organised for Farmers/fringe villagers about sustainable cultivation as well as harvesting of medicinal plants.
- Marketing of NTFPs shall be facilitated by Forest Department by undertaking 'Buy-Back' agreement and tripartite agreement with Private parties.

## 4.14 Estimated Revenue and Expenditure for NTFP:

The calculation of yield at present cannot be done as NTFPs are neither systematically harvested nor their estimated quantities are available. Such data should be recorded by the Range Officers for future planning.

## 4.15. Prescriptions for Bamboo Plantation

It is preferred that no large trees are present except those that come outside the planting area.If trees are to be retained then it would be a good idea to leave an area adjacent to the canopy around it free of bamboo. Once the land is prepared for plantation after leveling and weeding, the next step is to align and place stakes to mark spots for taking the pits.Depending on the spacing chosen and modifications made to avoid large trees and earth formations if any, wooden or bamboo stakes are driven into the ground to mark the centre of the square or round pits(in case augers are used). This will help avoid mis-alignment of pits when unskilled labour or machinery is used for pitting, particularly when planting is to be done along contours on undulating sites in hilly areas. A North–South orientation is ideal for aligning the rows to get the best benefit of sunlight. Larger pits of 60cm X60cm X60 cm or even larger (1m X1m X1 m)can be considered.Bigger pits will also benefit the lager bamboo species in establishing well. In lowlying areas as ystem of bunds can be considered. A trench is dug and the soil used to makeabund of about 1min width and 0.5 min height along the length of the plot. Thespacing between the trenches depends on the species (see below). In smaller plantations and in homesteads pits can be dug manually.For larger areas this activity can be efficiently done with hand operated or tractor mounted powered augers or small earth movers,if found economical in the locality. Large trenches is an option which facilitates the use of large earth movers and does away with the need for individual pits.

Choice of Species should be based on availability of the following species or planting material. Following species of Bamboo is available in entire state of Assam.

| Sl no | Vernacular Name | Botanical Name | Status |
|---|---|---|---|
| 1 | Saru Bijuli | *Baambusa assamica* | Commonly cultivated, culms are used as handicrafts, fishing rod and for erecting fence. |
| 2 | Bhaluka banh | *Bambusa balcooa* | Widely cultivated and nowhere found in wild state. It is probably the best and strongest species for building purposes. |
| 3 | Kotoha banh | *Bambusa bambos* | Flowering gregarious, occasionally sporadic. Sporadic flowering occurred in some parts of homestead under Kamrup district during 2008-2009.Species use in paper mill, young shoots are edible. |
| 4 | Barosi banh,Hedge banh | *Bambusa multiplex* | Indigenous to China but now available in throughout the state. Frequently cultivated as hedge . |
| 5 | Makal banh | *Bambusa nutans* | Naturally occurring in the state. Flowering sporadic ,occasionally gregarious. Use in construction. |
| 6 | Jati banh | *Bambusa tulda* | Widely cultivated all over Assam, used for house building, construction , fencing etc. Although Rajkhowa ( 1964) mentioned that it forms extensive gregarious belts in low hills of Central Assam Zone yet after investigations could not find it in wild state. Flowering gregarious , occasionally sporadic. Sporadic flowering recorded in two localities, one in Marakdola and other in North Guwahati in Kamrup district during the period 2007-2009. |
| 7 | Bijuli banh | *Bambusa pallida* | Cultivated in the plains of Assam. It is used for house building , handicraft, mat etc. Flowering sporadic. |
| 8 | Kalachi banh | *Bambusa vulgaris var. Wamini* | Cultivated throughout Assam as ornamental. So far flowering is not known for this taxon. |
| 9 | Haladhia banh | *Bambusa vulgaris var. vittata* | Cultivated throughout Assam as ornamental. Flowering sporadic and |

| | | | |
|---|---|---|---|
| | | | rare ,does not set seeds. |
| 10 | Kako banh | *Dendrocalamus hamiltonii* | Wild in the lower hills of Assam, often forming extensive patches and also occasionally cultivated in the plains. It is used in house building , making of busket, mat and containers for water and milk, tender shoots are eaten. Flowering gregarious and sporadic after 30-40 years. Gregarious flowering recorded in Kamrup during 1999. Sporadic flowering recorded in Garbhanga and khanapara RF during 2006-2008. |
| 11 | Muli banh | *Melocanna baccifera* | Cultivated all over Assam. It is used prefabricated walls called tarja, roofing, and walls of huts etc. Flowering gregarious rarely sporadic after 35 to 60 years. Sporadic flowering and fruiting recorded in Marakdola during 2010 -11. |

2.10.2. **Year wise allotted area for Bamboo Plantation**

Total 850 Ha of Bamboo plantation is envisaged and creation of plantation would start from 2020-2025 and followed by harvesting of Bamboo from 5$^{th}$ Year onwards. The entire plantation shall be accrued out in 12 compartments of Biswanath RF and 2 Compartments of Naduar RF. The proposed compartments are natural Bamboo area. The details of year wise area allotted for Bamboo Plantation is as given in Table 4.3.

Table 4.3. Year wise alloted area for Plantation of Bamboo

**Year 2020-23**

| RANGE | **Name of RF** | **Compartment** | **Area Alloted(In Ha)** | **2020-21** | **2021-22** | **2022-23** |
|---|---|---|---|---|---|---|
| PABHOI | BISWANATH | SER2C10 | 50 | | | 10 |
| | | SER2C1 | 50 | | 10 | 10 |
| | | SER2C4 | 100 | 25 | 25 | 25 |
| | | SER2C5 | 100 | | | 25 |
| | | SER2 C 8 | 50 | 10 | 10 | 10 |
| | | SER2C11 | 50 | | | 10 |
| | | SER2C12 | 50 | | 10 | 10 |
| | | SER2C13 | 50 | 10 | 10 | 10 |
| | | SER2C16 | 50 | | 10 | 10 |
| | | SER2C17 | 50 | 10 | 10 | 10 |
| | | SER2C3 | 50 | | | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| DIPLONGA | NADUAR | SER1C21 | 100 | 20 | 20 | 20 |
| | | SER1C14 | 100 | | 20 | 20 |
| | Total area | | 850 | 75 | 125 | 180 |

**Year 2023-25**

| RANGE | Name of RF | Compartment | 2023-24 | 2024-23 | 2023-24 | 2024-25 |
|---|---|---|---|---|---|---|
| PABHOI | BISWANATH | SER2C10 | 10 | 10 | 10 | 10 |
| | | SER2C1 | 10 | 10 | 10 | |
| | | SER2C4 | 25 | | | |
| | | SER2C5 | 25 | 25 | 25 | |
| | | SER2 C 8 | 10 | 10 | | |
| | | SER2C11 | 10 | 10 | 10 | 10 |
| | | SER2C12 | 10 | 10 | 10 | |
| | | SER2C13 | 10 | 10 | | |
| | | SER2C16 | 10 | 10 | 10 | |
| | | SER2C17 | 10 | 10 | | |
| | | SER2C3 | 10 | 10 | 10 | 10 |
| DIPLONGA | NADUAR | SER1C21 | 20 | 20 | | |
| | | SER1C14 | 20 | 20 | 20 | |
| | Total area | | 180 | 155 | 105 | 30 |

4.15.2 **Bamboo Cultivation :**

The bamboo plantations efforts are constrained due to non – availability of planting stock or the seeds as most of the economically important bamboo species shows considerably long seeding cycles viz. 30-60 years. Seedling production is the simplest and cheapest method of producing planting stock. Vegetatively bamboo can be propagated through rhizomes, offsets, layering, culm cutting, branch cutting etc.

**Production through seeds**: If seeds are available, after sporadic or gregarious flowering mature seeds should be collected from top portion of the clump is usually by cutting the seed bearing culms. Due to the short viability the seeds should be sown immediately to get maximum germination.

**Preparation of nursery bed** - . Seeds are usually sown in standard nursery beds ( 10 m x 1.2 m ) or raised nursery beds of any convenient dimension. The top portion of the bed must be filled with a soil sand, compost mixture ( 1:1:1 ratio) for proper aeration and root development. After broadcast seeds and raise the plants in nursery beds ,seedlings are ready for transplant to polybags after 45 to 60 days of growth in nursery beds .The seedlings are maintained in the nursery for one year before transplanting to the field .

When seeds are not available , vegetative propagation methods are used for the production of planting stock. In vegetative propagation , conventional method like offset planting, rhizome planting , layering etc are used.

**Offset planting** : An offset is the basal portion of a single culm with the rhizome axis and roots attached to it .For offset planting , preferably one to two year old culms from the peripheral portion of a clump are cut in a slanting manner in such a way that two nodes are left at the base .The major

limitation of this method is that the offsets are bulky and extraction and transportation are labour intensive and hence the method is not feasible for raising large scale plantations.

**Rhizome cuttings**: Rhizome cuttings are sections of fresh living rhizomes with at least a bud of the preceding year along with a portion of the culm (about 15 to 30 cm long). If transportation is involved the rhizome s should be protected from drying as in offset. This technique is mainly suitable for monopodial bamboos with runner type of rhizome.

*Vegetative propagation through techniques like divisions, rhizomes, offsets, layering etc. yield limited number of planting stocks and hence are not appropriate for large scale plantation.* In order to meet the ever increasing demand of planting stocks on regular basis and also to study the different vegetative propagation technique of bamboo species , Research and Education circle under state Forest Department in 2007-2008, developed , a new ,easy and low cost technique for production of quality planting stock of commercially important bamboo species of Assam vegetatively through two noded culm cutting with macro proliferation technique which yields planting stock with survival rate of 90 – 100 %.

**PRODUCTION OF FIELD PLANTING STOCK OF BAMBOO SPECIES THROUGH TWO NODED CULM CUTTING WITH MACROPROLIFERATION TECHNIQUE :**

**Methodology :**

1) **Bed preparation**: Nursery beds of 10 m x1.2 mx 0.5 m are prepared. Beds should be filled up with a mixture of soil, sand and FYM in a ratio of 1 : 1 : 1 . Seven days prior to the planting all the beds are fumigated with Formaldehyde solution to prevent insect attack. For each bed, 15 Lit. of 0.4 % Formaldehyde solution required.
2) **Preparation of culm cuttings** : From the already identified healthy non- congested clumps 1 year 6 months old culms should be selected and extracted with a sharp instrument leaving at least two node at the base. After extraction culms should be transported to the nursery site and prepare two noded cuttings ( leaving 5-8 cm on either side ).
3) **Planting of Cuttings** : Two noded cutting can be planted in the nursery beds horizontally , about 25 numbers of cuttings are required in one bed.
4) **Maintenance of nursery beds and sprouts** : Nursery beds should be provided with Shade
   ( Agronet) to protect the cuttings from direct sunlight. Beds should be watered regularly and also maintained by regular weeding and soil working.
5) **Macroproliferation** : Nodes of the each cutting will be sprouted within 7 to 10 days and root development takes within 30 to 60 days after planting. After root development completed the sprouts ( propa gules) are ready for separation. At the time of separation of propagules from the nodes of each cutting the care should be taken to ensure that the segregated propagules comes out with a portion of rhizome as well as roots. The segregated propagules are again planted to the already prepared macroproliferation beds ( 10 m x 1.2 m x 0.5 m beds filled with a mixture of soil, sand and vermin-compost in the ratio of 1 : 1 : 1 ).

   Through this simple technique from a single bamboo node average 120 nos of bamboo saplings can be produced in a year, which could be increased gradually by continuing macroproliferation.

   **Propagules ready for field planting** : The propagules /saplings do not need to the planted in polybags. It can directly be transferred to the earthen beds or to the fields.

   **Transportation :** The bare rooted planting can be transported from nursery to the field directly with 100% survival.

### 4.15.3. Plantation Management :

#### 4.15.3.1.Silvicultural System

The silvicultural system to be followed here will be selection system.

**Pre-monsoon Works :-**

Demarcation of the patches suitable for existing bamboo plantations will be done in the year of demarcation of the bamboo coupe. Plantable patches not less than 5 ha. in extent of plantable area will bear separate demarcation. Pits will be dug at 6m x 6m and of size 45 cm x 45 cm x 45 cm negotiating the overwood and bamboo clumps etc. to bring up the bamboo population to sufficient extent. Preplanting operations will be carried out in the year of harvesting the bamboo in the coupe. Planting operations will be carried out in the rains subsequent to bamboo harvesting. In case of uderplanting the bamboo , it will be done in the $4^{th}$ year of main planting. The coupe will be demarcated soon after the rains in the year in which the pre-monsoon works are to be undertaken by erecting posts at suitable intervals. This demarcation will exclude the working coupes of the main working circle to which this working circle overlaps to avoid confusion. On the posts, compartments number, coupe number and name of the planting series should be written with black paint.

**a). Cutting Cycle**

**Working Cycle:** The minimum age at which culm is harvestable and age of full maturity of culm determine the length of working cycle. The minimum age of harvest is two years and the age of full maturity of a culm is about 5 years. Smaller working cycle may result in over exploitation of clumps whereas longer working cycles result in over crowding of clumps. In view of the prevailing biotic conditions, a working cycle of 3 years has been prescribed from technical and administrative convenience.

**b). Method of Treatment:** The bamboos are in great demand and it will be harvested under periodic thinning in the clumps. A cutting cycle of 3 years has been fixed as it has been found that the yield reduces considerably at a short rotation of 2 years 1st and 2nd year bamboo culms provide food and nourishment to the rhizomes under soil and should not be cut. They are also deficient in lignifications and are brittle and highly vulnerable to fungal attack. Only 3rd year culms are fit for harvesting.

**c). Formation Of Cutting Series:** It is not possible to establish cutting Seris as on date and it will entirely depend on extend of plantation and species selected.

**d). Regulation Of Yield:** It is regulated by area.

**IDENTIFICATION OF AGE OF BAMBOO**

Since the marking of bamboo is highly selective, it is necessary to distinguish, current year, previous year and mature culms from one another.

**Current Year** : Culm sheath is present on lower half of the culm, branches are present throughout the length of the culm and bloom (White powdery dust) is present abundantly and comes off easily when touched.

**Second Year :** Culm sheath absent, branches are present practically at all nodes. Bloom is patchy and does not come off easily.

**Third Year** : Culm sheath absent branches are present practically at all nodes, white bloom is absent and it becomes blackish grey.

**e) Agency For Harvesting:** Harvesting should be done departmentally and sold of as per Coupes and Mahal Rules.

**f).Methods Of Executing The Treatment:** The coupe due for working will be demarcated in April/May (before onset of monsoon) in the year in which they become due for harvesting by erecting poles at suitable intervals. On the poles,compartment number, coupe No. and name of cutting series will be written. Soon after the demarcation, the entire coupe due for working will be thoroughly inspected by the R.F.O and 10% checking will be done by an A.C.F. The inspection will be carried out compartmentwise and the area containing Bamboo will be shown on the map. In this area sample enumeration will be done and on its basis, estimate of bamboo clumps will be prepared. As per the enumeration the estimate of various works and yield of bamboos will be prepared.

**g). Methods Of Working :** Present practice of working bamboo forests areas on three years felling cycle shall continue.

I) No harvesting works should be permitted between 15th June to 30th September.

ii) No culms below the age of two years will be felled.

**Following culms shall be removed from all clumps:-**

i) All dead, decayed and dry bamboos.

ii) Culms whose half or more top part is broken or damaged.

iii) Twisted or malformed culms.

iv) In a mature clump the following types of culms (green and living) will be retained.

v) All current season's (i.e. less than one year old) culms.

vi) From the rest culms equal in number to the current season's (i.e. less than one year old) culms or eight, whichever is more.

**The remaining culms will be considered available for harvesting.**

The cutting height of culms will be between 15 cm to 45 cm. above the ground level i.e. above the first internode above the ground. The cut shall be slant with a sharp instrument. In case of any flowering, no culms from flowered clump shall be felled in the year of flowering.

No clump should be considered fit for harvesting unless it contains more than 12 mature culms (one year as well as two years old included)

Harvesting of bamboo shall be done in a manner so as to ensure that the retained culms are evenly spaced and that some mature culms i.e. more than two years old are retained on periphery for the purposes of support to the new culms.

**h) Following Acts will be strictly prohibited:** Digging of rhizome, lopping of bamboo culms for fodder, use of tender bamboo culms bundling, Climbers infesting with growth of bamboo clump shall be cut. After cutting the debris will be removed away from the clumps and will be stacked at a distance not less than 2 meter away from the outer periphery of each clump.

**i) Tending Operations:** After completion of seeding it is essential to properly look after the young regenerated crop till a time the clump formation starts. The following operations will be carried out depending upon the age of the crop.

**A) Crop age between 1 to 3 years :**

During this period the area will normally contain thick seedling crop and the clump formation does not start. During this period following tending operations will be carried out. i) The area will be thoroughly gone over and 0.6 meter diameter foci at the rate of 300 per hectare will be formed, distributed evenly over the whole area.

ii) All the rank growth of grasses, weeds and even bamboo seedlings upto a distance of 1.5 meter all around the foci formed as above, will be cleared so that the growth of the bamboo seedlings in the selected foci are not hampered.

iii) All climbers within and around the foci upto 1.5 meter distance will be completely removed.

iv) The whole area will be strictly protected from fire and grazing.

**B) Crop age between 3 to 8 years. :**

During this period the clump formations starts but the crop is yet immature for harvesting. During this period following operations will be carried out.

i) All badly grown, twisted and damaged culms from the selected foci, will be removed.

ii) All weeds, grasses and climbers, within and around the foci upto a distance of 1.5 meter, will be completely removed.

iii) Tree growth of species, others than teak, ain, shisham, bija, tinsa, tiwas , dhaora, haldu, karam, semal, mowai and bhirra over topping the clumps, will be removed.

iv) The whole area will be strictly protected from fire.

**Cycle of tending operations :-**

The operations, as prescribed under (A) and (B) above, will be carried out annually. Where there is not possible due to administrative reasons, these operations, except fire protection, will be carried out on 2 years or at the most 3 years cycle. The territorial Conservator of Forests will decide and tending cycle to be followed in each area. The fire protection operations will be carried out every year and the area will be closed to grazing till completion of clump formation.

**j). Protection of regeneration of bamboo area** : Protection of regeneration bamboo seedlings in flowered area is most important for the future of the bamboo stand. Since abundant seeds is available near the flowered clumps , sufficient regeneration usually occur in areas except where soil is deficient or soil surface is too hard.

### 4.15.4. Bamboo plantation and Economics for vegetative planting stocks :

For one hacter Plantation of clump forming bamboo 400 vegetative planting stocks (rhizome, offset, culm cutting etc. ) required with 5m x 5m spacing. After plantation it takes 3 -4 years to produce culms of harvestable. A well-managed bamboo plantation can yields 2700 to 3000 culms /ha yearly after 3 years of growth.

**Economics of Bamboo (clump forming ) cultivation ( 5.0 ha area ) and harvesting :**

a) Spacing : 5.0m x 5.0m
b) Number of clumps : 400/ha
c) Number of productive clumps : 350/ha
d) Total Number of productive clumps for 5 ha plantation : 350 x 5 =1750.

**Table 4.4. : Cultivation and harvesting plan for 5 Ha plantation model of bamboo.**

| Year | Yield | | | |
|---|---|---|---|---|
| | No of culms to be recruited per clump | No of culms to be harvested ( 3-yr old)/clump | Total no of culms to be harvested ( 350 clumps) | Total no of culms to be harvested for 5 ha plantation (350 x5 clumps) |
| 1 | 1.5 | | | |
| 2 | 4.5 | | | |
| 3 | 7.5 | 1.5 | 525 | 2625 |
| 4 | 8.0 | 3.0 | 1050 | 5250 |
| 5 | 8.0 | 6.0 | 2100 | 10,500 |
| 6 | 8.0 | 7.5 | 2625 | 13,125 |
| 7 | 8.0 | 8.0 | 2800 | 14,000 |
| 8 | 8.0 | 8.0 | 2800 | 14,000 |
| 9 | 8.0 | 8.0 | 2800 | 14,000 |
| 10 and onwards | 8.0 | 8.0 | 2800 | 14,000 |

Table 4.5. Projected yield calculation for the Bamboo Plantations as per presumptions of Table 4.4. above

| Year of creation of Plantation in Ha | Year of Harvesting of Bamboo Culms 5th Year Onwards | 2023-24 | 2024-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 |
|---|---|---|---|---|---|---|---|---|---|---|
| **2020-21** | 75 | 78750 | 157500 | 196875 | 210000 | 210000 | 210000 | 210000 | | |
| **2021-22** | 125 | | 131250 | 262500 | 328125 | 350000 | 350000 | 350000 | 350000 | |
| **2022-23** | 180 | | | 189000 | 378000 | 472500 | 504000 | 504000 | 504000 | 504000 |
| **2023-24** | 180 | | | | 189000 | 378000 | 472500 | 504000 | 504000 | 504000 |
| **2024-25** | 155 | | | | | 162750 | 325500 | 406875 | 434000 | 434000 |
| **2025-26** | 105 | | | | | | 110250 | 220500 | 275625 | 294000 |
| **2026-27** | 30 | | | | | | | 31500 | 63000 | 78750 |
| **Total culms to be harvested** | | **78750** | **288750** | **648375** | **1105125** | **1573250** | **1972250** | **2226875** | **2130625** | **1814750** |

### 4.15.5. Analysis and Valuation Of The Crop

The bamboo crop was not undertaken during the tree enumeration exercise. For development of the working plan the following FSI data on bamboo was taken into account.

**Table 4.6**

| Species | Clumps | Culm | <2 yr culm | 2 yr culm | >2 yr culm | Damaged culm |
|---|---|---|---|---|---|---|
| Bhaluka | 141 | 10077 | 4348 | 2338 | 2608 | 750 |
| Bijuli | 23 | 2351 | 1199 | 501 | 465 | 186 |
| Jati | 539 | 42571 | 17449 | 9939 | 12799 | 2385 |
| Bakal | 8 | 695 | 268 | 197 | 183 | 47 |
| Total | 711 | 55694 | 23265 | 12973 | 16055 | 3368 |
| Dry weight (t) | | 532 | 177 | 123 | 198 | 33 |

| Species | Clumps | Clump diameter class | | | |
|---|---|---|---|---|---|
| | | 0 – 200 cm | 200 – 300 cm | 300 – 400 cm | >400 cm |
| Bhaluka | 141 | 29 | 24 | 29 | 59 |
| Bijuli | 23 | 12 | 6 | 1 | 4 |
| Jati | 539 | 140 | 146 | 92 | 161 |
| Bakal | 8 | 1 | 0 | 0 | 7 |
| Total | 711 | 182 | 176 | 122 | 231 |
| | | | | | |

**4.15.5. Fire Protection :-** Fires cause extensive damage to the new shoots of bamboos and, therefore, these areas will be completely protected from fire.

**4.15.6. Grazing Control:-** These areas should be protected from grazing especially after flowering and in the rainy seasons in which the recruitment of new culms will takes place.

## 4.16.Estimated Revenue and Expenditure for Bamboo Plantations

Table 4.7 : Proposed estimate for the working circle in Sonitpur East Division

a).Model Estimate

**NORMS PROPOSED FOR IMPLEMENTATION OF 1 Ha OF BAMBOO PLANTATION**
**(Wage rate @ Rs. 247/-)**

| | Patern of Works | No.of Labour Units | Amount (Rs) per Hect |
|---|---|---|---|
| **A. Advance works** | | | |
| 1 | Site clearance & planting | 30 | 7410.00 |
| 2 | Fencing (LS) | LS | 25000.00 |
| 3 | Planting materials- 625 Rhizomes/Ha @ Rs. 20/Rhizome | | 12500.00 |
| **B. Creation (First year)** | | | |
| 1 | Planting | | |
| 2 | First rain weeding | | |
| 3 | 2nd rain weeding | 49 | 12103.00 |
| 4 | 3rd weeding | | |
| 5 | 4th weeding | | |
| **Sub Total** | | | **57013.00** |
| **C. First Year** | | | |
| 1 | First weeding | | |
| 2 | 2nd weeding | | |
| 3 | 3rd weeding | 18 | **4446.00** |
| 4 | 4th weeding | | |
| 5 | Fire watching etc. | | |
| **D. Second Year** | | | |
| 1 | First weeding | | |
| 2 | 2nd weeding | | |
| 3 | 3rd weeding | 18 | **4446.00** |
| 4 | 4th weeding | | |
| 5 | Fire watching etc. | | |
| **D. Third Year** | | | |
| 1 | First weeding | | |
| 2 | 2nd weeding | 18 | **4446.00** |
| 3 | 3rd weeding | | |
| 4 | 4th weeding | | |

5 Fire watching etc.

The rates are subject to revision based on approval from the Forest Department

b). Area in Hactares for plantations and maintenance in subsequent years

| Year/Hactare | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 |
|---|---|---|---|---|---|---|---|---|---|
| Advance work and Creation | 75 | 125 | 180 | 180 | 155 | 105 | 30 | | |
| 1st Year Maintenance | 75 | 125 | 180 | 180 | 155 | 105 | 30 | | |
| 2nd Year Maintenance | | 75 | 125 | 180 | 180 | 155 | 105 | 30 | |
| 3rd Year Maintenance | | | 75 | 125 | 180 | 180 | 155 | 105 | 30 |

c). Year wise projected expenditure in Creation and Maintenance of Bamboo Plantation based on

Table 4.7 a. Expenditure for Creation and Maintenance of Bamboo Plantation w.e.f. 2020-27

| **Year** | **2020-21** | **2021-22** | **2022-23** | **2023-24** | **2024-23** | **2023-24** | **2024-25** | **2025-26** | **2026-27** |
|---|---|---|---|---|---|---|---|---|---|
| **Advance work and Creation(In Rs)** | 4275975 | 7126625 | 10262340 | 10262340 | 8837015 | 5986365 | 1710390 | 0 | 0 |
| **1st Year Maintenance (In Rs)** | 333450 | 555750 | 800280 | 800280 | 689130 | 466830 | 133380 | 0 | 0 |
| **2nd Year Maintenance (In Rs)** | 0 | 333450 | 555750 | 800280 | 800280 | 689130 | 466830 | 133380 | 0 |
| **3rd Year Maintenance (In Rs)** | 0 | 0 | 333450 | 555750 | 800280 | 800280 | 689130 | 466830 | 133380 |
| **Total Amount** | 4609425 | 8015825 | 11951820 | 12418650 | 11126705 | 7942605 | 2999730 | 600210 | 133380 |

Table 4.7. Projected revenue from harvesting of Bamboo.

| **Year of Harvesting** | **2023-24** | **2024-23** | **2023-24** | **2024-25** | **2025-26** | **2026-27** | **2027-28** | **2028-29** | **2029-30** |
|---|---|---|---|---|---|---|---|---|---|
| | 63 | 126 | 157.5 | 168 | 168 | 168 | 168 | 0 | 0 |
| | 0 | 105 | 210 | 262.5 | 280 | 280 | 280 | 280 | 0 |
| | 0 | 0 | 151.2 | 302.4 | 378 | 403.2 | 403.2 | 403.2 | 403.2 |
| | 0 | 0 | 0 | 151.2 | 302.4 | 378 | 403.2 | 403.2 | 403.2 |
| | 0 | 0 | 0 | 0 | 130.2 | 260.4 | 325.5 | 347.2 | 347.2 |
| | 0 | 0 | 0 | 0 | 0 | 88.2 | 176.4 | 220.5 | 235.2 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 25.2 | 50.4 | 63 |
| **Total Amount (In Lakh Rs)** | 63 | 231 | 518.7 | 884.1 | 1258.6 | 1577.8 | 1781.5 | 1704.5 | 1451.8 |

**Note: Such Projected estimate is under ideal condition. Given the history of elephant depredation in the Division, it may not be possible to attain such revenue figures.**

# CHAPTER 5
# FOREST PROTECTION WORKING CIRCLE(OVERLAPPING CIRCLE)

## 5.1 Name of the Working Circle

Forest Protection Working Circle. The detail map of this Working Circle is shown in the Figure 5.1.

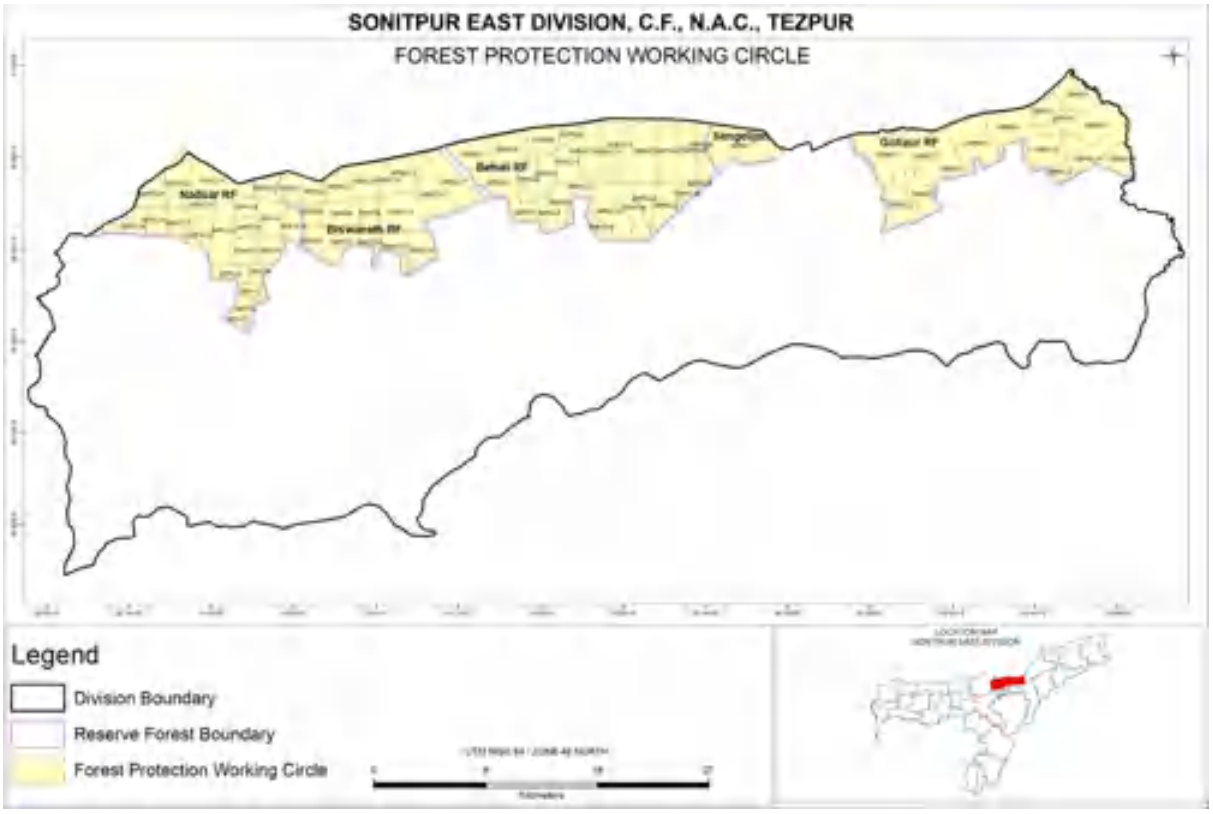



**Figure 5.1: Map of forest protection working circle in Sonitpur East Division, Assam**

## 5.2 General Constitutents of the Working Circle

The areas with canopy cover above 70% and other areas under extreme biotic pressure and natural hazard prone areas will be under this working circle. Acute biotic pressure is changing the conditions of forests. It becomes absolutely essential to keep the core of the forest areas intact and free from anthropogenic/human disturbances. In future, when the forests start functioning again at its peak productivity, sustainable extraction from these forests may be allowed. Till that time, forests falling under the identified working circle shall function as nature's laboratories, which will keep on imparting insights about the functioning of the nature, to a keen observer. Specifically, these forests include areas of unique flora and fauna with rich biological diversity and genetic resources. The forest

provides habits wildlife especially elephants and straying cats and other hebivores so it is necessary to protect these areas. The Division, serves as catchments to critical wetlands, its denudation facilitates erosion especially after heavy monsoon rains and it is absolutely essential to maintain a permanent vegetation cover over the catchments. The role of the forests in these catchments, which receive very heavy rainfall in a short span of four months from June to September, needs no emphasis. In the past, these forests were worked repeatedly and heavily in accessible areas and along riverbanks. It will include all the water bodies of the forest Division. Such areas shall not be worked for timber or other NTFPs but shall be preserved by providing highest degree of protection. These areas should be seen as the ones which sustain forest productivity, the flow of ecosystem services and also protect from floods.

The ecological and environmental role of forests has precedence over all other roles one can think of. Forests are the natural resources which are to be passed on to the posterity with least disturbance to the natural processes they are being subjected. Keeping this mandate in view, the protection working circle is carved out. The only Reserve forest which is left a green patch along northern bank of brahmputra are Behali and Singlijan RF. The patch of forests needs to be protected at all cost.

All compartments of all reserve forest are allotted to this Circle. The terrain is uneven and soil is prone to erosion with loss of forest cover.

## 5.3 Objectives of the Working Circle

The broad objective of this working circle is to improve the stocks of the forest of this Division by regeneration and plantation. Specific objectives are given below –

- To regulate and prohibit anthropogenic activity detrimental to the reserve forest area like illegal mining and felling.
- Consolidation of Boundaries of Reserve Foersts and prevent further encroachment of forest area.
- To prevent encroachment of Forest area from neighbouring state of Arunachal Pardesh.
- To file cases under Forest Conservation Act 1980 against Govt official engaged in diversion of Reserve Forest without authority.

## 5.4 General Condition of Flora and Fauna

Wet Semi-Evergreen and Evergreen forests: As the name indicates this type with *Nahor* strongly predominating in the top canopy is found in several areas whereas *Nahor* mixed with other species forming the under storey is also common in many cases. In the Behali Reserv Forests, *Nahor* forms dominant crop near Behali river and its tributaries. In *Nahor* forests whether as single crop or as under storey almost all size class are found and the young ones shootup as soon as proper condition is available. While the top canopy is formed by *Amari, Sopa, Borpat, Bandardima, Gonsoroi, Jutuli,*

*Badametc. Simul, Cham, Bhelu*etc. area is common. In the middle storey *Owtenga, Morsal, Bonjalakia, Jamun, Kanchan, Jia, Borhamthuri, Hingori*etc. Arecommonly found. The *Coffea bengalensis, Titaphul,* etc. forms the undergrowth. Below the emergent layer, the top canopy is formed by *Bonsum, Amoora, Bhelu, Gogera, Sopa, even-Simul, Titasopa, Badam, Ficus, Dhuna, Paroli, Hatipolia, Gonsoroi* etc. The middlestorey consists of *Barhamthuri, Bandardima, Jamun, Nahor,Leteku, Moz, Gomari,Tezpat, Uriam,* etc.The ground cover is made up of *Tora, Clerodendron, Geruga, Phlogacanthus* species*, Solanum Spp., Coffea bengalensis, Ferus, Flamingia, Surath Lea, Terrestrial orchids* etc. Canes are occasional in occurance. Bizal bamboo is found in drier part and along the river bank. Amongst the climbers *Ficus* spp, *Mikenia*, *Hippooratee*, *Loranthus* spp., *Entada*spp., *Zanthoxylum* spp., *Dioscoria* spp.,*Smilax* spp., *Bauhinia* spp. *Spatholobus* spp. are almost found everywhere in this type of forests.

By far the great portion of the forests in the reserves of this Division can be allotted to this type. The type attains its greatest prominence in the Behali Reserve. In respect of Behali Reserve the entire forests area is under this type except in the area covered by Pansopa forest towards the central south. All the gregarious species mentioned above in respect of *Messua* type, such as *Bonsum, Amari, Nahor, Mekahi, Pansopa* occur sporadically in this type of Semi Evergreen forest. The more important other species found in the top canopy are *Amoorawallichii, Ailanthusgrandis, Tetramales nudiflora, Cinnamomumoccidodaphane*, *Hollock* etc. A middle storey is generally prominent and consists mainly of the species mentioned under Bonsum-Amari above. Terrain occupied by this type of forest is generally what corresponds to the 'Terai' track with the water table fairly close to the surface and with numerous streamlets meandering through the area. This terrain is thus very much cut up and often the rear egreat stretches of 'Khurkhani' land. Reproduction of *Bonsum* is seen locally in suitable locations. Reproduction of *Amari* is fairly noticeable everywhere. Reproduction of *Duabangasonneratoides* in certain places where the canopy has been opened out is excellent while whenever *Nahor* occurs in top or middle canopy its reproduction is profuse. *Nahor* seedlings are commonly found in many places where there is little or no *Nahor* in the top canopy where it is of no doubt that the numbers of streams bring down the seeds in flood time and they get deposited in the Khurkhanimounds where they germinate and flourish.

Altogether, there are 26 compartments in Behai Reserve Forest. Out of which 16 compartments are well protected and undertree cover. Ten compartments are under occupation of Arunachali tribes men and Government establishments.

## 5.5 Legal Position

Wildlife (Protection) Act, 1972 is applicable for entire Assam. Indian Forest Act 1927 also deals with wildlife. The Wildlife (Protection) Assam Rules, 1980 are applicable. Assam Forest Policy, 2004 under IFA, 1927 hunting of wild animals has been completely banned as per the amendments made to the Wildlife (Protection) Act, 1972 in the year 1991 are in vogue.

## 5.6 Blocks and Compartment Allotment of Areas

Blocks, compartment and the area to be covered in this working circle is provided in the Table 17.6a.

**Table 5.2: Proposed area (ha) under protection working circle of Sonitpur East Division**

| Name of the RF | Compartment No. | Area (Ha) |
|---|---|---|
| BEHALI RESERVE FOREST | SER3C1 | 496.76 |
| | SER3C10 | 8.14 |
| | SER3C12 | 189.65 |
| | SER3C14 | 198.67 |
| | SER3C15 | 56.05 |
| | SER3C17 | 205.56 |
| | SER3C18 | 78.51 |
| | SER3C19 | 347.47 |
| | SER3C2 | 454.51 |
| | SER3C21 | 411.66 |
| | SER3C22 | 290.87 |
| | SER3C23 | 402.15 |
| | SER3C24 | 148.86 |
| | SER3C25 | 285.19 |
| | SER3C26 | 67.91 |
| | SER3C3 | 0.08 |
| | SER3C4 | 429.71 |
| | SER3C5 | 4.21 |
| | SER3C6 | 331.06 |
| | SER3C7 | 11.46 |
| | SER3C9 | 188.40 |
| BISWANATH RESERVE FOREST | SER2C1 | 272.77 |
| | SER2C10 | 144.03 |
| | SER2C11 | 182.26 |
| | SER2C12 | 340.94 |
| | SER2C13 | 392.36 |
| | SER2C14 | 282.87 |
| | SER2C15 | 455.75 |
| | SER2C16 | 638.68 |
| | SER2C17 | 727.84 |
| | SER2C2 | 124.21 |
| | SER2C3 | 199.45 |
| | SER2C4 | 237.14 |
| | SER2C5 | 432.98 |
| | SER2C6 | 183.18 |
| | SER2C7 | 273.79 |
| | SER2C8 | 314.71 |
| | SER2C9 | 117.83 |
| GAHPUR RESERVE FOREST | SER5C1 | 1227.73 |
| | SER5C10 | 644.45 |
| | SER5C11 | 1094.45 |
| | SER5C12 | 778.46 |
| | SER5C13 | 197.08 |
| | SER5C14 | 714.54 |
| | SER5C15 | 402.27 |
| | SER5C2 | 524.28 |
| | SER5C3 | 821.09 |
| | SER5C4 | 591.25 |
| | SER5C5 | 1027.92 |
| | SER5C6 | 888.41 |
| | SER5C7 | 431.75 |
| | SER5C8 | 713.07 |
| | SER5C9 | 392.49 |
| NADUAR RESERVE FOREST | SER1C1 | 143.21 |
| | SER1C10 | 58.32 |
| | SER1C11 | 609.86 |
| | SER1C12 | 164.60 |
| | SER1C13 | 273.55 |
| | SER1C14 | 751.40 |
| | SER1C15 | 332.31 |
| | SER1C16 | 342.61 |
| | SER1C17 | 380.75 |

| Name of the RF | Compartment No. | Area (Ha) |
|---|---|---|
| | SER1C18 | 292.23 |
| | SER1C19 | 298.86 |
| | SER1C2 | 169.77 |
| | SER1C20 | 136.28 |
| | SER1C21 | 613.31 |
| | SER1C3 | 136.69 |
| | SER1C4 | 114.41 |
| | SER1C5 | 174.65 |
| | SER1C6 | 287.91 |
| | SER1C7 | 189.98 |
| | SER1C8 | 307.10 |
| | SER1C9 | 170.03 |
| SINGLIJAN RESERVE FOREST | SER4C1 | 670.42 |
| | | **26995.14** |

## 5.7 Analysis of the Flora and Fauna

In the past, the accessible portions of these forests were exploited to supply timber, plywood and matchwood to the industries. The area are the remaining ones with good canopy density. Waterbodies are vital for maintaining the hydrological regime and provide habitat for the fish germplasm. The regeneration of natural species is moderate and therefore the proposed areas needs to be protected. The endemic species growing inside the forest cover of the mature trees provide as food reserves for the herbivores.

## 5.8 Associated Regulations and Measures

National Forest Policy, 1988, Indian Forest Act 1927, Assam Forest Policy, 2004 under IFA, 1927, Indian Biodiversity Act, 2002, Assam Forest Regulation Acts (Amended 1995), Forest Conservation Act 1980, Assam Biodiversity Rule 2010, The Cattle Trespass Act 1871, The Assam Forest (Removal and storage of produce) Regulation Act-2000, The Assam (Control of Felling and Removal of trees from Non-forest Land) Rules 2002, The Schedule tribe and other traditional Forest Dwellers (Recognition of Forest Rights) Acts 2006. Always start working form the ride to valley approach. After eviction, immediately planting is to be carried out. Preference for vegetative measures followed by other engineering measures. Caution to be taken to maintain the hydrological regime and compaction of soil. Participatory measures need to be taken for the measures proposed.

## 5.9 Strategy

The existing forests will be protected from any encroachment and or any illegal activities. Grassland will be maintained surrounding the wwetlands for providing habitats of the straying/migrating and habiting wildlife. Roosting habitat for migratory and other local migratory birds around the wetlands will ne maintained. Any gaps developed in areas under forest cover with canopy density over 70% will be quickly filled. Fish germplasm will be maintained through release of fingerlings of important endemic species. Any area under encroachment would be cleared the and restored as per the rules and regulations in vogue. Ejection of encroachers if any, is no doubt an uphill task for the present-day administrators simply because of the whooping extent and magnitude of the problem. It requires an all-out effort from all government departments such as Revenue, Police, Forest, Paramilitary, Judiciary etc. There is every need to revise certain policies to begin thinking in

the direction of rehabilitation of such a huge number of encroachers to suitable places with attractive compensation package. Immediately after ejection, it will be planted. Involvement of local communities especially youths, women from the forest and fringe villages for massive plantation of the evicted area. Excluding local population can often lead to illegal activities which can cause further degradation of the flora and fauna. The efforts therefore be to impose restrictions on local populations through participation in purview of legal and allow traditional practices to continue to ensure their long-term success. For this purpose, capacity building programs may be taken up. Regular monitoring and updation of the status of the forest needs to be taken up taking the present data as the base.

## 5.10 Measures for Its protection

### 5.10.1 **Action Plan for Restoration of Habitat in the Sonitpur East Division**

There are 5 numbers notified Reserve Forests under Sonitpur East Division viz. Naduar RF, Biswanath RF, Behali RF, Singlijan RF & Gohpur RF. Encroachment in these Reserve Forests has started way back in the year 1967. Encroachment status of these Reserve Forest can be summarized in the following table:

Table 5.2a.

| Name of the RF | Total Notified Area in Ha | Encroached Area in Ha | Nature of Encroachment | Year of encroachment started |
|---|---|---|---|---|
| Naduar RF | 8141 | 8041 | Cultivation, Establishment of household, community hall etc | Way back in the year 1982 |
| Biswanath RF | 10561 | 9274 | | Way back in the year 1983 |
| Singlijan RF | 1400 | 284 | | Way back in the year 1973 |
| Gohpur RF | 13310 | 13310 | | Way back in the year 1990 |
| Behali RF | 14016 | 6663 | | Way back in the year 1937 |

As per record available in this office encroached area details alongwith households based on information maintained since 2011are as follows:

Table 5.2b.

| Name of the RF | Name of the encroached area | Community | No. of household | Total population | Area encroached for dwelling | Area encroached for cultivation | Total encroached area |
|---|---|---|---|---|---|---|---|
| Naduar RF | Hatipati, Sijusa, Morisuti, Panchmukh, Boimora, Jaishidhi, Nagda, Mahalxmi | ST, ST & others | 23600 | 47590 | 1608 | 6433 | 8041 |
| Biswanath RF | Tarajui, Bhimajuli, Samukjuli, Bharalijuli, Derring | ST & Others | 8474 | 8760 | 929 | 8345 | 9274 |
| Singlijan RF | Sirajuli, Karibil, Kocubil, Kachamari | ST Plain | 25 | 100 | 115 | 169 | 284 |
| Gohpur RF | Balijan, | ST, ST & | 6019 | 113680 | 2662 | 10648 | 13310 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Jharani Karbi, Bikrampur, Owguri, Alupara, Sonapur, Ghogra, Gopcharguri Kolmouguri, Pulisumoni, Sessa, Rangajan | Others | | | | | |
| Behali RF | Bogijuli, Dikal, Radhasur (Upper & Lower), Pumpella, Bormai, Townbil, Thandapani | ST Plain & Arunachali | 480 | 15725 | 1992 | 4671 | 6663 |
| | Bihmari, Naharjan, Fatherveta, Radhasura, Chowldhua | Mixed community | 817 | | | | |
| | | | 39,415 | 1,85,855 | 7306 | 30,266 | 37572 |

During the process of FRA implementation Forest Right settled for an area of 4766 ha under Biswanath Dsitrict and claims for an area of 11436 ha is pending under SLDC of Biswanath & Gohpur Sub-Division. Apart from that an area of 400 Ha in under encroachment by Arunachali People and the matter is presently subjudice at the Hon'ble Supreme Court.

### 5.10.1.1. The proposed Action Plan

**Objective 1: To determine the encroachers and encroached land:**

To achieve the objective the following strategies/actions are proposed.

| Strategy / action | Time required | Remarks |
|---|---|---|
| Survey the encroached area with GPS demarcation. | 30 days | Subjected to law and order situation and good weather conditions. |
| Preparation of GPS based demarcation maps in kml format. | 05 days | Subjected to law and order situation. |
| Enumeration of encroachers<br>Options: referral of the General Demographic Census report / preparation of a list of encroachers' households village-wise, with the help of Ranges and Civil support through Socio Economic Survey | 60 days | Subjected to law and order situation.<br>Response / receipt of report from the concerned Departments in time. |

**Objective 2: To make the area free from encroachment:**

In order to achieve the objective, in due accordance with Sec 72 of the Assam Forest Regulation 1857, amended upto 1995, the following strategies are proposed.

| Strategy/ action | Time required | Remarks |
|---|---|---|
| Through Ejection operations (U/S 72 of AFR'1995) | Time limit to be set after the initial survey of households to be ejected | 1. As the area is infested with armed militant outfits, it is apprehended that the ejection operation will be face massive resistance and smooth operation is not expected.<br>2. Effective and planned combing operation and flushing out of the militant groups by security forces will be of utmost necessity.<br>3. For ejection operation, separate budget allocation shall be required, which can be prepared only after determining the extent and magnitude of encroachment. |
| Domination over the ejected area | During course of ejection process | 1. Immediately after the ejection operation, camping of adequate security personnel would be essential to dominate over the area, in order to avoid further encroachment recurrence. |

**Objective 3: Restoration of ejected land:**

To achieve the objective, the following strategies/ action are proposed.

| Strategy/ action | Time required | Remarks |
|---|---|---|
| Building up of infrastructures such as camps / barracks | During course of ejection process | 1. Adequate numbers of camps and barracks are to be constructed once the ejection process is effected. |

| | | |
|---|---|---|
| | | 2. Repairing of existing roads and construction of new roads will be most essential.<br>3. Vehicles shall be required for effective patrolling duties and surveillance.<br>4. A budget needs to be prepared separately for effective execution. |
| Posting of staff and security personnel, creation of new forest beat offices | Immediately after the ejection process | 5. Posting of additional staff and armed forces shall be essential in each camp / barrack. In order to accommodate new forest beat offices/ camps, new recruitment of staff is a prerequisite. |
| Creation of Nurseries and plantations | 5 Years | 1. Adequate nurseries will have to be created in different locations for plantation.<br>2. Plantation will be created engaging Eco-Task force and local people.<br>3. Maintenance of the plantations will be essential at least for 5 years.<br>4. Separate budget will be required for these activities and demand for releasing fund, will be placed accordingly in time. |

**5.10.1.2. Analysis for Eviction/ Ejection period:**

For carrying out eviction/ejection operation, a tentative work programme as below is prepared based on the information/ data available. Encroachment position based on information available in this office maintained since 2011and Eviction /ejection period is given in Table 5.3

Table 5.3. Encroachers in Reserve Forests of Sonitpur East Division

| Name of RF | Total encroachers household | Per day average ejection | Total days required for ejection |
|---|---|---|---|
| Naduar RF | 23,600 Nos. | 40 Nos. | 590 days |
| Biswanath RF | 8,474 Nos. | 40 Nos. | 212 days |
| Singlijan RF | 25 Nos | 40 Nos | 1 day |
| Gohpur RF | 6,019 Nos | 40 Nos | 151 days |
| Behali RF | 1,297 Nos | 40 Nos | 33 days |
| Total | 39,415 Nos. | | 987 days |

**Table 5.4. Logistics that would be required in each operation:**

| Truck for Labour | Truck for seized materials | Bus for security personnel | Small vehicle for Officers/ Doctors | Ambulance | JCB | Elephant/ Kunki | Medical team | Labour |
|---|---|---|---|---|---|---|---|---|
| 2 Nos. | 10 Nos. | 5 Nos. | 4 Nos. | 1 No. | 2 Nos. | 2 Nos. | 1 No. | 50 Nos. |

**Table 5.5. Tools and Equipments:**

| Daggers/ Chisels | Hammers | Spade | Saw/ Power Saw | Ropes | Measuring tapes |
|---|---|---|---|---|---|
| 50 | 50 | 10 | 10 | 200 Kg | 10 |

**5.10.1.3 .Post eviction measures:**

Posting of security personnel would be essential after the eviction operation to dominate the area for which tents and accommodation would be required.

**5.10.1.4. Infrastructure:**

After ejection, Camps/ Barracks in different locations are to be constructed. Standard norms to be adopted is one camp in each 4 sq. km area. This, the total camp that would be required (for encroached area) is as follows:

**Table 5.6.**

| **Name of Range/ Beat** | **Name of RF** | **Total existing camps** | **Total new camps required** | **Total camps** |
|---|---|---|---|---|
| Diplonga Range | Naduar RF | - | 20 Nos. | 20 Nos. |
| Pabhoi Range | Biswanath RF | - | 16 Nos. | 16 Nos. |
| Borgang Range | Behali RF | - | 23 Nos. | 23 Nos. |
| | Singlijan RF | | 1 No | 1 No. |
| Gohpur Beat | Gohpur RF | - | 33 Nos. | 33 Nos. |
| | | | 93 Nos. | 93 Nos. |

**5.10.1.5. Requirement of staff/ security personnel/ barrack for security forces:**

To manage the camps the total requirement of forest staffs (min 4 staff / camp) that would be required and the security personnels in each camp and Range would also be required as follows:

Table 5.7.

| Range/ Beat | Staff required in Camp | Staff required in Range / Beat | Total staff required | Security personnel required in camp | Security personnel required in Range/ Beat | Total security personnel required in the Camp | New security barrack required |
|---|---|---|---|---|---|---|---|
| Diplonga Range | 80 | 10 | 90 | 20sections | 1 section | 21sections | 21 |
| Pabhoi Range | 64 | 10 | 74 | 16sections | 1 section | 17sections | 17 |
| Borgang Range | 96 | 10 | 106 | 24sections | 1 section | 25sections | 25 |
| Gohpur Beat | 132 | 10 | 142 | 33sections | 1 section | 34sections | 34 |
| Total | 372 | 40 | 412 | 93sections | 4 sections | 97sections | 97 |

**5.10.1.6.Plantation:**

Plantation in the evicted area has to be carried out immediately. For which nurseries are to be maintained and created in different locations as follows:

Table 5.8

| Total area for Plantation | Area of each nursery | Total nursery proposed |
|---|---|---|
| 37,572 Ha | 1.5 Ha | 50 (min)-100 |

**5.10.1.7.Vehicles:**

The following vehicles that would be required for proper management of the forests once the area is made free from the encroachment:

Table 5.9

| Name of Range/ Beat | Mini Trucks required | Small vehicles required | Tractors required |
|---|---|---|---|
| Diplonga Range | 2 | 1 | 1 |
| Pabhoi Range | 2 | 1 | 1 |
| Borgang Range | 2 | 1 | 1 |
| Gohpur Beat | 2 | 1 | 1 |
| Total | 8 | 4 | 4 |

**5.10.1.8.Road network:**

Maintenance and new construction of road would be required as follows:

Table 5.10

| Maintenance of Road | New construction of Road | New pools and bridges approx |
|---|---|---|

| | | |
|---|---|---|
| | approx. | |
| 200 Kms | 150 kms | 40 nos. |

**5.10.1.9. Aerial communications and Solar lights:**

There has to be proper aerial communications among all the staff posted in different locations of Reserve forests. For this quadcopters/ drones and adequate solar lighting measures are needed.

**5.10.1.10.Arms and ammunitions:**

In all the camps, arms and ammunitions are to be provided along with sufficient numbers of ammunitions.

**5.10.1.11.Publicity and awareness:**

Adequate publicity materials are to be prepared and meetings are to be arranged particularly in the fringe areas of the RFs to create awareness among the common people to get their support in the endeavour.

**Table 5.11. Cost Analysis:** The analysis done is purely subjective and suggestive in nature.

| Sl. No. | Items of Work | Unit | Cost/ Unit | Total (in Rs.) |
|---|---|---|---|---|
| 1. | 50 labourers/ day for 987 days | 49350 unit | Rs. 250/ unit | 1,23,37,500.00 |
| 2. | 2 trucks/day for labourers for 987 days | 1974 units | Rs. 3000/day/truck | 59,22,000.00 |
| 3. | 10 trucks / day for seized materials for 987 days | 9870 units | Rs. 3000/day/truck | 2,96,10,000.00 |
| 4. | 5 buses/day for security forces for 987 days | 3015 units | Rs. 6000/day/bus | 2,96,10,000.00 |
| 5. | 4 small vehicles /day for officers for 987 days | 3948 units | Rs. 2000/day/vehi | 78,96,000.00 |
| 6. | 1 no. ambulance/day for 987 days | 987 units | Rs. 3000/day/vehi | 29,61,000.00 |
| 7. | 2 Nos. JCB/day for 987 days | 1974 units | Rs. 3000/day/JCB | 59,22,000.00 |
| 8. | 2 nos. of Elephant/day for 987 days | 1974 units | Rs. 1500/day/Elephant | 29,61,000.00 |
| 9. | Tools and equioments | | | 5,00,000.00 |
| 10. | Contingency/ TA/DA etc. | | | 1,00,00,000.00 |
| 11. | Tents, accommodations of Security forces | | | 50,00,000.00 |
| 12. | Construction of new camps | 93 | Rs. 10,00,000.00/ camp | 9,30,00,000.00 |
| 13. | Construction of new security barracks | 97 | Rs. 20,00,000.00/ barrack | 19,40,00,000.00 |
| 14. | Mini Truck | 8 | Rs. 10,00,000/ truck | 80,00,000.00 |
| 15. | Small vehicles | 4 | Rs. 6,00,000/ truck | 24,00,000.00 |
| 16. | Tractor | 4 | Rs. 20,00,000/ tractor | 80,00,000.00 |
| | **Sub Total** | | | **39,14,69,500.00** |
| 17. | 1.5 Ha Nursery | 50 nos | Rs. 24,65,000/ | 12,32,50,000.00 |

| | | | | |
|---|---|---|---|---|
| | | | nursery | |
| 18. | Plantation | 37572 Ha | Rs. 1,50,000/ Ha | 563,58,00,000.00 |
| 19. | Maintenance of plantation 3 maintenance/ year @7000/maintenance Total Rs. 21,000/year/ha for 5 years, the cost/ha = Rs. 1,05,000.00 | 37572 Ha | Rs. 1,05,000/ Ha for 5 years | 394,50,60,000.00 |
| 20. | Maintenance of nurseries for 4 years | 50 Nos.*4 years = 200 Nos. | Rs. 12,80,000/nursery | 25,60,00,000.00 |
| | **Sub Total** | | | **996,01,10,000.00** |
| ROADS AND BRIDGES | | | | |
| 21. | Maintenance of existing roads | 200 Km | Rs. 1,00,000/km | 2,00,00,000.00 |
| 22. | Construction of new Roads | 150 km | Rs. 10,00,000/km | 15,00,00,000.00 |
| 25. | Solar Lights | | | 40,00,000.00 |
| | **Sub Total** | | | **17,4000,000.00** |

### 5.10.2. Encroachment in Interstate boder areas :

Following steps need to be undertaken –

- The Naharjan Forest protection camp, Dikal Forest Protection camp and Radhasoo Forest Protection camps are complete and manned by Police and Forest personnel. Ensure regular patrolling by Joint Patrolling team comprising of Forest staff and Police personnel along the encroached area of Behali RF
- Maintain continuos vigil that no fresh encroachment takes place along northern boundary of Arunachal Pradesh.
- Ensure that local social and political groups donot encroach upon Behali RF in the garb of protection land from Aruachal Pradesh aggression.
- The incomplete Forest protection camp at Singlijan RF needs to be completed and manned.
- Ensure that there is no fresh clearing by Arunachal Pradesh tribesmen.
- Any suspicious movements and gathering may be immediately ommunicated to Deputy Commissioner, Superintendent of Police and concerned Officer In charge of Local PS.

### 5.10.3. Interstate Boundary Disputes in Behali Reserve Forests with State of Arunachal Pradesh.

The disputes can be summarized from the extract presented below and stpes taken to counter such encroachment.

1. The Forest Protection Camp, Radhasoo was sanctioned vide letter no. SPD/Forest/253/2011/195 Dt 28/2/2014 from Deputy Commissioner Sonitpur, Assam and Govt of Assam vide memo no PLA 475/2010/127-A Dt Dispur the 25th Feb 2014**.** And in pursuance of direction issued the Forest protection camp was built at Latitude. 26°56'35.8"N and Longitude 93°17'27.70"E within notified Boundary of Behali RF. And present location of Radhasoo FPC is about 500meters south of northern boundary of Behali RF and located away from human inhabitation.Petitioner is conveniently silent on Behali Reserve Forest Notification as the Tarasoo Revenue circle comprising of villages like Chango, radhasoo, dikalmukh etc are all established by govt of Arunachal Pradesh in blatant violation of of Forest Conservation Act 1980 and Assam Forest Regulation 1891. The Forest Protection camp at Radhasoo was established to protect further encroachment by government of Arunachal Pradesh. Petitioner is conveniently silent on Arunachal Pradesh Indian Reserve battalion Camp(Armed Police) with strength of One Company and headed by Sub Inspector rank officer in northern side of River Dhiri(Just 300meters north of present position of Radhasoo Forest protection camp). Such establishment of Arunachal Pradesh Indian Reserve Battallion camp is in violation of , Section 26 of Indian Forest Act 1927 and Section 2 and 3-B of Forest conservation Act 1980. Location of Radhasoo Forest Protection Camp and Arunachal Pradesh IRBn camp is marked in toposheet no83 F/5 Survey of India Published in 1973. And labourers were present at work site for construction of forest camp and not carrying any sophisticated weapons as alleged by petitioner.

2. Assam Police or Assam Police official does not have any Naka in Behali Reserve Forest as claimed by petitioner. Check posts if any is manned by Forest official and any unauthorised entry into reserve forest is violation of section 24 of Assam Forest regulation 1891( amended upto 1995) and Section 26 of Indian Forest Act 1927. In this case Forest Officer having territorial jurisdiction i.e., Divisional Forest Officer, Sonitpur East , Biswanath Chariali Assam did not receive any verbal or written communication asking for permission to enter Reserve Forest from any authority of Arunachal Pradesh till now.

However, Deputy Commissioner, Papum Pare Shri T Kaye, Superintendent of Police Shri P N Khrimey, Circle Officer Shri Kipa Raja, DSP Hq Shri Neelam and other civilians trespassed into Behali RF on 29th June 2015 and met Divisional Forest Officer Sonitpur East Division, Biswanath. Thus, the allegation that there was unilateral blockade is false and figment of imagination. Forest Department establishing Forest protection camp in Reserve Forest is ancillary to conservation and not encroachment as alleged.

3. The Radhasoo Forest Protection camp has been established in Latitude. 26°56'35.8"N and Longitude 93°17'27.70"E with forest density 1 (close canopy). The site was chosen due to imminent threat of encroachment by Govt of Arunachal Pradesh as already expressed by petitioner himself in the instant para. One Forest case has been filed in court of Honble SDJM, Biswanath Chariali after Sub Inspector Teg Bahadur Karki I/C Tarasoo from Arunachal Pradesh police was found supervising cutting large tract of forest area in same location vide Offence Report no BG/5 of 14-15 dt 23/03/2015 is under trial at SDJM(M) Biswanath vide CR case no 59/15.

4. The Radhasoo Forest protection camp is being established by DFO Sonitpur East, Forest department, Govt of Assam. And no such forest protection camp is being contemplated in Holong Hote and Dullung village of Tarasoo Revenue Circle (encroached revenue circle ) as alleged by petitioner.

5. The Radhasoo Forest Protection camp has sanction and approval on letter no. SPD/Forest/253/2011/195 Dt 28/2/2014 from DC Sonitpur Assam and Govt of Assam vide memo no. PLA 475/2010/127-A Dt Dispur the 25th Feb 2014 related to protection of Forest Area. The area in question outside disputed area with forest density 1 and full canopy cover. And thus it is not violative of any order or proceedings of Hon'ble Supreme Court.

6. Petitioner has accepted that since 1979, and meetings held thereafter between Chief Ministers of two states and various points agreed upon. However in utter disregard and blatant violation Indian Forest Act 1927, Assam Forest regulation 1891 and Forest Conservation Act 1980, Government of Arunachal Pradesh has continued to encroach upon newer areas using Government machinery like Police Force.

7. Unabated violation of Indian Forest Act 1927, Assam Forest Regulation 1891(As amended in 1995) and Forest Conservation act 1980 by Government of Arunachal Pradesh through progressive encroachment upon the Behali reserve Forest has to be checked. Such Forest Protection camps are so chosen that fresh encroachment does not happen and not disputed sites as alleged by petitioner.

8. Establishment of Radhasoo Forest Protection camp does not violate the long commitment of Status –quo, rather strengthen the commitment. The Radhasoo FPC shall protect and conserve forest in Behali RF which is need of the hour. **(EXTRACT FROM REPLY FILED IN IA NO 15-1-89 IN CIVIL SUIT NO 1/89 IN Hon' ble Supreme Court)**

## 5.11. Prescriptions

The action plan proposed needs approval from Government and sanction of commensurate budget. Therefore the prescriptions shall lay more emphasis on preventive measures like actions for interstate borders, consolidation of boundaries, illicit felling, controlled grazing etc.

### 5.11.1. Plan of Action for Preventing further encroachment in Interstate Border areas of Behali RF

**i)** Maintenance of Dikal Radhasoo Road; The road may be maintained on annual basis and strictly restricted to use only for forest protection patrolling. The road should not be allowed to use for non forestry purposes.

**ii)** The forest protection camps sanctioned by Ministry of Home Affairs Govt of India at Dikal, Radhasoo and Naharjan may be maintained regularly.

**iii)** Strength of Police personnel in Radhasoo FPC should not be reduced below One Company. Any reduction in police force may lead to major retailiation from Arunachali local militant groups.

**iv)** Mandatory Joint Patrolling by Forest and Police Authorities all along Naharjan, Radhasoo, Dikal and Chauldoha for preventing any further encroachment.

**v)** The encroachments from Assam Side in Naharjan should be checked effectively. No increase in numbers of houses may be allowed till final eviction.

### 5.11.2. Pre- Eviction Plan, Eviction and Post Eviction Plan

As mentioned in previous paras, detailed analysis of cost etc is provided for carrying out pre eviction, eviction and post eviction operations. Proposals should be sent for financial sanction from government.

### 5.11.3. Consolidation of Boundary

The Boundaries of Sonitpur East Divisions are mostly artificial boundaries. There has been longstanding dispute along northern boundaries which is contiguous with interstate boundary of Assam and Arunachal Pradesh. However the southern boundaries are distinct and without dispute. However it is imperative that the status of existing boundaries/boundary pillars of forests and missing boundary pillars on ground using distance and bearing values provided in RF notifications needs to be surveyed.

**5.11.2.1.Maintenance of boundaries and Pillars:** To avoid legal disputes in the future, maintenance or boundary pillars is necessary especially the state boundaries. Inspection path of 3 m wide all along the boundary should be prepared for inspection and protection. The boundary pillars must be numbered and written. The distantly located pillars may be connected to one another by digging lines, which should be regularly cleared. Boundary registers should be maintained. The records be prepared in triplicate and kept in Range, Division and Circle Offices.The Range Officer should check the boundaries once a year and record a certificate to that effect on the Boundary Register. The Block Officer should check the entire boundaries of the forest under his charge and send the necessary report to the Forest Range Officer. The Beat Guards should keep the records of boundaries of their beats in the Beat Book.The programme repair of Boundary Pillars should be followed as given in the Protection Working Circle. The dimensions of Main Pillar and Sub Pillar shall be as per estimates prescribed by Assam Forest Department. The estimated costs is as per prevailing rate of wages and cost of construction material ( in 2019) and approved estimate. Such estimate shall be revised as and when felt necessary.

The following proposal is prescribed based on the need to maintain Pillar after every 3 year period. Cost of maintenance is 25 % of cost of creation of Boundary Pillar.

Table 5.12. Total Number of Pillars Proposed to be Constructed

| Total no Pillars to be Consructed (10 year) | | | | | | |
|---|---|---|---|---|---|---|
| **SL No** | **Item** | **External Boundary Area of All Reserve Forests in Sonitpur East Division (km)** | **No of Pillars( per km )** | **Total No of Large pillars required** | **No of Pillars existing at present in the division** | **Required no of pillars to be established (10 year)** |
| **1** | Main Pillars | 232 | 1 | 232 | 17 | 215 |
| **2** | Sub Pillar Pillars | 232 | 3 | 696 | 55 | 641 |

**Table 5.13 . Total Costs for Boundary Pillars : New Construction and Maintenance (10 Year Period)**

| **Sl No** | **Year of Working Plan** | **Item** | **Pillars to be established** | **No of Pillars existing at present in the division** | **Pillars to be maintained** | **Unit Cost of establishment (Rs)** | **Unit Cost of Maintenance (Rs)** | **Total Costs (Rs)** | **Total Cost (Per Year) (Rs)** |
|---|---|---|---|---|---|---|---|---|---|
| **1** | 2019-20 | Main Pillar | 22 | 17 | 17 | 15300 | 3825 | 401625 | 984750 |
| | | Sub Pillar | 64 | 55 | 55 | 7500 | 1875 | 583125 | |
| **2** | 2020-21 | Main Pillars | 22 | 39 | 0 | 15300 | 3825 | 336600 | 816600 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sub Pillar | 64 | 119 | 0 | 7500 | 1875 | 480000 | |
| **3** | 2021-22 | Main Pillars | 22 | 61 | 0 | 15300 | 3825 | 336600 | 816600 |
| | | Sub Pillar | 64 | 183 | 0 | 7500 | 1875 | 480000 | |
| **4** | 2022-23 | Main Pillars | 22 | 83 | 22 | 15300 | 3825 | 420750 | 1020750 |
| | | Sub Pillar | 64 | 247 | 64 | 7500 | 1875 | 600000 | |
| **5** | 2023-24 | Main Pillars | 22 | 105 | 22 | 15300 | 3825 | 420750 | 1020750 |
| | | Sub Pillar | 64 | 311 | 64 | 7500 | 1875 | 600000 | |
| **6** | 2024-25 | Main Pillars | 22 | 127 | 22 | 15300 | 3825 | 420750 | 1020750 |
| | | Sub Pillar | 64 | 375 | 64 | 7500 | 1875 | 600000 | |
| **7** | 2025-26 | Main Pillars | 22 | 149 | 22 | 15300 | 3825 | 420750 | 1020750 |
| | | Sub Pillar | 64 | 439 | 64 | 7500 | 1875 | 600000 | |
| **8** | 2026-27 | Main Pillars | 22 | 171 | 22 | 15300 | 3825 | 420750 | 1020750 |
| | | Sub Pillar | 64 | 503 | 64 | 7500 | 1875 | 600000 | |
| **9** | 2027-28 | Main Pillars | 22 | 193 | 22 | 15300 | 3825 | 420750 | 1020750 |
| | | Sub Pillar | 64 | 567 | 64 | 7500 | 1875 | 600000 | |
| **10** | 2029-30 | Main Pillars | 17 | 215 | 22 | 15300 | 3825 | 344250 | 951750 |
| | | Sub Pillar | 65 | 631 | 64 | 7500 | 1875 | 607500 | |
| | TOTAL | Main Pillars | 215 | 215 | | | | | 9694200 |
| | | Sub Pillar | 641 | 631 | | | | | |

## 5.11.4.Illicit Felling

Following steps shall be taken –

- Regular patrolling and monitoring. Patrolling Register shall be maintained by all Beat Officers and Range Officers. Such Registers shall be fortnightly signed by DFO/ACF
- All Beat Officers and Range Officers shall maintain Beat Map, Compartment Map and Range Map in toposheets.
- Beat records and registers to be kept uptodate.
- Illicit felling should be immediately reported. Stump seizure made and steps taken to salvage the remaining out turnoff timber.

- Arms should be in serviceable condition. RO and Beat Officers should ensure maintenance of arms and inform headquarter for sufficient supply of ammunition.
- Firing incidents should be reported promptly with a copy marked to local Police Station. Blank shells from firing should be salvaged and submitted wherever possible.
- GPS based patrolling to be introduced so that effective monitoring is possible.
- Forest offense register should be maintained and Offence Registered should be pursued in proactive manner to ensure conviction.
- Maintenance of Forest Roads and bridges

### 5.11.5. Grazing and Lopping

The fringe villages around Behali RF are dependent on forest for grazing and fuelwood. Itis not possible to stop grazing or collection of fuelwood due to socio- economic consideration.However, uncontrolled grazing needs to be regulated as it suppresses regeneration and promotes soil compaction and is detrimental to wildlife.The concept of rotational grazing and lopping must be adopted. The area may be divided into 5 blocks each. Each blocks canbe opened for grazing and lopping for twomonths in a year.

## 5.12. Estimated revenue and expenditure:

The Proposed Forest Protection budget shall be as proposed from time to time by Assam Forest Department. This plan proposes for Budget Provision for Boundary Pillars as mentioned in Table 5.12

# CHAPTER 6

# COMMUNITY AND FOREST RIGHTS WORKING CIRCLE (OVERLAPPING CIRCLE)

## 6.1 Name of the working circle

Community and Forest Rights Working Circle. The detail map of this Working Circle is shown in the Figure below. All compartments included are encroached area, where claimants have claimed to be residents under Forest Rights Act., 2006. The rights have to be settled or rejected as the case may be.

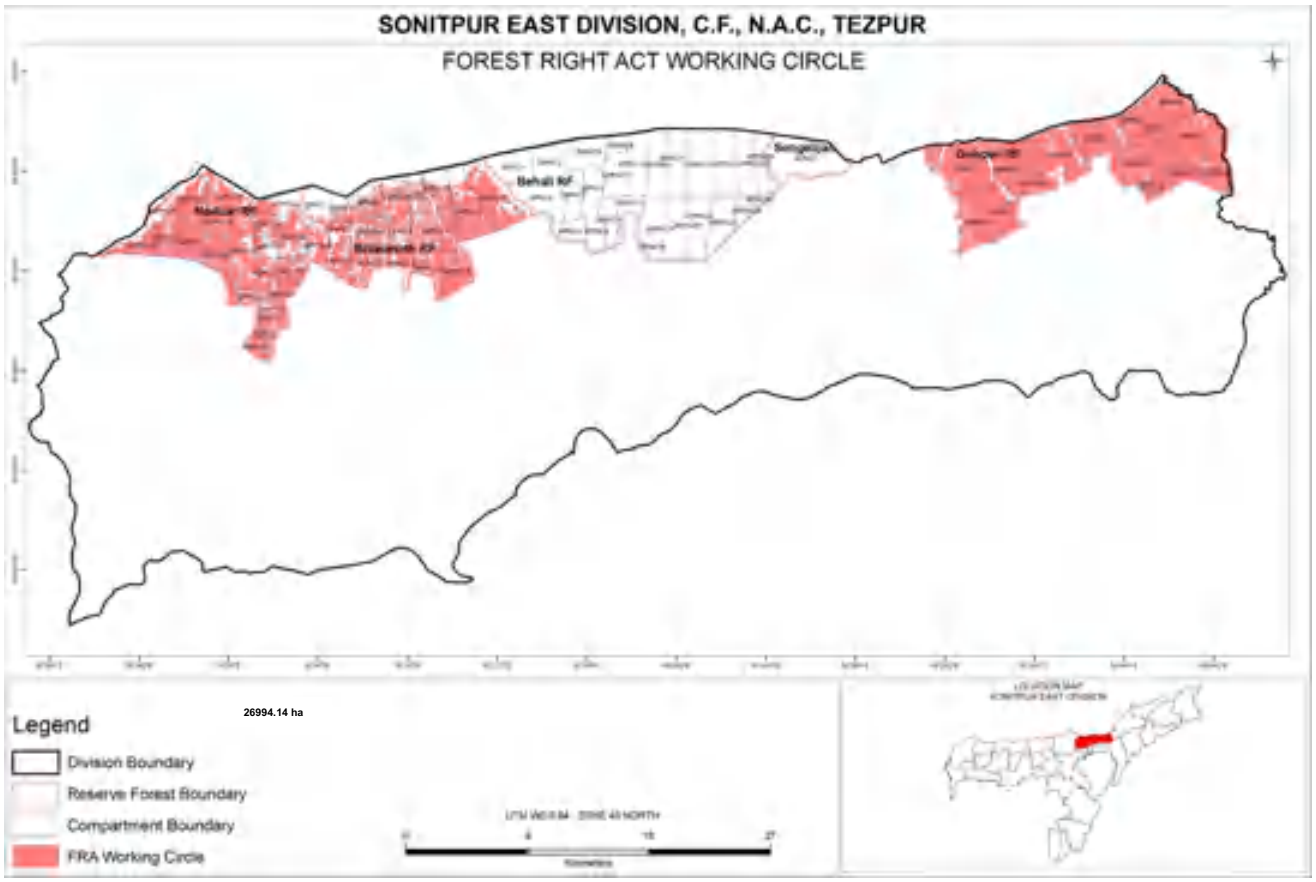



**Figure 6.1a: Map of Community and Forests Rights working circle in Sonitpur East Division, Assam**

## 6.2 General constitutents of the working circle

The entire area under this working circle have been repeatedly undergone encroachment in systematic manner. The reason for analyzing the circumstances under which it was carried out cannot be analysed at this stage neither it is mandate of this working plan. Repeated eviction operations were carried out jointly by Police , Civil administration and Forest authorities but met with no success. The areas allotted

in the working circle area those compartments which are under encroachment and claimants have applied for claims under FRA 2006. Such rights are not settled. The Forest Village areas where allotment of FRA has already been done is however within allotted areas.

## 6.3 Objectives of the working circle:

The broad objective of this working circle is to implement Forest Rights Act 2006 in the forest division and Specific objectives are given below –

- To Implement Forest Rights Act 2006 in letter and spirit and in the light of various judgements passed by Hon'ble Courts from time to time in this regard.
- To consolidate the boundaries of exisiting reserve forests after settlement of rights as per Forest Rights Act 2006.
- To prevent any further encroachment
- Ensure that the duties prescribed for forest dwellers as per Forest Rights Act 2006 is diligently performed by them
- Deputy Commisioner cum Chairman of District Level Committee of Forest Rights Act 2006 shall publish reject list after completion of imeplementation of the Forest Rights Act 2006 in time bound manner as provided in Act and Rules.

## 6.4 General condition of flora and fauna

Wet Semi-Evergreen and Evergreenforests: As the name indicates this type with *Nahor* strongly predominating in the top canopy is found in several areas whereas *Nahor* mixed with other species forming the under storey is also common in many cases .In the Behali Reserved Forests,*Nahor* forms dominant crop near Behali river and its tributaries. In *Nahor* forests whether as single crop or as understorey almost all size class are found and the young ones shoot up as soon as proper condition is available. While the top canopy is formed by *Amari, Sopa, Borpat, Bandardima, Gonsoroi, Jutuli, Badametc. Simul, Cham, Bhelu*etc. area is common. In the middle storey *Owtenga, Morsal, Bonjalakia, Jamun, Kanchan, Jia, Borhamthuri, Hingori*etc. Arec ommonly found. The *Coffea bengalensis, Titaphul,* etc. forms the undergrowth. Below the emergent layer, the top canopy is formed by *Bonsum, Amoora, Bhelu, Gogera, Sopa, even-Simul, Titasopa, Badam, Ficus, Dhuna, Paroli, Hatipolia, Gonsoroi*etc. The middle storey consists of *Barhamthuri, Bandardima, Jamun, Nahor, Leteku, Moz, Gomari, Tezpat, Uriam,* etc. The ground cover is made up of *Tora, Clerodendron, Geruga, Phlogacanthus* species*, SolanumSpp., Coffea bengalensis, Ferus, Flamingia, Surath Lea, Terrestrial orchids* etc.Canes are occasional in occurance. Bizal bamboo is found in drier part and along the river bank. Amongst the climbers *Ficus* spp, *Mikenia*, *Hippooratee*, *Loranthus* spp., *Entada* spp., *Zanthoxylum* spp., *Dioscoria* spp., *Smilax* spp., *Bauhinia* spp. *Spatholobus* spp. Are almost found everywhere in this type of forests.

By far the great portion of the forests in the reserves of this Division can be allotted to this type.The type attains its greatest prominence n the Behali Reserve. Inrespect of Behali Reserve the entire forests

area is under this type excepting the area covered by Pansopa forest towards the central south. All the gregarious species mentioned above in respect of *Messua* type,such as *Bonsum, Amari, Nahor, Mekahi, Pansopa* occur sporadically in this type of Semi Evergreen forest. The more important other species found in the top canopy are *Amoora wallichii, Ailanthus grandis,Tetramales nudiflora, Cinnamomum occidodaphane*, *Hollock* etc. A middle storey is generally prominent and consists mainly of the species mentioned under Bonsum-Amari above. Terrain occupied by this type of forest is generally what corresponds to the 'Terai' track with the water table fairly close to the surface and with numerous streamlets meandering through thearea. This terrain is thus very much cut up and often there are great stretches of 'Khurkhani'land. Reproduction of *Bonsum* isseen locally in suitable locations. Reproduction of *Amari*s fairly noticeable everywhere. Reproduction of *Duabanga sonneratoides* in certain places where the canopy has been opened out is excellent while whenever *Nahor* occurs in top or middle canopyi ts reproduction is profuse. *Nahor* seedlings are commonly found in many places where there is little or no*Nahor* in the top canopy where it is of no doubt that the numbers of streams bring down the seeds in flood time and they get deposited in the Khurkhani mounds where they germinate andflourish. Altogether there are 26 compartments in Behai Reserve Forest. Out of which 16 compartments are well protected and undertreecover. Ten compartments are under occupation of Arunachali tribesmen and Government establishments.

## 6.5 Legal position

Apart from applicability of Forests Rights Act 2006 and various other acts such as Wildlife (Protection) Act, 1972 , Indian Forest Act 1927 , The Wildlife (Protection) Assam Rules, 1980 are applicable. Assam Forest Policy, 2004 under IFA, 1927 hunting of wild animals has been completely banned as per the amendments made to the Wildlife (Protection) Act, 1972 in the year 1991 are also applicable. Most relevant judgement in WP(C) No 5043/08 and WP(C) No. 3340/08, where Hon'ble Gauhati High Court has passed judgement, whose excerpts are reproduced below:

" *19.The petitioners being found encroachers of the forest land, actions of the authorities in taking necessary steps for their eviction from such forest land cannot be termed as illegal or without jurisdiction and accordingly no interference is called for against such action of the authority. No declaration under Section3 and 4 of the Act can be given in favour of petitioners, on the basis of the proved facts of the case.*
*20. However, in the view of the circumstances to which the petitioners are subjected , I would observe that it would be open for state respondents to rehabilitate the petitioners in some other areas, other than forest land as per prevailing policy of the State Government. Since the petitioners have been rendered homeless, such consideration may be taken by the authority in an expeditious manner."*

## 6.6 Blocks and compartment allotment of areas

Blocks, compartment and the area to be covered in this working circle is provided in the Table 17.6a.

**Table 6.1a: Proposed area (ha) under protection working circle of Sonitpur East division**

| Name of the RF | Compartment No. | Area (Ha) |
|---|---|---|
| BISWANATH RESERVE FOREST | SER2C1 | 272.77 |
| | SER2C10 | 144.03 |
| | SER2C11 | 182.26 |
| | SER2C12 | 340.94 |
| | SER2C13 | 392.36 |
| | SER2C14 | 282.87 |
| | SER2C15 | 455.75 |
| | SER2C16 | 638.68 |
| | SER2C17 | 727.84 |
| | SER2C2 | 124.21 |
| | SER2C3 | 199.45 |
| | SER2C4 | 237.14 |
| | SER2C5 | 432.98 |
| | SER2C6 | 183.18 |
| | SER2C7 | 273.79 |
| | SER2C8 | 314.71 |
| | SER2C9 | 117.83 |
| GAHPUR RESERVE FOREST | SER5C1 | 1227.73 |
| | SER5C10 | 644.45 |
| | SER5C11 | 1094.45 |
| | SER5C12 | 778.46 |
| | SER5C13 | 197.08 |
| | SER5C14 | 714.54 |
| | SER5C15 | 402.27 |
| | SER5C2 | 524.28 |
| | SER5C3 | 821.09 |
| | SER5C4 | 591.25 |
| | SER5C5 | 1027.92 |
| | SER5C6 | 888.41 |
| | SER5C7 | 431.75 |
| | SER5C8 | 713.07 |
| | SER5C9 | 392.49 |
| NADUAR RESERVE FOREST | SER1C1 | 143.21 |
| | SER1C10 | 58.32 |
| | SER1C11 | 609.86 |
| | SER1C12 | 164.60 |
| | SER1C13 | 273.55 |
| | SER1C14 | 751.40 |
| | SER1C15 | 332.31 |
| | SER1C16 | 342.61 |
| | SER1C17 | 380.75 |
| | SER1C18 | 292.23 |
| | SER1C19 | 298.86 |
| | SER1C2 | 169.77 |
| | SER1C20 | 136.28 |
| | SER1C21 | 613.31 |
| | SER1C3 | 136.69 |
| | SER1C4 | 114.41 |
| | SER1C5 | 174.65 |
| | SER1C6 | 287.91 |
| | SER1C7 | 189.98 |
| | SER1C8 | 307.10 |
| | SER1C9 | 170.03 |
| | | 21717.86 |

Behali Reserve forest and Singlijan Reserve Forest was kept out of the Circle as the entire area remains subjudice in Civil Suit 1/89 in Hon'ble Supreme Court.

## 6.7 Analysis of the flora and fauna

The entire area is devoid of vegetation and large tree cover except in sporadic places. The area is frequented by Wild Elephant frequently

## 6.8 Associated regulations and measures

National Forest Policy, 1988, Indian Forest Act 1927, Assam Forest Policy, 2004 under IFA, 1927, Indian Biodiversity Act, 2002, Assam Forest Regulation Acts (Amended 1995), Forest Conservation Act 1980, Assam Biodiversity Rule 2010, The Cattle Trespass Act 1871, The Assam Forest (Removal and storage of produce) Regulation Act-2000, The Assam (Control of Felling and Removal of trees from Non-forest Land) Rules 2002, The Schedule tribe and other traditional Forest Dwellers (Recognition of Forest Rights) Acts 2006 and Rules. Always start working form the ride to valley approach. After eviction, immediately planting is to be carried out. Preference for vegetative measures followed by other engineering measures. Caution to be taken to maintain the hydrological regime and compaction of soil. Participatory measures need to be taken for the measures proposed.

## 6.9 Challenges in Implementation of Forests Rights Act 2006

- **Deficiency within Gram Sabha** The Gram Sabha (village assembly) is the first tier of decision-making as per the Act. But in most of the states, the Gram Sabha do not have the desired infrastructure and technical know-how to keep these records. In many tribal areas, Gram Sabha is yet to be constituted.
- **Lack of regular elections in panchayats -** In many states the panchayat system is not very strong and in some cases, the panchayat elections are not held regularly. In such areas, the Gram panchayats are not operational up to the desired level necessary for the implementation of the Act.
- **Ambiguity in the formation of Forest Rights Committee -** Each village is to elect a committee of 10 15 people from its residents as a Forest Rights Committee , which will do the initial verification of claims and place its recommendations before the Gram Sabha. None of the Forests Rights Committee were elected bodies in first place in case of Sonitpur East Division.
- **Lack of awareness and Illiteracy** - The main target beneficiaries of this act are mostly illiterate and therefore filling and submission of forms regarding the claims becomes very difficult. In this case, many intermediaries with vested interests try to take advantage of the situation. Also, there is severe lack of awareness about the provisions of the act not only among the beneficiaries but also among the officials in charge of implementing it. Department of Welfare of Plain Tribes and Backward Classess are implementing departmemt

- **Lack of land records as proof -** As per the provision in Act it is the responsibility of the claimant to provide atleast two documentary evidence alongwith claims. Which is not forthcoming in most of the cases.
- **Inter-departmental coordination-** The tribal department has been declared as the nodal department for the enactment of this Act, but the records for the forest lands are in possession of either forest department or the revenue department. Involvement of three departments - the tribal welfare department, the revenue department and the forest department and effective liasoning is important in achieving the goals of FRA 2006.

**Tbale 6.2. Present Status of Implementation of Forest Rights Act 2006 in Sonitpur East Division**

A. FRA Claims Recieved

| Revenue Districts | Sub Division | Forest Range | Claim Received | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Claim received by Gram Sabha | | | Area (Ha) involved | | |
| | | | Individual | Community | Total | Individual | Community | Total |
| Biswanath | Biswanath | Diplonga, Pabhoi, Borgang | 3931 | 147 | 4078 | 4888 | 194 | 5082 |
| | Gohpur | Gohpur Beat | 8864 | 592 | 9456 | 8937.47 | 241.33 | 9178.8 |
| Sonitpur | Tezpur | Diplonga | 2571 | 204 | 2775 | 4456 | 154.8 | 4610.8 |
| TOTAL | | | **15366** | **943** | **16309** | **18281.47** | **590.13** | **18871.6** |

B. FRA Claims Accepted

| Revenue Districts | Sub Division | Forest Range | Claim Accepted | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Claim Accepted | | | Area (Ha) involved | | |
| | | | Individual | Community | Total | Individual | Community | Total |
| Biswanath | Biswanath | Diplonga, Pabhoi, Borgang | 935 | 44 | 979 | 1464.79 | 41.5 | 1506.29 |
| | Gohpur | Gohpur Beat | 2851 | 124 | 2975 | 3204.5 | 43 | 3247.5 |
| Sonitpur | Tezpur | Diplonga | 228 | 34 | 262 | 469.6 | 25.33 | 494.93 |
| TOTAL | | | **4014** | **2025** | **4216** | **5138.89** | **109.83** | **5248.72** |

C. FRA Claims Rejected

| District | Sub Division | Forest Range | Claim rejected | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Claim rejected | | | Area (Ha) involved | | |
| | | | Individual | Community | Total | Individual | Community | Total |
| Biswanath | Biswanath | Diplonga, Pabhoi, Borgang | 0 | 0 | 0 | 0 | 0 | 0 |
| | Gohpur | Gohpur Beat | 7 | 0 | 7 | 7.2 | 0 | 7.2 |
| Sonitpur | Tezpur | Diplonga | 2343 | 170 | 2513 | 3986.4 | 129.47 | 4115.87 |
| TOTAL | | | **2350** | **170** | **2520** | **3993.6** | **129.47** | **4123.07** |

D. FRA Claims Pending

| District | Sub Division | Forest Range | Claim pending | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Claim pending | | | Area (Ha) involved | | |
| | | | Individual | Community | Total | Individual | Community | Total |
| Biswanath | Biswanath | Diplonga, Pabhoi, Borgang | 2996 | 103 | 3099 | 3423.21 | 152.5 | 3575.71 |
| | Gohpur | Gohpur Beat | 6006 | 468 | 6474 | 3725.77 | 198.33 | 5924 |
| Sonitpur | Tezpur | Diplonga | 0 | 0 | 0 | 0 | 0 | 10 |
| TOTAL | | | **9002** | **571** | **9573** | **9148.98** | **350.83** | **9499.81** |

## 6.10. Observation related to Implementation of Forests Rights Act 2006

Observations about the approved claims by SDLC Gohpur, Biswanath and Tezpur and presently pending with DLC. As per Scheduled Tribes and Other Traditional Forest Dwellers Rules 2012(amended) GSR 669(E) Dt 6/9/2012.

- Rules 12(e ), FRC has to prepare a Map delineating the area of each claims indicating recognisable landmarks.
- Rule 12(f) Delineate the customary boundary of community forest resource……
- Rule 12A, the officials of Forest and Revenue Department shall remain present during verification of claims and verification of evidences onsite and shall sign the proceedings with their designation, date and comments if , any.

In the light of above rules in force, it was already informed to Chairman District Level Committee that

1. The FRCs may be directed through the SDLCs to submit MAP of individual claims and MAPs for community rights as well.
2. The proceeding during verification of claims by FRC signed by revenue/forest department official may also be submitted along with claims.

In absence of Maps and Proceedings of verification, delineation of village boundaries, individual claimant boundary and that too without putting RCC Pillars the implementation is incomplete. The above exercise is essential for implementation of Forests Rights Act 2006 in letter and spirit. Detailed estimate for Survey for Delineation of individual claims and Village boundary and putting up RCC Pillars is as below.

## 6.11.Prescriptions

Methodology for delineation and demarcation of boundary for consolidation of land allloted through forest rights act 2006 and erection of boundary pillars are prescribed.

## 6.11.1.Steps for Delieneation and demarcation of boundary:

1. Data

The data sets to be used are as follows:

(a) Topographic maps - hard copy format

(b) Aerial photographs - digital format

(c) Satellite Data - digital format

Satellite data : Date of acquisition

Landsat data : 1980 to 2005 ( If possible)

(d) GPS data - digital format

2. Data import

The import of the data into the GIS will consist of direct import of the digital data (satellite images) and by the digitizing of the non-digital data (old maps of plot, streams, roads etc.).

3. Data structure

The data will be structured both as raster and vector formats. The satellite data, aerial photographs will be in raster formats, whereas streams and roads will be in vector format.

4. Analysis

The analysis of the data for the study will be conducted under the Quantum GIS and GRASS GIS.

4.1. Digitizing of data

Data will be digitized using digitizing modules for the raster and vector data structures.

4.2. Image processing

Image processing will have to be performed on the satellite data because these are raw spectral bands. This processing will involve digital enhancement (manipulating the contrast between objects) and spatial filtering (to detect the edges between features thereby defining boundaries), in order to improve the interpretation of these images. Image processing will also require the geo-referencing of the satellite and aerial photographs. All images will be spatially referenced using the GPS, which are to be used to geo-correct the images. Classification of the images will have to be undertaken, in order to separate the spectral data into different categories. This is with particular reference to the various vegetation types in the study area.

4.3. Boundary determination

In order to determine the boundary limits of various features, buffers will have to be constructed around these features.

5. Outputs:

The expected outputs are as follows:

i. Awareness generation on the Forest Right Act, 2006, among the stakeholders.
ii. Participation of the villagers in the entire process of implementation of FRA.
iii. Demarcation of land boundaries of each stakeholder of the Forest villages.
iv. Demarcation of the forest boundaries as on the formation date of Gram Sabha which would impart a vital role in controlling further encroachment.
v. Formation of the Local Biodiversity Committee to manage the local resources.
vi. Classification of vegetation types and land use patterns on the historical time scale (1980 & 2005 if possible)

6. Estimated Expenditure:

| BUDGET FOR MAPING ( 1 Unit = 40 Plots of any measurement) | | | | |
|---|---|---|---|---|
| Sl.No. | HEAD | Amount per Unit | Fixed or Variable cost | Additional Units |
| 1 | Camping & Honorarium for Field Assistant | 1500.00 | V | 1000.00 |
| 2 | Honorarium for GIS Processing | 2500.00 | V | 2000.00 |
| 3 | Honorarium for Datasheet Preparation | 500.00 | V | 500.00 |
| 4 | Honorarium for Documentation & File Processing | 500.00 | V | 500.00 |
| 5 | Stationeries | 300.00 | V | 300.00 |
| 6 | Digital Print 1' X 1.5' @ Rs.200 | 200.00 | F | |
| 7 | Transportation | 700.00 | V | 700.00 |
| 8 | Food | 200.00 | V | 200.00 |
| 9 | Reporting & Binding | 600.00 | F | |
| 10 | Office Administrative Cost 5 % | 500.00 | V | 300.00 |
| 11 | Contingency | 300.00 | V | |
| 12 | TOTAL | 7800.00 | | 5500.00 |

In the above mentioned budget a sum of Rs. 7800.00 would be required to carryout the programme in one unit considering 40 nos. of plot of land only. In case a village consisting of 80 nos. of plot of land then cost of additional one unit would be added. Subsequently cost of additional units would be added in multiples of 40 plot of land.

## 6.11.2. Erection of Boundary Pillars

Boundary Pillars may be erected all along Forest Rights Act settlements/villages and remaining part of reserve forests for effective consildation of Forest Boundary. Boundary Pillars demarcating individual plots of rights holder must be mandatory to avoid any complication in futire.

## 6.11.3. Duties of Holders of Forests Rights

The rights holders enjoy the rights conferred under this Act, at the same time they are bounded by certain duties. The gram sabha shall ensure that the duties are discharged properly for maintaining ecological balance.

*Section 5 in The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006*

Duties of holders of forest rights. -The holders of any forest right, Gram Sabha and village level institutions in areas where there are holders of any forest right under this Act are empowered to-

(a) protect the wildlife, forest and biodiversity;

(b) ensure that adjoining catchments area, water sources and other ecological sensitive areas are adequately protected;

(c) ensure that the habitat of forest dwelling Scheduled Tribes and other traditional forest dwellers is preserved from any form of destructive practices affecting their cultural and natural heritage;

(d) ensure that the decisions taken in the Gram Sabha to regulate access to community forest resources and stop any activity which adversely affects the wild animals, forest and the biodiversity are complied with.

District Level Committee for implementation of Forest Rights Act 2006 shall ensure the above with help of Forest Department.

## 6.11.4. Publishing the reject List of claimants by Deputy Commissioner and Chairman of District Level Committee on Schedule Tribes and Traditional Forest Dwellers Act 2006.

DFOs to take up with appropriate authority and Deputy Commissioner to publish such list so that the implementation of Forests Rights Act 2006 is complete in all aspect.

## 6.13. Estimated Expediture in the Working Circle:

The required expenditure for the purpose would borne by the respective Gram Sabhas of their own in a contributory manner on satisfying the terms and condition and after fulfilling the formalities of Memorandum of Understanding between Gram Sabha and facilitator or State Government can also support the activity.

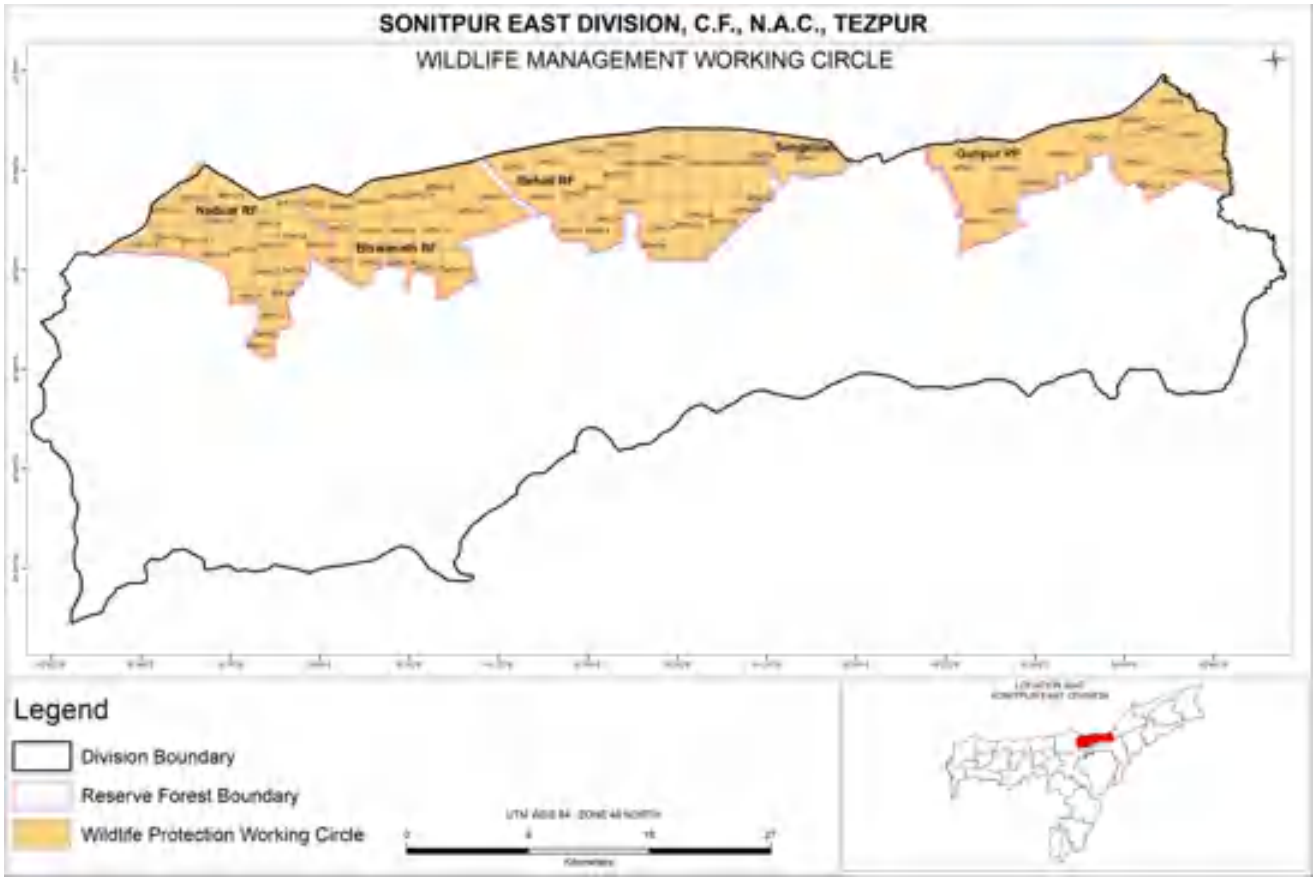
# CHAPTER 7
# WILDLIFE MANAGEMENT WORKING CIRCLE (OVERLAPPING)

## 7.1 Name of the working circle

Wildlife Management (Overlapping) Working Circle.

## 7.2 General constitutents of the working circle

Thisis an overlapping Working Circle covering all RFs of the Division. Out of the 80 compartments in the Division, 9 are under encroachment by tribes from Arunachal Pradesh. For practical purpose only 71 compartments shall be available for operation.




## 7.3 Objectives of the working circle

The aim of the Wildlife Management Working Circle is to ensure wildlife habitat conservation, improvement and maintenance of corridors for movement of elephants and their protection, management

options for reducing man-animal conflict, and conservation and preservation of biodiversity. The specific objectives of this Working Circle are –

- Habitat maintenance of important wildlife species available in the division.
- Ensure reduction of man - wildlife / elephant conflicts.
- Initiating protection, conservation and improvement of habitat to ensure survival of all forms of animals including the endangered and threatened.
- To maintain the terrestrial ecosystem in and around the wildlife habitat areas.
- Generate adequate publicity measures for conservation of wildlife.
- Enrichment of habitat for supporting wildlife population
- Maintenance and conservation of elephant/animalcorridors

## 7.4 General condition of vegetation

Wet Semievergreen and Evergreen forests in Behali RF and Singlijan RF. Part of Biswanath RF are under scrub forest and bamboo stocks.

## 7.5 Legal position

Wildlife (Protection) Act, 1972 is applicable for entire Assam. Indian Forest Act, 1927 also deals with wildlife. The Wildlife (Protection) Assam Rules, 1980 are applicable. Assam Forest Policy, 2004 under IFA, 1927 hunting of wild animals has been completely banned as per the amendments made to the Wildlife (Protection) Act, 1972 in the year 1991 are in vogue. The hunting and trading of wild animals and its trophies were strictly monitored after enactment of The Wildlife (Protection) Act, 1972, and subsequent amendments in this Act in 1991 and 2002, hunting of any animal included in the Schedules of Wildlife (Protection) Act 1972, (other than vermin), as game or sport, has been completely banned. Hunting of wild animals however can be allowed for special purposes but only in exceptional circumstances. The maintenance of biological diversity is the new mandate of National Forest Policy, 1988. Restriction of degraded habitats outside the protected areas is one of the strategies for action listed in National Wildlife Action Plan (2002-2016). Priorities of environmental concerns and biodiversity conservation have been dealt in this chapter. The Biological Diversity Act, 2002 enacted to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental thereto should be adhered to for related matters of Sonitpur East division.

## 7.6 Strategy

For wildlife management the key focus is to ensure maintenance of corridors and maintenance of habitat in the division. This is to be ensured through spatial mapping of corridors areas and assisting regeneration of elephant preferred species shall be enhanced. A total ecosystem conservation concept will

be adopted for conservation of the wildlife habitat in these reserve forests. Introduction of exotic species in the area will be restricted and plantation of both, slow and fast growing native species of herbs, shrubs, and trees shall be promoted. Involvement of local communities especially youths, women from the forest and fringe villages will be sensitized in forest and wildlife protection issues identification and appropriate measures, participatory planning and sharing of responsibility and benefits needs to be promoted. Excluding local population can often lead to illegal activities which can cause further degradation of the flora and fauna. The efforts therefore be to impose restrictions on local populations through participation in purview of legal and allow traditional practices to continue to ensure their long-term success. For this purpose, capacity building programmes may be taken up.

Regular monitoring and updation of species data through research and development activities needs to be taken up taking the present data as the base. Ethno biological information also needs to be generated for the species recorded in the division.

## 7.7. Prescriptions

Measures for protection in this Working Circle is elaborated below under proposed wildlife management prescriptions, and proposed biodiversity conservation measures.

7.7.1. **Improvement of habitat quality for Wild Elephant**

**a ). Establishment of Nursery at Singlijan Beat Office and Bihmari Beat Office**

Two one-hectare nursery (10000 m2) is being proposed to be set up

The nursery will be used to raise seedlings of local plant varieties to be used towards improvement of forest habitat and elephant corridors in both the districts.

Following steps will be taken to set up nursery-

I. Livestock proof fencing with bamboo or wooden posts in the nursery

II. Preparation of standard beds with the size of 10 m x 1 m

III. Collection of seeds or purchase of seed

(in case seeds are not available locally, needs to purchase)

IV. Creation of poly pot seedlings.

In the nursery sapling of local elephant fodder species such as (*Terminalia belliraca, Emblica officinalis, Ficus species, Sterculia villosa, Dillenia indica, Artocarpus chama, Dillenia pentagyna*) will be raised.

b ) **Removal of weeds**

The selected area may be demarcated for improving habitat is covered with invasive plant species *Chromolaena odorata, Lantana camara*. Before plantation these invasive plant needs to remove. It will be done by cutting and followed by manual removal.

**c ) Elephant Fodder and Grass Plantation**

To enrich degraded habitat under Sonitpur Division . The species include in the enrichment programme will be a mixed of local tree species, grass species such as *Saccharum spontaneum, Erianthus ravennae, Imperata cylindrica* will also be planted.

**d. )Installation of Solar power electric fence**

Livestock grazing is major issue in our forest area, plantation will not survive unless it is protected. therefore immediately after plantation solar power fence will be installed. This will ensure the survival of tree sapling and grasses. This fencing is not for HEC, rather to secure the plantation till it reaches maturity. This operation will be done in phases to use the resources such as power fencing etc to the optimum.

**e ) Maintenance of plantation**

After plantation, if any sapling died than it will be replaced by another sapling. Weeds will be removed regularly.

**f ). New Water Bodies and digging up or cleaning of existing water bodies**

Water is a major requirement inside elephant habitat and water bodies are getting silted or full of weeds, which need improvement. Such water bodies can be created or existing water bodies can be cleaned and desilted using excavator.

### 7.7.2. Encroachment , Illegal felling and illicit mining

Sporadic felling has been observed in the Division.The forest staff shall keep vigil through patrolling, information sharing, information on felling equipment through networks developed with the help of local people, shopkeepers selling felling equipment. Illegal felling to be stopped and persons involved arrested as per the rules. Any felling equipment to be seized according to the rules.

Boundary pillars to be constructed in the protected areas. Proper demarcation was undertaken during the last management plan. Encroachments should be identified and the standard procedure for eviction is to be done at priority.

### 7.7.3. Grazing

Grazing is negligible in the Division. However, domestic cattle sometimes stray into the RFs of the division. Stray cattle to be chased away and local people to be made aware on the effect of livestock grazing inside the division. All domestic cattle need to be immunized. Initiation in this regard should be taken by facilitating vaccination camps for cattle of the fringe villagers.

### 7.7.4. Prevent Illegal mining in Elephant Habitat

Due to anthropogenic pressure, the wildlife habitat has degraded in the DIvision. Water, food and safe resting places for wildlife, breeding areas, and nesting areas is to be ensured in the division.

### 7.7.5. Temporary Mitigation Measures for Man Elephant Conflict and Cost estimates

The measures adopted for tackling human elephant mitigation techniques were studied and research extensively by various agencies. It was revealed that Solar Powered Fencing combined with elephant proof trench is one of best available short term measures to deal with man-elephant conflict. Elephant power fencing and elephant proof trench has been most affective in most part of the country. Thus after careful consideration of estimates and plans obtained from various Divisions, Plan and Estimate

is submitted as underTable 18.8b and Table 7.1. The proposed EPF locations are as proposed below. EPT may not be suitable for Alluvial soils.

**Buroi Experiment and Success Story**

**Installation of a low cost power fence along the Southern boundary of Singlijan reserved forest**

Considering the high intensity of Human Elephant Conflict a 7 km (Approx) long low cost solar powered fence along the southern boundary of Singlijan RF was installed with the joint effort from local communities, Buroi TE Management , Sonitpur East Forest Division and WWF India. Before installation several village level meeting with the locals and other stake holders were organized to educate people as well as for planning various HEC mitigation initiatives at the field level basis. As an outcome of those meetings it was decided to install one approximate 7 km km long, low cost (single strand) power fence, along the southern boundary of Singlijan RF with contribution and active participation of the all the Villagers and tea garden workers contributed physical labors to erect the fence and also committed for maintenance of the same. Forest dept (Sonitpur East Division) has provided the GI wire, posts, energizer, battery and solar panel for the fence while WWF India extended the support of a technician and also ensures the participation of all stakeholders and proper implementation of the work in the field. The fence is now working properly since the day of its installation on Aug 8, 2015. After the installation of the low cost solar fence it is now possible to protect average 800 bigha of crop fields per year. Simultaneously the success of the fence installation also helps to create an environment of co-existence between locals and elephants. The detail of crop damage before and after installation of low cost solar fence is given below.

**Table 7. Crop damage before and after installation of low cost fence**

| Nos of Villages Benefitted from the Solar Fencing | Total crop damage in Bigha | | | |
|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016 |
| 19 | 366.6 | 1220.78 | 0 | 0 |

Map.1. Yellow line indicates the low cost solar fence

The fence needs to be maintained every year to prevent any conflict in Buroi Tea estate area.

**7.7.6. Managing Man Animal Conflict:** The man-elephant conflict is an important issue in the Sonitpur East Division for over two decades.The major elephant migration routes as in Fig 18.8a All revenue villages in such migration routes may be identified and Anti Depredation Squads may be formed during the month of September every year. Frequent meeting may be held with the Anti Depredation Squads. Minutes of meetings may be recorded..

a. Annual ADS meeting should be convened at DFO Office as annual feature without fail.

b. The meeting of District Level Task Force for Wild Elephant Antidepredation Committee notified by Government shall be convened before onset of elephant depredation season.

c. ADS register should be maintained at Range and Division level as well.

d. Forest Staff on Antidepredation duty shall carry a Elephant Duty Register with them whenever they visit villages for such duty. Village headmen or any villager or ADS member may sign such Elephant Duty Register. Such Elephant Duty Register is record of forest staff discharging duty in Revenue areas. Such Register may be diligently maintained and issued by Concerned Range Officer.

e. ADS meetings shall be recorded in register. All phone numbers of ADS members may be circulated among DFO, ACF, RO and BO. The phone nos of DFO, ACF and RO should be compulsorily shared with ADS members.

f. The RO/BO and ADS members shall be close connection with local Police Station/ OP, Veterinary Doctor and Revenue Official of the Rank of Circle Officer.

g. During September meeting with Tea Garden Officials, SDO Civil Gohpur, all members of ADS, Police shall be convened at SDO Civil Gohpur office and preparedness for upcoming Elephant depredation season should be reviewed.

h. Similar meeting should be convened at DC Office Biswanath.

i. 6.Crackers and Torch Lights shall be procured in advance , in credit if necessary before the onset of Elephant depredation season. Such Crackers and Torch lights may be distributed liberally among the ADS members and Staff.

j. Community Solar powered electric fence is ideal for location of high intensity conflicts. Division headquarter should maintain conductor, energizer, Solar plates, Battery 12 V so that during emergency it can erected immediately.

k. Two(2) Kunki Elephant may be hired for man animal conflict.

l. Solar powered fencing may be erected in phased manner at proposed places as in Table 7.1

**7.7.7. Mitigation of HE Conflict by Monitoring herd movement across Railway Tracks:**

9 locations were identified across the Division which are elephant corridors and due to increased frequency of Trains in the Tracks there are chances of Train hit. Such accidents are fatal to both elephants and trains.

3 such corridors falls under Diplonga Range,4 in Pabhoi Range, 1 Corridor at Borgang Range and Gohopur Beat each. During the month of December to January joint patrolling of railway tracks may be made mandatory. The details of Elephant corridors and movement pattern was surveyed and recorded as in **Annexure XII**

Photo 7. Elephant Antidepredation Team during duty in Bholaguri Tea Estate and Elephants taking shelter in Teas Estate.

**Fig 7. Google Earth Map of Elephant Corridors/Route**

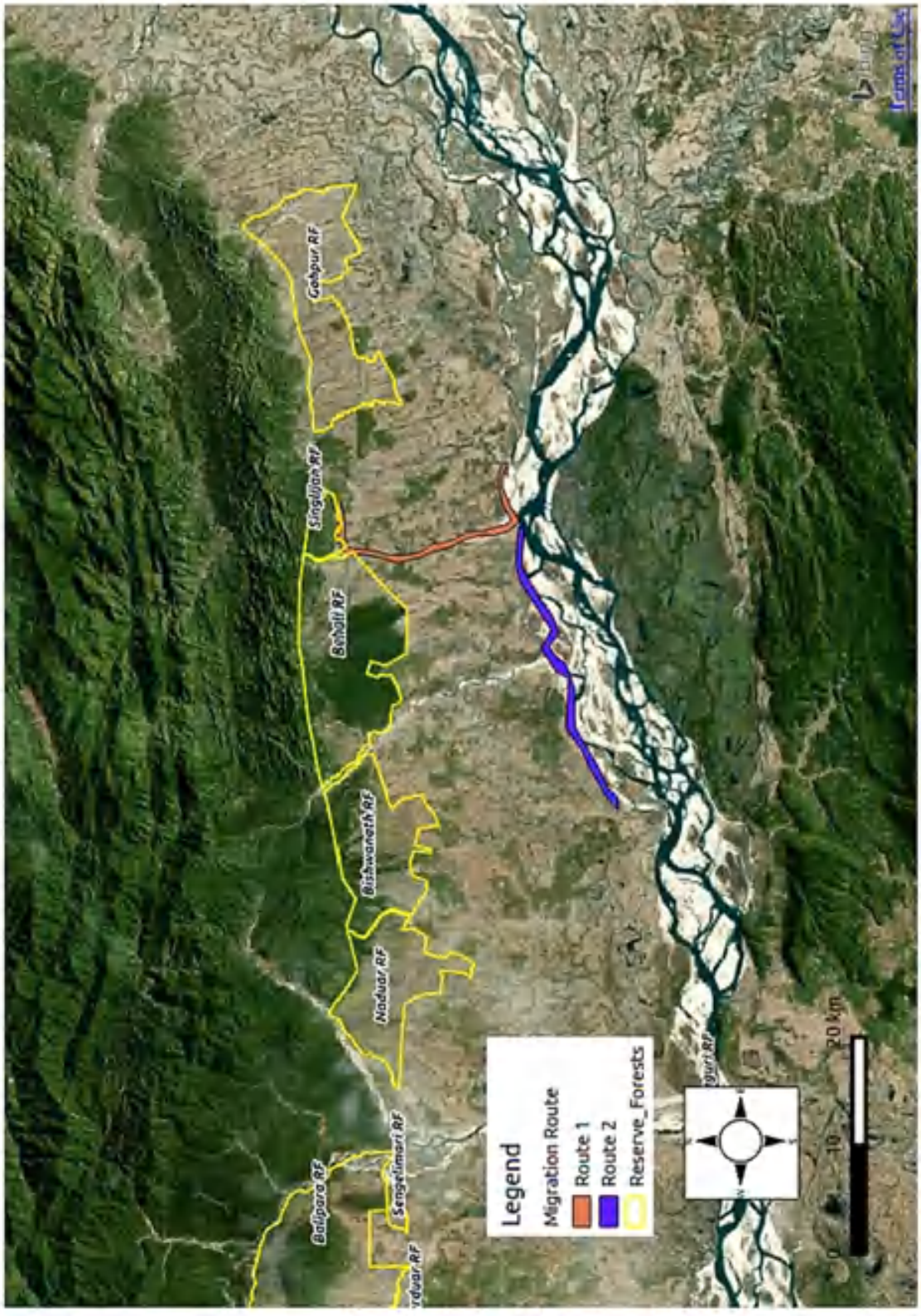


**Table 7.1. Geo-Coordinates for Elephant power fencing and EPT for Sonitpur East Division**

| Sl. No. | Name of Place withGPS Co- Ordinate | | | | Elephant Power Fencing (km) | Elephant Proof Trench (km) | Range | Name of Nearest RF |
|---|---|---|---|---|---|---|---|---|
| | From | GPS Coordinate | To | GPS Coordinate | | | | |
| 1 | Singlijan RF | 26°55'47.6"N 93°25'48.2"E | Assam Arunachal Pradesh Border | 26°56'12.6"N 93°28'44.4"E | 6 | 6K | Borgang Range | Singlijan RF |
| 2 | Rongaghor | 26°52'24.4"N 93°20'40.9"E | Behali | 26°52'38.3' 'N, 93°16',23.8"E | 10 | 1 | Mariani | Behali RF |
| 3 | Borjarani to Bharajuli | 26°52'01.8"N 93°15'20.2"E | Eastern bankof Dihajan | 26°53',47.1"N 93°13', 35.8"E | 5 | 5 | Pabhoi | Behali RF |
| 4. | Sialmari | | Thandapa ni | | 5.5 | 5.5 | | Behali RF |
| 5. | Balupara | | Kamarbas ti | | 1.5 | 1.5 | | Behali RF |
| 6 | Kamarbasti | | Jhalukbari | | 1 | 1.5 | | Behali RF |
| 7. | Ghorpal | 26°40'0.22"N 93°00'40.0"E | Confluence of Brahmaputra/Jiabho rali | 26°39', 0.77"N 93°54', 6.87"E | 11 | | | 6th Addition Kazirang a National Park |
| 8 | Confluence of Buroi River to River Brahmaput ra | 26°47'23.84"N 93°27'3.20"E | Gopaljhar oni | 26°46'48.1 2"N 93°39'9.66 "E | 21.4 | | | 6th Addition Kaziranga National Park |
| | | | | **Total** | **61.4** | **29.5** | | |

### 7.7.8. Citizen Engagement For Awareness In Dealing Man Animal Conlfict

Citizen engagement for wildlife management: The spectrum of citizen engagement includes Inform, Consult, Involve, Collaborate, and Empower. The potential benefits of citizen engagement are making legitimate decisions,making Better Policy, overcoming polarization, reducing conflict, looking for common ground, building competent, responsible citizens and including minorities.

AID IN Citizen Engagement Plan:

- To develop some good audio-visual Modules on Wildlife and Man Animal Conflict for interaction with community.
- To develop some Documentaries on good practices/examples to be shown to the community.
- To develop some One-Act Plays or short Plays on critical issues and make arrangements for performances with the help of Civil Society Groups or Schools.
- To engage school/college students to take out processions to convey important messages on important Wildlife Week, Forestry Day, International Elephant Day , etc.
- Make use of Van Mahotsava and Wildlife Week Celebrations or cultural occasions to convey messages.

- Organise Household visits through volunteers/school college students/civil society groups to create awareness.
- Make arrangements for sending bulk messages on critical issues.
- Create a Website or Interactive Portal to transfer knowledge and get feedback from the community.
- Institutionalise a system of analysis of the feedback from the community and factoring it in the departmental plans.

In case of Sonitpur East Division following objectives can be identified for engagement of citizen

1. To engage the forest villagers ,stakeholders and other forest dwellers in Man Animal Conflict

2. Identification of community leaders and civil society and capacity building as essential aspect ofMan Animal Conflict.

Scope of Citizen Engagement: There is a scope in engaging the citizen in all the above activities, service of the gram sabha/JFMC/NGO/Volunteer/community leader/religious leader can be utilized for the purpose of Wildlife management.

Task Description in Citizen Engagement : There will be definite task for every individuals or every organisation.

(a)Information gathering

(b)Rescue operation

(c)Advance warning

**7.7.9. General care should be taken :**

1) To avoid any activity which breaks/fragments the continuity of animal corridor.

2) Removal of encroachments & eviction/rehabilitation is to be carried out in areas which are more prone to animal attack so as to save human life & animal causalities.

3) Shrinkage of habitat or habitat degradation is to be avoided by maintaining/planting fodder grasses and tree species which are palatable to animals.

4) While more emphasis needs to be given on endemic flora & the palatable grasses/legumes & the fruit bearing trees species like Ficus, Aonla, Jamun Ber etc., mono-cropping with non palatable species like Teak plantation is to be avoided near the animal visitation/frequenting areas.

5) As water shortage is not there all around the year, however monitoring of the animals for diseases/infection of viral, bacterial, protozoon origin should be done to avoid spread of commicable diseases.

6) Vaccination of cattle near the fringe village of both the Kaziranga National Park respectively needs to done regularly and awareness camp & animal health camps needs to be conducted with the help of Veterinary doctors regularly.

7) Areas adjoining the Kaziranga National Park must be declared as sensitive areas and information on the time of depredation, no. of animals attacking/frequenting the area needs to be well documented. Documentation on the number of animals rescued at Behali area & the information on strayed Rhino/Tiger into the areas of various range jurisdiction needs to be documented.

8) Elephant depredation hot spots needs to be identified.

9) JFMC's (or) EDC's needs to be activated & awareness to be given on protection to wildlife.

10) Provision of funds to public for construction of solar electric fencing around their agricultural fields will help to reduce the human-animal conflict.

11) For timely release of remuneration for human injury, crop damage & ex-gratia payments to victims of animal depredation, the Range Officers are required to inspect, verify the casualty areas & conduct spot enquiry & submit reports to the higher authority for quick release of the claims, which will reduce the vengeance killing of animals by the affected villagers.

12) Construction of watch towers & posting of staff on 24 hours duty during most vulnerable periods.

13) Use of JFMC & EDC's in animal conflict mitigation.

14) Care should be taken to prevent livestock grazing, fodder extraction, timber extraction, NTFP collection & establishment of new roads (or) pathways, encroachments/dwelling huts/ new clearing of lands for cultivation which may lead to shrinking of prey base/habitat degradation (or) corridor for augmentation.

15) A detailed elephant track/movement plan needs to be made covering the entire elephant movement area within the Nagaon Division & specifically covering the conflict boundary areas

where elephant proof trenches/solar electric fencing is required to control the elephant from moving rampantly into the human habitational areas.

## 7.8. Budgetary provision for Wildlife overlapping Circle

The budgetary estimate is as in Table 7.3. Some important components of Wild Elephant Anti-depredation viz., providing of Kunki elephants, PoL, Kerosene, Crackers, Torch light, Battery, Elephant Watch Tower, elephant trenches, electric or Solar fencing, village defence teams/Anti-depredation teams/ forewarning teams, arms and ammunition, torches etc., apart from habitat improvement. The Rates referred against each item of work are current rates which may be escalated at the rate of 5 % per year or inflation rates per year for duration of the working plan.

**Table 7.2. Construction of 3 stranded Power Fencing (Electric) for Anti-Depredation measure against Wild Elephant (1Km)**

| Sl.No | Item of works | Unit | Rate/unit (`) | Total (`) |
|---|---|---|---|---|
| 1 | Supply,f itting, fixing a SolarP.V Module of 12 Volt capacity. | No | 18,600 | 18,600 |
| 2 | Supply, fitting, fixing a Solar PV module mounting structure = 1No. | No | 900 | 1,900 |
| 3 | Cost of Solar PV Battery of 12 Volt = 1No. | No | 15,100 | 15,100 |
| 4 | Cost of Solar PV Batterybox = 1No. | No | 1,900 | 2,900 |
| 5 | Cost of super Earthling Kit including supplying, fitting & fixing =1No. | No | 10,400 | 10,400 |
| 6 | Supply, fitting, fixing a Solar Energizer of 0-5km Range = 1No. | No | 1,21,200 | 1,21,200 |
| 7 | Cost of P.P Real insulator = 303 No.. | No | 50 | 15,150 |
| 8 | Cost of lighting arrester including supplying, fitting and fixing = 1No. | No | 10,400 | 10,400 |
| 9 | Cost of supplying of the RCC posts at the site to be erected at the interval of 10 m of specification 0.1 x0.1x2.4=101 No. | No | 580 | 58,580 |
| 10 | Cost of GI Wire of 10 gauge size = 3,000 RM = 217 kg (3 stranded wire in1km) | Kg | 70 | 15,190 |
| 11 | Cost of Cable, Nut, Bolt and other accessories | L.S | | 3,000 |
| 12 | Wages for skilled labours for erecting and fixing the post including fitting of G.I Wires for supply of power etc.=120DLS | DL | 208 | 24,960 |
| 13 | Contingency | L.S | | 2,620 |
| **Total** | | | | **3,00,000** |

Table 7.3.. Estimate for Fund Requirement in HEC in Sonitpur East Division.

| | | | | | Grand Total |
|---|---|---|---|---|---|
| **Sl No.** | **Item of works** | **Activities** | **Area in Ha/ Km/ Nos.** | **Amount Required (Unit Price)** | **Total( In Rs)** |
| 1 | Habitat Improvement | Planting of fodder fruit species | 50 ha / yr | Rs. 12500 /ha | 8254242 |
| 2 | Deepening of Ponds (or) Wells | Desiltation | 10 nos / yr | Rs. 50000 / unit | 6603394 |
| 3 | Elephant proof trenches | | 20 Km | Rs. 4,00,000 / km | 10565430 |
| 4 | Solar fencing | | 25 Km | Rs. 4,50,000 /Km | 14857636 |
| 5 | Purchase of crackers | | | Rs.3,00,000 /yr | 3962036 |
| 6 | Purchase of Arms & ammunition | DBBL/SBBL Gun | DBBL - 10 Nos. SBBL - 10 Nos. | Rs.30000 / unit - DBBL Rs.25000 / unit- SBBL | 726373 |
| | | Ammunition Cartages | 500 / yr | Rs 120 / unit | 792407 |
| 7 | Purchase of ropes etc. | | | Rs. 60,000 /yr | 792407 |
| 8 | Hiring of Kunki elephant for Anti-Depredation | | | Rs. 3000/ day / elephant | 9378093 |
| 9 | Purchase of vehicles | Bolero Camper | 5 Nos. | Rs. 6,85,000 per unit | 2193713 |
| 10 | Vehicle maintenance Rs. 30000/- year | | 5 Nos. | Rs. 1,50,000 per yr | 9747590 |
| 11 | Food for Kunki & rescued elephant calf etc. | | | Rs. 1000 /day | 1188611 |
| 12 | Remuneration for crop damage | | 15000 Bigha | Rs. 1000 per bigha | 19810181 |
| 13 | Remuneration for human injury | | 100 Nos | Rs. 30000/case | 3962036 |
| 14 | For ex-gratia payment to the human casualty | | 50 Nos | Rs.4,00,000 | 26413574 |
| 15 | Anti Depredation Squad ( Rs. 4,00,000 /Range and Account Beat/yr) | | | Rs. 20,00,000/ yr | 26413574 |
| 16 | Tranquilizing Gun & Chemicals | | 2 Nos | Rs.1,50,000 /unit | 157500 |
| 17 | Procurement of wireless handsets | | 20 Nos. | Rs.20,000 /Unit | 362051 |
| 18 | Construction of Watch towers | | 10 Nos. | Rs. 7,00,000 /unit | 6335884 |
| 19 | Watch & Ward & forewarning labourers payment | | | Rs. 400 /DLS/day | 28526660 |
| 20 | Rescue & Rehabilitation fund for wild animals during flood | | | Rs.2,00,000 /yr | 2641357 |
| 21 | Protection of elephant corridor ( at entry/exit point ) | | | Rs.3,00,000 /yr | 3962036 |
| 22 | Reduction of invasive weeds | | 500 ha | Rs. 3,000 /Ha/yr | 1981018 |
| 23 | Provision for Trapping cage & other wildlife emergency | | 4 Nos | Rs.2,00,000 / unit | 420000 |
| | TOTAL | | | | 190047803 |

**Note: Estimates prepared considering inflation rate 5% per year**

# CHAPTER 8

# MISCELLANEOUS REGULATIONS

## 8.1 Deviations

Any large and unusual operation, variation from yield and target for plantation/regeneration and other activities provided in control forms of the working plan constitutes a deviation. Deviation beyond 25 percent of target is considered to constitute a major deviation. All deviations, which permanently alter the basis of management laid down in a working plan, will require prior sanction of the PCCF. All deviations, which do not permanently alter the basis of management and with the necessity of which he agrees, may be approved and sanctioned by the Working Plan Conservator on behalf of the PCCF. Where there is difference of opinion between the Working Plan Conservator and the territorial Conservator of Forests, the former will refer them to the PCCF for instructions. The PCCF/CFWP, as the case may be, will counter sign the deviation statement. Minor deviations can be sanctioned at the level of the CF Working Plan or the PCCF as the case may be, but the PCCF before sanctioning the major deviations of following nature, will necessarily take prior approval of the Regional CCF/APCCF of the Ministry of Environment and Forests:

(i) Change in Silvicultural system

(ii) Clear felling of natural forest

(iii) Formation of new felling series; and

(iv) Large scale felling due to natural calamities.

For all major deviations with respect to prescriptions where sanction of the MoEF is mandatory, an explanatory note alongwith the request for regularization has to be sent by PCCF (HoFF) to RAPCCF (MoEF). In case, where there is difference of opinion between the PCCF (MoFF) and RAPCCF (MoEF), the former will refer the matter to DG F&SS (MoEF), whose decision shall be final. The PCCF (HOFF) will countersign the deviation statement for reporting to the MoEF (para 132 of National Working Plan Code-2014).The following format for deviation statement should be used:

Year….. Division……

| Sl. No. of deviation | Control book, name, form, No. page | Reference to Working Plan | | Nature of deviation requiring |
|---|---|---|---|---|
| | | Paragraph | Nature of Prescription | |
| | | | | |
| | | | | |

The DFO territorial will forward through the Head, territorial circle, typed copies of this form in triplicate yearly with his copy of control forms. No explanatory remarks are required on this form but these should be given in theforwarding letter. The Head, Working Plan Organisation, as per situation given above, after sanction, will return one copy of the statement to the DFO territorial through the Head,

territorial circle, and the other copy will be sent to the WPO for record. All major deviations without altering the basis of management, the prior sanction of the PCCF (HoFF) should have been obtained in advance, the sanction number and date should be quoted in the last column.

## 8.2 Construction of Roads/Link Roads

No construction of roads/link roads passing through the forests shall be allowed without the sanction of the competent authority/Government of India, as they attract the provisions of the Forest (Conservation) Act, 1980.

## 8.3 Buildings

The old buildings requiring repair needs to be approved by the PCCF. Those building that are not put to use needs to be used.

## 8.4 Maintenance of boundaries and Pillars:

This has been dealt with in the Protection Working Circle. To avoid legal disputes in the future, maintenance or boundary pillars is necessary especially the state boundaries. Inspection path of 3 m wide all along the boundary should be prepared for inspection and protection. The boundary pillars must be numbered and written. The distantly located pillars may be connected to one another by digging lines, which should be regularly cleared. Boundary registers should be maintained. The records be prepared in triplicate and kept in Range, Division and Circle Offices.The Range Officer should check the boundaries once a year and record a certificate to that effect on the Boundary Register. The Block Officer should check the entire boundaries of the forest under his charge and send the necessary report to the Forest Range Officer. The Beat Guards should keep the records of boundaries of their beats in the Beat Book.The programme repair of Boundary Pillars should be followed as given in the Protection Working Circle. Details of Boundary Pillar is given in Forest Protection Working Circle

## 8.5 Fire Protection

There are as such no significant damages from fires, however the following miscellaneous regulations are necessary to ward of forest fires:

Annual maintenance of fire lines to be done in the January through vegetation clearing from fire lines. Fire risks should be notified by the DFO to the staff for necessary preventive measures. Entry of people inside the forests for extraction of MFP should be regulated. The territorial staff should maintain cordial relations with the local people to garner their support in case of fires and other eventualities.The Divisional Forest Officer should visit the fire-affected areas immediately after it comes to his knowledge and should submit a report to the Conservator of Forests giving all the detail of occurrence of fire, causes of fire and damage occurred to the crop with remedial measures for the future.

## 8.6 Control of Grazing

The prescriptions on control of grazing made in the various working circles should be strictly observed. In this regard, strict enforcement of the penal provision of the Indian Forest Act, 1927 and the Cattle Trespass Act, 1871 should be ensured.

## 8.7 Preservation Plot

It is proposed to preserve 3.00 ha area of endemic species Hollong - Mekai - Naharas the permanent preservation plot to study the increment of these species in the area and its further prospects. Artificial protection around this forest patch to be initiated. The boundary geo-coordinates should be recorded. Periodical measurement should be taken and recorded. Account of any silvicultural operation, maintenance measures and natural disasters should also be recorded. Existing preservation plots is any will be maintained.

## 8.8 Nurseries

To meet the needs of plantation in the area, new nursery for raising tree species, medicinal plants, fruit species needs to be initiated.To raise good quality seedlings, the following steps should be taken up in the nurseries:

- Seed from identified Plus Trees should be used. In case of other species seed from reliable seed orchards should be used.
- Production through vegetative means like root, stem, shoot cuttings, tissue culture, tree improvement techniques, cloning, rhizomes to raise the planting stock.
- For bamboos, cuttings, rhizome multiplication method should be used to raise qualitative seedlings.
- To minimize the cost of transportation of seedlings to the field in the difficult terrain situations, seedlings should be raised in the root-trainers which give sturdy seedlings with high root-shoot ratio.

## 8.9 Petty Sales

Dry, dead and wind fallen trees after getting sanction from the CCF through the DFO may be disposed off as early as possible to avoid financial loss. Thatch and other grass if falling inside the JFMC areas may be handed over to the JFM committees. However, if there are problems with JFMC or they are not willing to take over, various minor forest produces should be auctioned.

## 8.10 Stone Mahals

All stone mahals should be geotagged, inspection carried out and quarrying in stone mahals may be in operation adhering all the formalities. It should be ensured that in no way there are any

environmental and ecosystem and its services degradation / deterioration through stone quarrying activities.

## 8.11 Sand Mahals

All sand mahals should be geotagged, inspection carried out and sand mining in sand mahals may be in operation adhering all the formalities. It should be ensured that in no way there are any environmental and ecosystem and its services degradation / deterioration through sand mining activities.

## 8.12 Departmental Supply of Wind Fallen Logs

The competitive sale needs to be improved to prevent further deterioration of wind fallen, dead, dying and decay trees in the process of disposal.

# CHAPTER 9

# MONITORING, ASSESSMENT AND REPORTING

## 9.1 Control and Records

The control forms required for control of deviation from prescriptions for JFMC operation, plantation and regeneration, forest protection, soil and moisture conservation, FRA operations, Wildlife Mangement and Biodiversity Conservation is provided in this chapter. The control forms shall be prepared and submitted annually to the Conservator of Forests with a copy to the working Plan Officer on the 1st of January for scrutiny and ontaining sanctions of deviations, if any.

The following control forms will be used for monitoring allthe important operations prescribed and suggested in this working plan:

### 9.1.1. Bamboo Harvesting Control Form

For cutting bamboo identified for felling and bamboo left out, the Control Form 1 shall be used.

### 9.1.2 Silvicultural Control Form

For control of all silvicultural operations such assubsidiary cultural operations, cleanings, burnings etc., Form No. 2 shallbe used.

### 9.1.3 NTFP Control Form

For controlling and maintaining a record of all NTFPsharvest so as to make the removal/harvesting of NTFP sustainable, Form No. 3 shall be used.

### 9.1.4 Wildlife Management and Biodiversity Conservation Control Form

For improvement of wildlife habitat and conservation and preservation of biodiversity, Form No. 4a, 4b & 4c shall be used.

### 9.1.5 Plantation Control Form

For any plantation block, gap, regeneration natural and assisted Form No. Pa, 4a, 4b & 4c shall be used. The DFO territorial will annually make entries in his copy of the controlforms and send them, together with the deviation statement in triplicate to theHead, territorial circle. After the entries have been checked and approved, theHead, territorial circle will first get his copies completed and then send it in twocopies to the concerned WPO. The later will then complete his copy and finallyreturn the DFO"s set for deposit in the latter"s office till next year. The WPO willsend the deviation statement with appropriate justification in four copies to the CCF/APCCF (RE&WP) for recommendation to PCCF (HoFF) for sanction. After the sanction, one copy each will be sent to theWPO, Head, territorial circle and the DFO territorial for their record and theCCF/APCCF (WP) as the case may be, will retain the fourth copy for his set ofcontrol forms. The control forms should be submitted by the DFO territorial to theHead, territorial circle by October

and the latter should send them to the WPOconcerned by December each year (para 129 of the National Working PlanCode-2014).

## 9.2 Compartment History

Compartment history will be furnished and any deviation for aligning compartments for the current context of sustainable management of forests adhering to watershed approach will be recorded. The DFO will direct the marking Officer to write the compartment description and maintaued in the registrar. The compartment history along with a thematic map will include the operations, silvicultural operations, and any other operations in the compartment as prescribed in the working circles.

## 9.3 Maintenance of Records

A detailed record of each forestry activity shallbe maintained in order to have a solid database for scientific monitoring,evaluation and future planning. In order to avoid any complicacy at any level, thecontrolling officers should inspect the following documents during inspection and enter signed observations.

i. Annual Plan of Operations (APO)

ii. Plantations Journals

iii. Nursery Registers

iv. Measurement Books

v. Divisional Note Book

vi. Fire Control Forms

vii. Beat Book

### 9.3.1 Annual plan of operations

An annual plan of operations should beprepared by the Divisional Forest Officer based on the prescriptions andoperations to be carried out as per the provisions of the Working Plan. It shouldbe approved by the Conservator of Forests.

### 9.3.2 Plantation forms and journals

The existing system of filling plantation forms and compartment history will be furnished and any deviation for aligning compartments for the current context of sustainable management of forests adhering to watershed approach will be recorded. The DFO will direct the marking Officer to write the compartment description and maintaued in the registrar. The compartment history along with a thematic map will include the operations, silvicultural operations, and any other operations in the compartment as prescribed in the working circles.

For each plantation, a separate journal shall be maintained in the prescribed form wherein a complete record of plantation viz.year and month of plantation, area planted, Number of plants planted,

species. All activities such as advance work, plantation, regeneration, maintenances, felling andenumeration, maintenance cost, weed cutting, constructing of fire-lines etc.should be recorded for a year. For each year, there will be one entry that shouldbe signed by the Forest Range Officer. The inspection notes by the officersshould be recorded in the journals. The Divisional Forest Officer should inspectthe entries at the time of annual office inspection.

Details of expenditure incurred month-wise, compartment wise/and operationwise including maintenance cost forsubsequent three years. At the end of each year observation regarding successof plantation, survival percentage and the reports on monitoring and evaluation should be given. Specific instructions givenduring the inspection by senior forest officers to be recorded. Instructions of thePCCF/APCCF on checking of plantations issued from time to time should also befollowed.

### 9.3.4 Nursery register

The existing system of filling plantation forms and compartment history will be furnished and any deviation for aligning compartments for the current context of sustainable management of forests adhering to watershed approach will be recorded. The DFO will direct the marking Officer to write the compartment description and maintaued in the registrar. The compartment history along with a thematic map will include the operations, silvicultural operations, and any other operations in the compartment as prescribed in the working circles.

For each nursery, separate registers need to be maintained. It shall have monthly detail of operations and expenditure incurred, plants raised, plants used departmentally, plants supplied to the public during the month etc. Detail of plants supplied free of cost to other Government Departments, public institutions, NGOs etc. shall also be recorded in the register. Plants destroyed as a result of natural calamities or otherwise destroyed shall be got written off from the competent authority. A copy of the nursery statement showing details of species wise nursery stock should be sent to the Divisional office monthly.

### 9.3.5 Divisional note-book

The Divisional Forest Officer should maintain a note-book in which the following information shall be recorded.

a) Flowering of important tree species.

b) Seeding of important tree species including geocordinates of mother trees

b) Gregarious flowering of bamboos.

c) Climate-rainfall and temperature experienced during this year and itseffect of the forest crop.

d) Pests and diseases noticed in the crop, treatment and result thereof.

e) Growth date of trees collected during the year.

f) Labour related problems faced during the year.

g) Market trend of forest produce.

h) Working of JFM committees.

i) Any other major important issue from the forest management point of view.

### 9.3.6 Fire Control Form

The record of forest fires should be maintained without any bias. The details of area burnt with sketch, cause of fire, date of fire, time of fire, date and time of control, damage and financial loss will be recorded. The copy of the fire report should be sent to the Conservator of Forests.

### 9.3.7 Deviation statement

To exercise control over progress of various operations at the end of each financial year, the prescriptions of the working plan will be compared with the actual operation done in the field on felling, silvicultural operations and miscellaneous works and any excess or short fall shall be recorded giving reasons for deviation and sanction of the competent authority shall be obtained as per the details given in the Miscellaneous Regulations.

### 9.3.8 Beat Books

Each beat guard will maintain a Beat-Book to be prepared and issued by theDivisional Office. The Beat-Book shall contain the following information:

a) Beat map

b) Detail of forests in the beat

c) Copy of boundary register of forests

d) Duties of Forest Guard

e) Legal status of the forest area with notifications

f) Abstract copy of the relevant sections of the Indian Forest Act, 1927;
Wildlife (Protection) Act, 1972; Forest (Conservation) Act, 1980 and
vernacular translation thereof.

g) List of buildings, roads, paths, fire-lines in the beat

h) List of plantations raised during the past 10 years

i) Record of water table at various places in the area

### 9.3.9 Registers and Records

The following updated (till last financial year)register and records will be maintained by the Division:

i) Compartment histories
ii) Fire records and registers
iii) Register of Boundary Pillars
iv) Register of Rights and Concessions
v) Record of forest produce harvested
vi) Free grants

vii) Register of land transferred to other departments under FC Act.
viii) Register of soil and water conservation works
ix) Register of rotational grazing
x) Register of invasive species e.g. Lantana eradication
xi) Register of wildlife management may include detailed record of humanwildlife conflicts that includes data on human casualities and injuries, loss of domestic animals and crop damage and compensation paid etc.
xii) Register of Government buildings that includes log of the repairs and addition (if any) undertaken in the building.
xiii) Register of registered saw-mills in the Division.

## 9.9 Annual Inspection

Annual inspection of DFO territorial office by CF/CCFand Range office by DFO territorial is mandatory within three months ofcompletion of financial year to have checks on annual statements in controlforms and deviation statements and maintenance of registers and records.

# CHAPTER 10

# CONTROL FORMS

**Control Book of……the Working Circle of……Division**

**……Circle, Assam……for the year 20……**

**CONTROL FORM NO. 1**

**BAMBOO HARVESTING**

| Provision of Working Plan | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Locality to be exploited | | | | Results of operation | | | | | Comparison balance + No - No. | Remarks |
| | Forest | Compt. | Area (Ha.) | No of culms to be removed | Year of working | Balance brought forward No of culms | Forest | Compt. | No. of culms felled | | |

**CONTROL FORM NO. 2**

**Control Book of……the Working Circle of……Division**

**……Circle, Assam……for the year 20……**

**SILVICULTURAL OPERATIONS**

| Provision of Working Plan | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Para of W. P. | Locality | | Nature of operation | Result of Operation | | | Cost Amount spent (₹) | Remarks |
| | | Forest | Comptt. | | Year of operation | Locality of Operation | | Area (Ha) | |
| | | | | | | Forest | Compt. | | |

**CONTROL FORM 3**

**Control Book of……the Working Circle of……Division**

**……Circle, Assam……for the year 20……**

**NON-TIMBER FOREST PRODUCE HARVESTING**

| Year | Para of W. P. | Locality | | Area (Ha.) | NTFP to be harvested | Result of Operation | | | | | Comparison | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Forest | Comptt. | | | Year of Harvesting | Locality of Operation | | Area (Ha.) | NTFP Harvested | Excess (+) | Short (-) | |
| | | | | | | | Forest | Comptt. | | | | | |

**CONTROL FORM NO 4a**

**Control Book of……the Working Circle of……Division**

**……..Circle, Assam……for the year 20……**

**WILDLIFE MANAGEMENT & BIODIVERSITY CONSERVATION**

Ref: Para Area to be taken up for habitat improvement

Annually and improvement planting of fruit trees and fodder species

| Control Year | Plantation centre | Prescribed | | Marked | | Remark |
|---|---|---|---|---|---|---|
| | | RF & Comptt. | Area (Ha.) | RF & Comptt. | Area (Ha.) | |

Total running excess/ deficit in area at the end of the year of commencement of the plan

…… (±) …….. hectares.

**CONTROL FORM NO. 4b**

**Control Book of……the Working Circle of……Division**

**……..Circle, Assam……for the year 20……**

**Wildlife Management & Biodiversity Conservation**

**Ref: Para Map of the area planted**

| Control Year | Plantation centre | Prescribed | | Marked | | Remark |
|---|---|---|---|---|---|---|
| | | RF & Comptt. | Area (Ha.) | RF & Comptt. | Area (Ha.) | |

**Scale 1: 16,000**

N.B:

1. Map of the Compartment to be traced from stock map and the area over which under planting is done and other blank area where fresh plantation is created should be plotted in this centre form.
2. Area treated in past year under same prescription if falls in same comptt. should also be shown.
3. One form to be used annually for each compartment.

## CONTROL FORM NO. 4c

**Control Book of……the Working Circle of……Division**

**……..Circle, Assam…….for the year 20……**

**Wildlife Management & Biodiversity Conservation**

Ref: Para Weeding, maintenance, ANR to be continued in subsequent years till plantation is established.

| Control year | RF & Comptt. No. | Plantation centre | Year of creation | Area of plot (Ha.) | Item of Subsidiary operation | | | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | Prescribed | Executed | Month | |
| | | | | | | | | |

**N.B : One form to be used for all plots (other than plot of year) in a Compartment each year.**

# CONTROL FORM NO. PI

**Control Book of……the Working Circle of……Division**

**……..Circle, Assam…….for the year 20……**

**PLANTATION AND REGENERATION RECORDS**

**PLANTATION FORM**

General instruction One set forms to be maintained for each plantation centre and these should be lose bound between two hard-covers so that additional sheets can be added from time to time. Some of the forms relate to the whole centre and some for individual plots as detailed below:

Form no. P I a …… one form for the whole centre

Form No. P I b …….. To the scale map for whole centre. Individual plots need not be shown here.

Form No. P I C …… To the Scale map showing individual plots in the centre. Now plots to be added and plotted as soon as plantations are created. One form for whole centre.

Form No. P II a ……. One form for the whole centre.

Form no. P II b ……. One form for the whole centre

Form no. P III a …….. To be maintained for each individual plot.

Form No. P III b ……. To be maintained for each individual plot.

Form No. P III C ……. To be maintained for each individual plot.

## FORM NO. P I a

Name of plantation centre
Division……
Reserve ……..
Range ……
Block ……..……..
Beat ……
Compartment No. ……..

Situation …….
Aspect and slop …….
Soil …….
Brief description of Forest type …….
Top Story ……..…….
Mid Story ……..……
Under growth ……..…..……
Ground Cover ……..……..…
Sources of labour ……
Supply – Villages …….
Approximate number ……..
Of daily labours ……
Available in different Periods ……..
General Remarks …….

## FORM NO. P.I b

Name of plantation centre
Reserve ……..
Block ……..……..
Compartment No. ……..

Division……
Range ……
Beat ……

SITUATION MAP

Scale 1: 16,000

N.B : The position of the centre should be shown in this map with reference to the nearest Beat office, Range Office, inspections Bungalow. Location of roads, river, compartment / Block/ Reserve Boundaries should also be indicated in the Map.

## FORM NO. P.I C

Name of plantation centre

Division……

Reserve ……..

Range ……

Block ……..……..

Beat ……

Compartment No. ……..

PLANTATION CENTRE MAP

Scale 1 cm – 50 meters

N.B: The map will be shown the individual plots with plot No. and year of creation recorded on the body of each plot. Nearest Compartment, boundaries are also to be shown in the map. Now creations are to be plotted and added each year.

## FORM NO. P.II a

Name of plantation centre
Reserve ……..
Block ……..……..
Compartment No. ……..

Year in which plantation
commenced in the centre
Division……
Range ……
Beat ……..……

## AREA STATEMENT

| Year of Creation | Plot No | Area attempted (Ha.) | Species | Area failure/Successful | | | Remarks |
|---|---|---|---|---|---|---|---|
| | | | | Year of assessment | Failure (Ha.) | Successful (Ha.) | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

N.B :

1. In column 1 the calendar year in which planting / sowing etc. of a plot were done is to be filled in.
2. Column 1 to 4 should be filled in during the first year of a plantation plot. As soon as new plots are taken in hand in the centre. These columns should be filled in.
3. Column 5 to 7 are to be filled at the end of 5$^{th}$ year of each plot.
4. In remarks column reason for failure and sanction no. writing off failures should be entered.

## FORM NO. P.II b

Name of plantation centre
Reserve ……..
Block ……..……..
Compartment No. ……..

Year in which plantation
commenced in the centre
Division……
Range ……
Beat ……..……

## SUMMARY OF EXPENDITURE AND REVENUE

| Year | Expenditure (₹) of the year from Commencement | | | | | | Revenue (₹) of the year | | | Progressive total of revenue (₹) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Creation | Upkeep | Total | Creation | Upkeep | Total | From seeds | From seedlings | Total | |

N.B :

1. Col. 1 should preferably be the calendar year.
2. In Col. 2 cost of creation of the plot of that calendar year inclusive of seed cost nursery cost and first year's tending should be entered.
3. Col. 3 will show the cost of tending, thinning etc. of previous year's plots incurred during the particular calendar year of column 1 .
4. Col. 5, 6, 7 will reflect the progressive total of column 2,3,4 respectively from year to year.

## FORM NO. P.III. a

Name of plantation centre — Division……

Reserve …….. — Range ……

Block ……..…….. — Beat ……..……

Compartment No. …….. — Year of creation…….

Area (Hectares)

Brief description of:

Type of plantation ……..…….

Method of Formation ……..……

Species ……

Quantity of seeds / number of stumps …….

Number of transplant used ……..…….

Spacing ……..

Category of labour ……

Inter-culture of field crops (if any) …….

Fencing ……..

| Financial year | Date of work | Brief summary of works | Extent of area covered by the item of work | Cost in ₹ | | Cost interms of unit of daily labours₹ | | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Free labour converted to (₹) | Cash paid labour interms (₹) | No. of free labours | No. of paid labours | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

N.B :

1. This form is to be maintained plot by plot. Additional sheets to be added as soon as new area taken in hand.
2. All items of work including cost of seed collection, nurseries etc. for the particular plot should be entered in this form and hence entries are to start prior to the year of creation of the plot.
3. Form to be filled up immediately on completion of a particular item of works.

## FORM NO. P.III. C

Plantation centre ……. Plot No. …….. Year of Creation ……

Reserve……....Block ……compartment No. ……..……

Division…..…….. Range ……..……Beat ……..……

PROGRESS OF HEIGHT AND DIAMETER / GIRTH GROWTH

| Species | Age at which measurement recorded | Height (in meter) | | Diameter/girth (in centimeters) | | Remarks |
|---|---|---|---|---|---|---|
| | | Maximum | Average | Maximum | Average | |

N.B :

1. For the purpose of measurements of trees growing along the edges of the plot in the open. Measure a few groups of stems selected at random of property at fixed intervals along the rows of plots. The maximum would be the topmost dimension found during such measurements of groups and the average is to be worked out in the usual way.
2. From end of the 1st to 4th year of the plot only height measurement are to be recorded annually from the end of 5th year onwards record height / diameter of Girth measurements at periods intervals (say 5 years)
3. One form to be maintained for each plot, end to be opened as soon as plot is created.

## FORM NO. P.III. C

Plantation centre…….. Plot No. …….. Year of Creation ……

Reserve……....Block ……Compartment No. ……

Division……Range……Beat ……of the plot Area (in ha.)……..

Analysis of cost per hectare upto the end of 10th year

| Sl. No. | Item of work | Total cost (₹) for the entire plot | | Total Cost (₹) | Remarks |
|---|---|---|---|---|---|
| | | Cost of materials (₹) | Total No. of daily labour | | |
| | | | | | |

1. Seed collection
2. Nurseries
3. Clearance of site
4. Burning
5. Staking / Lining
6. Hoeing / site preparation
7. Sowing/ Dibbling / planting
8. Fencing
9. 1st year's fire - protection measure
10. Repeat item 9 and 10 for 2nd to 10 year add
11. Clearing in the 6th year and thinning in the appropriate year.

N.B :

1. One form to be maintained for each plot and posting carried out at the end of each financial year.
2. In remarks column enter quantity and type of materials used.

## PLANTATION JOURNAL
### General Instruction:

One bond Register with serially numbered pages to be maintained for each center. First page to provide an index showing plot No. year of creation and reference to page nos. in which the plot appears. A Map showing the location with GPS Co-ordinates in KML,GPX Format to be attached including Google Spread sheet and a Trace Map not in scale.

Entries to be effected for each plot in the form of abstract of information furnished in the plantation Forms.

Sufficient blank pages to be left out between two plots for the purpose of future entries.

Proforma could be as follows.

**LEFT- HAND PAGE OF THE REGISTER**

Name of plantation center …….…… Division ……..…….. Plot No. …….

Reserve……Range ……..…… Year of Creation ……..……..……

Block …….. Beat …… Compartment No. …….. Area (in Ha.) ……

| | |
|---|---|
| | Species ……. |
| Type of Plantation …… | Method of Formation …… |
| Quantity of seeds/number of | Spacing …… |
| Stumps or transplant used | field - crops raised (if any) …… |
| | Fencing …….. |

| Brief summary of work done | Month 7 year in which done | Cost. |
|---|---|---|
| 1. Seed collection /Nurseries | | ₹ |
| 2. Cost of the creation of the Plot including first year's tending And fire-protection……. | | ₹ |
| 3. 2nd year's tending and fire protection etc. | | ₹ |

**(Removal due to disease/windfallen/decay (if any) to be entered in red ink and photographs to be attached)**

**RIGHT HAND PAGE OF THER REGISTER**

Remarks by the Inspecting Officer. Noting

# CHAPTER 11

# SUMMARY OF THE PRESCRIPTIONS

The brief summary of prescription against each Working Circle are narrated in table 22.

**Table 10.1: Summary of prescriptions for each working circle.**

| Sl. No. | Chap No. | Name of the Working Circle | Para No / Sub para | Prescription | Remarks |
|---|---|---|---|---|---|
| 1. | Chapter 2 | Joint Forest Management Working Circle | 2.10.1 | Appraisal of Existing JFMCs and Gradations. Gradation of JFMC in Grade A, B , C and D. | |
| | | | 2.10.2 | Plantation Activities. After assessment of survival % in older plantations, those area where survival is less than 35% shall be taken up for new Plantations | Record of Older plantation are given in Section 2.9 |
| | | | 2.10.3 | Training Programmes and formation of SHGs. Capacity building of JFMCs members and dovetailimg with National Missions of Livelihood | Details in Section 2.9.3.3 and 2.9.3.4 |
| | | | 2.10.4 | Adoption of APFBC Manual for JFMC | The APFBC Manual is as in Annexure- |
| 2. | Chapter 3 | Plantation and Improvement Working Circle | 3.5.3.1. | **Year wise allotment of areas for improvement w.e.f 2020-26** | |
| | | | 3.5.3.2. | Rules of marking and extraction | Details of procedure given |
| | | | 3.5.3.3. | Operations for Improvement | |
| | | | 3.5.3.4. | Rongaghora- Hathidepot Improvement areas*( Bola, koroi, borhamthuri, Outenga, bogipoma, phulgomari should me promoted and planted in ANR)* Bedeti-Golbil Hathimora Improvement Areas *(Pansopa, Hollock, Amari, Phulgomari, Oxi)* | |
| | | | 3.5.3.5. | Regenartion | |
| | | | 3.5.3.6. | ANR is proposed with 3 year | |

| Sl. No. | Chap No. | Name of the Working Circle | Para No / Sub para | Prescription | Remarks |
|---|---|---|---|---|---|
| | | | | maintenance | |
| | | | 3.5.4.1 | Prescription for Plantation, Yearwise allotment of areas | |
| | | | 3.5.4.5. | Plantation models with 4 yrs maintenance prescribed | |
| 3 | Chapter 4 | Non Timber Forest produce & Bamboo (Overlapping) Working Circle | 4.13 | Prescription for NTFP<br>No collection of NTFP or medicinal plants to be encouraged from areas outside allotted area. However, inventorisation and identification of medicinal plants in the reserve forests would be taken up over the tenure of the current Working Plan.<br>Plantations of medicinal plants shall be created in JFMC areas. Such Medicinal plants shall be harvested in a sustainable manner.<br>Training programmes shall be organised for Farmers/fringe villagers about sustainable cultivation as well as harvesting of medicinal plants. | |
| | | | 4.15 | Precription for Bamboo Plantation<br>850 Ha Bamboo Plantation proposed in Biswanath and Naduar RF with 3 Years maintenance and harvesting during 5$^{th}$ year of plantation. | |
| | | | | | |
| | | | | | |
| 4 | Chapter 5 | Forest protection working circle | 5.11.1. | Maintenance of Dikal Radhasoo Road; The road may be maintained on annual basis and strictly restricted to use only for forest protection patrolling. The road should not be allowe to use for non | |

| Sl. No. | Chap No. | Name of the Working Circle | Para No / Sub para | Prescription | Remarks |
|---|---|---|---|---|---|
| | | | | forestry purposes.<br>The forest protection camps sanctioned by Min of Home Affairs Govt of India at Dikal, Radhasoo and Naharjan may be maintained regularly.<br>Strength of Police personnel in Radhasoo FPC should not be reduced below One Company. Any reduction in police force may lead to major retailiation from Arunachali local militant groups.<br>Mandatory Joint Patrolling by Forest and Police Authorities all along Naharjan, Radhasoo, Dikal and Chauldoha for preventing any further encroachment.<br>The encroachments from Assam Side in Naharjan should be checked effectively. No increase in numbers of houses may be allowed till final eviction. | |
| | | | 5.11.2. | Consolidation of Boundary<br>Survey, Construction and Maintenance of Boundary Pillar Year wise | |
| | | | | | |
| | | | 5.11.3. | Illicit Felling<br>Regular patrolling and monitoring. Patrolling Register shall be maintained by all Beat Officers and Range Officers.<br>Such Registers shall be fortnightly signed by DFO/ACF<br>All Beat Officers and Range Officers shall maintain Beat Map, Compartment Map and Range Map in toposheets. | |

| Sl. No. | Chap No. | Name of the Working Circle | Para No / Sub para | Prescription | Remarks |
|---|---|---|---|---|---|
| | | | | Beat records and registers to be kept uptodate.<br>Ilicit felling should be immediately reported. Stump seizure made and steps taken to salvage the remaining out turnoff timber.<br>Arms should be in serviceable condition. RO and Beat Officers should ensure maintenance of arms and inform headquarter for sufficient supply of ammunition.<br>Firing incidents should be reported promptly with a copy marked to local Police Station. Blank shells from firing should be salvaged and submitted wherever possible.<br>GPS based patrolling to be introduced so that effective monitoring is possible.<br>Forest offense register should be maintained and Offence Registered should be pursued in proactive manner to ensure conviction.<br>Maintenance of Forest Roads and bridges | |
| | | | 5.11.4. | Grazing and lopping<br>The concept of rotational grazing and lopping must be adopted. The area may be divided into 5 blocks each. Each blocks canbe opened for grazing and lopping for twomonths in a year. | |
| | | | | | |
| 5. | Chapter | Community | 6.11.1 | **Steps for Delieneation and** | |

| Sl. No. | Chap No. | Name of the Working Circle | Para No / Sub para | Prescription | Remarks |
|---|---|---|---|---|---|
| | 6 | and Forest Rights Working Circle | | **demarcation of boundary**<br>Awareness generation on the Forest Right Act, 2006, among the stakeholders.<br>Participation of the villagers in the entire process of implementation of FRA.<br>Demarcation of land boundaries of each stakeholder of the Forest villages.<br>Demarcation of the forest boundaries as on the formation date of Gram Sabha which would impart a vital role in controlling further encroachment.<br>Formation of the Local Biodiversity Committee to manage the local resources.<br>Classification of vegetation types and land use patterns on the historical time scale (1980 & 2005 if possible) | |
| | | | 6.11.2 | Erection of Boundary Pillars | |
| | | | 6.11.3 | Duties of Boundary Pillars | |
| | | | | | |
| 7 | Chapter 7 | Wildlife Management (Overlapping) Working Circle | 7.7.1. | Improvement of habitat quality<br>Estb of Nursery at Singlijan and Bihmari for Elephant fodder plantation, removal of weeds, elephant fodder plantation, installation of power fence, creation of new water bodies and cleaning of exisiting water bodies | |
| | | | 7.7.2 | Prevention of encroachment | |
| | | | 7.7.3 | Controlled grazing | |

| Sl. No. | Chap No. | Name of the Working Circle | Para No / Sub para | Prescription | Remarks |
|---|---|---|---|---|---|
| | | | 7.7.4 | Prevent illegal mining | |
| | | | 7.7.5 | Temporary Mitigation measures; Low cost electric fencing as in Table 7.1 | |
| | | | 7.7.6. | Annual ADS meeting should be convened at DFO Office as annual feature without fail.<br><br>The meeting of District Level Task Force for Wild Elephant Antidepredation Committee notified by Government shall be convened before onset of elephant depredation season.<br><br>ADS register should be maintained at Range and Division level as well.<br><br>Forest Staff on Antidepredation duty shall carry a Elephant Duty Register with them whenever they visit villages for such duty. Village headmen or any villager or ADS member may sign such Elephant Duty Register. Such Elephant Duty Register is record of forest staff discharging duty in Revenue areas. Such Register may be diligently maintained and issued by Concerned Range Officer.<br><br>ADS meetings shall be recorded in register. All phone numbers of ADS members may be circulated among DFO, ACF, RO and BO. The phone nos of DFO, ACF and RO should be compulsorily shared with ADS members.<br><br>The RO/BO and ADS members shall be | |

| Sl. No. | Chap No. | Name of the Working Circle | Para No / Sub para | Prescription | Remarks |
|---|---|---|---|---|---|
| | | | | close connection with local Police Station/ OP, Veterinary Doctor and Revenue Official of the Rank of Circle Officer.<br><br>During September meeting with Tea Garden Officials, SDO Civil Gohpur, all members of ADS, Police shall be convened at SDO Civil Gohpur office and preparedness for upcoming Elephant depredation season should be reviewed.<br><br>Similar meeting should be convened at DC Office Biswanath.<br><br>6.Crackers and Torch Lights shall be procured in advance , in credit if necessary before the onset of Elephant depredation season. Such Crackers and Torch lights may be distributed liberally among the ADS members and Staff.<br><br>Community Solar powered electric fence is ideal for location of high intensity conflicts. Division headquarter should maintain conductor, energizer, Solar plates, Battery 12 V so that during emergency it can erected immediately.<br><br>Two(2) Kunki Elephant may be hired for man animal conflict | |
| | | | 7.7.7 | Joint Patrolling with Railways Personnels in the Elephant corridors and movement pattern was surveyed and recorded as in **Annexure XII** | |
| | | | 7.7.8 | Citizen Engagement Plan<br>To develop some good audio-visual | |

| Sl. No. | Chap No. | Name of the Working Circle | Para No / Sub para | Prescription | Remarks |
|---|---|---|---|---|---|
| | | | | Modules on Wildlife and Man Animal Conflict for interaction with community.<br>To develop some Documentaries on good practices/examples to be shown to the community.<br>To develop some One-Act Plays or short Plays on critical issues and make arrangements for performances with the help of Civil Society Groups or Schools.<br>To engage school/college students to take out processions to convey important messages on important Wildlife Week, Forestry Day, International Elephant Day , etc.<br>Make use of Van Mahotsava and Wildlife Week Celebrations or cultural occasions to convey messages.<br>Organise Household visits through volunteers/school college students/civil society groups to create awareness.<br>Make arrangements for sending bulk messages on critical issues.<br>Create a Website or Interactive Portal to transfer knowledge and get feedback from the community.<br>Institutionalise a system of analysis of the feedback from the community and factoring it in the departmental plans. | |

# CHAPTER 12

## GENERAL FINANCIAL FORECAST & FINANCIAL PLAN OF OPERATION

### 12.1. General

The costs and prices are influenced by market forces and depend on supply and demand. It further depends on the principles of management and pattern of exploitation adopted from time to time. Therefore, it is not possible to estimate with reasonable accuracy the expenditure and revenue during the period of this working plan. The estimates given below are based on the current prices of various items of forest produce and the cost involved in carrying out the prescriptions of the plan at current rates.

### 12.2 Past Revenue and Expenditure

The details of past revenue and expenditure have been given in the following table 12.1.

**Table12.1. Revenue and Expenditure for Sonitpur East Division w.e.f., 2008-2019**

| Year | Expenditure incurred | Revenue generated | Surplus |
|---|---|---|---|
| 2008-2009 | Rs 91,88,700/- | 33,28,000.00 | 5860700.00 |
| 2009-2010 | Rs 64,80,560/- | 70,44,000.00 | 563440.00 |
| 2010-2011 | Rs 60,05,500/- | 62,88,000.00 | 282500.00 |
| 2011-2012 | Rs 72,25,083/- | 58,87,000.00 | 1338083.00 |
| 2012-2013 | Rs 91,90,984/- | 25,60,250.00 | 6630734.00 |
| 2013-2014 | Rs 98,09,557/- | 10,09,000.00 | 8800557.00 |
| 2014-2015 | Rs 42,54,110/- | 15,37,000.00 | 27,17,110.00 |
| 2015-2016 | Rs 24,57,000/- | 1,34,02,406.00 | 1,09,45,406.00 |
| 2016-2017 | Rs 44,32,600/- | 7,46,94,059.00 | 7,02,61,459.00 |
| 2017-2018 | Rs 64,82,063/- | 7,54,69,915.00 | 6,89,87,852.00 |
| 2018-2019 | Rs 51,63,100/- | 11,74,27,997.00 | 11,22,64,897.00 |

**12.3.1** Major revenue is expected from the **minor minerals**. The average yield per hectare was never worked out for the areas. The following are the operational areas from where yield is anticipated:
(a). Salvage felling/removal to be carried out in areas under Conservation & Improvement working circle.
(b). Removal of windfallen trees only.
Salvage felling is proposed in improvement working circle, but it is not possible to assess or anticipate the outturn and consequent revenue.

**12.3.5 Total Estimated Revenue:** Summing up the values of above Para12.3.4 the anticipated revenue for 2023-2024 is worked out to be **Rs.10.32 Crore**. Thus assuming increase of 5% in one year the total estimated revenue for 2024-2025 may be **Rs.10.84 Crore**.

## 12.4 Future Expenditure

**12.4.1** The expenditure involves the expenditure made for establishment & allowances and for expenditure in conservancy and developmental works. The estimated expenditure on establishment & allowance for year 2023-2024 is based on the average of last three years. The expenditure for conservancy and works are worked out on the basis of current PWD schedule of rates and aaproved by Conservator of Forests.Northern Assam Circle, The works are quantified by taking average of works prescribed for next ten years to meet the requirement of the current plan.

**12.4.2** By using the table12.5, the estimated expenditure for 2023-24 is worked out to be Rs. 62.04 Crore. and the total estimated expenditure for 2024-2025 may be Rs 65.14 Crore.

## 12.5. Financial Forecast

Based on the above estimated figures, the financial forecast is as follows:

| | | |
|---|---|---|
| Annual revenue | : | Rs.11.74 Crore |
| Annual expenditure | : | Rs. 43.67 Crore |
| Hence, deficit | : | Rs. 31.93 Crore |

**Table 12.3. Financial Forecast for the Plan period of 10 Years and annual expenditure**

| SL No. | Item | Qty | Rate | Estimated expenditure (Rs Cr ) (For 10 yearsYrs) | Estimated expenditure (per Year/In Cr) |
|---|---|---|---|---|---|
| | | | (in Rs.) | | |
| 1.0 | Establishment & Allowances | | | 61 | 6.1 |
| | Works & Conservancy: | | | | |
| 2.0 | Joint Forest Management Working Circle ( As in Table 12.4) | | As Per CAMPA Estimate | 14.3 | 1.4 |
| 3.0 | Plantation and Improvement Working Circle( As in Table 12.5.) | | As Per CAMPA Estimate | 37.2 | 11 |
| 4.0 | NTFP and Bamboo (overlapping) Working circle | 850 | 70351/Ha | 5.9 | 0.59 |
| 4.0 | Forest Protection Working Circle | | | | |
| 4.1. | Boundary pillars repairs etc. | 215 Big B. Post, 641 Small B. Post | 15000/ Big B. Post, 7500/Small Post | 0.99 | 0.1 |
| 4.2 | Long distance Group patrolling & Monsoon patrolling | 2 lakh Lt. (diesel) | 65 | 13 | 1 |
| 4.3. | Consolidated expenses in Eviction Operations | 10000 Ha | | 39 | 3.9 |
| 5.0 | Community and Forest Rights Working Circle | 10339 Ha | 8849 Settled Claims | 1 | 0.1 |
| 6.0 | Wildlife Management working Circle | | | 1.7 | 19 |
| 7.0 | Development of Local forest Intelligence system | | | 1.3 | 0.13 |
| 8.0 | Building maintenance and maintenance of Forest Protection Camps | 5 Building/year | Rs 500000/ Building | 2.5 | 0.25 |
| 9.0 | Human resource development(Training, visits etc.) | 10 Trainings/ Year | | 1 | 0.1 |
| | | | | | |
| | Total | | | 178.89 | 43.67 |

**Table 12.4 Projected Expenditure for Working Plan Circle**

| | 2021-22 | | 2022-23 | | 2023-24 | | 2024-25 | |
|---|---|---|---|---|---|---|---|---|
| **Area Alloted for Plantation** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** |
| **760** | **280** | **0** | **280** | **280** | **100** | **560** | **100** | **660** |
| Amount In Rs | 14707840 | 0 | 14707840 | 5281920 | 5252800 | 10563840 | 5252800 | 65745300 |

| | 2025-26 | | 2026-27 | | 2027-28 | | 2028-29 | |
|---|---|---|---|---|---|---|---|---|
| **Area Alloted for Plantation** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** | **Creation in Ha** | **Maintenance in Ha** |
| **760** | **0** | **760** | **0** | **480** | **0** | **200** | **0** | **100** |
| Amount In Rs | 0 | 11447320 | 0 | 6554020 | 0 | 2740900 | 0 | 1070400 |

Total Rs 14.3 Crores is required in 10 years for JFM working Circle

**Table 12.5. Projected Expenditure for Improvement and Plantation Working Circle**

| **Year** | **2020-21** | | **2021-22** | | **2022-23** | |
|---|---|---|---|---|---|---|
| **Operations** | **Imrprov. Opns** | **ANR** | **Imrprov. Opns** | **ANR** | **Imrprov. Opns** | **ANR** |
| **Area in Ha** | **300** | **0** | **350** | **300** | **425** | **350** |
| **Amount in Rs** | 1111500 | | 1296750 | 43950000 | 1574625 | 56870000 |

| **Year** | **2023-24** | | **2024-25** | | **2025-26** | |
|---|---|---|---|---|---|---|
| **Operations** | **Imrprov. Opns** | **ANR** | **Imrprov. Opns** | **ANR** | **Imrprov. Opns** | **ANR** |
| **Area in Ha** | **475** | **425** | **450** | **475** | **100** | **450** |
| **Amount in Rs** | 1759875 | 124492500 | 1667250 | 73851250 | 370500 | 65925000 |

Total Rs 37.2 Crores is required in 10 years for Improvement working Circle

## 12.6 Cost of the Preparation of the Working Plan

The actual expenditure incurred on the preparation of this Working Plan during 2013-2014 is given in table 12.6.

**Table 12.6. Expenditure incurred in preparation of Working Plan**

| Details | Expenditure incurred during Financial year in Rs. | | | |
|---|---|---|---|---|
| | 2013-2014 (Actual) | 2018-2019 (Actual) | 2019-2020 (Estimated) | Total |
| | | | | |
| 01. Pay | - | - | - | - |
| 02. Labour | - | - | - | - |
| 03. Dearness Allowances | - | - | - | - |
| 04.Travelling allowance | 150000 | - | - | 150000 |
| 05.T.T.A | - | - | - | - |
| 06.Other allowance | - | - | - | - |
| 08. Office Expenditure | 100000 | - | - | 100000 |
| 11. Stationery &printing of forms. | 50000 | - | - | 50000 |
| 12. Office furniture | - | - | - | - |
| 13.Telephone | - | - | - | - |
| 15.Vehicles maintenance and petrol | - | - | - | - |
| 18. Publication | - | - | - | - |
| 42. Other expenditure | 15000 | - | - | 15000 |
| 47. Computer Maintenance | | - | - | |
| **Total** | 315000 | - | - | 315000 |

**(Note:** The working plan team has been assigned to revise &prepare the working plans of the Division. Hence, 60% of total expenditure can be considered as the expenditure for making this plan)

## 12.7 Cost of Enumeration

The details of cost of enumeration carried out under various working circle and Regeneration Survey are given in table12.7

**Table12.7.Expenditure incurred in regeneration survey of working plan**

| Working Circle | Management area of the working circle(ha.) | Area actually enumerated (ha.) | Total cost of enumeration (Rs.) | Average cost of enumeration per ha.(Rs.) |
|---|---|---|---|---|
| Regeneration Survey | 5756.11 | 5756.11 | 338000 | 58.72 |
| **Total** | 5756.11 | 5756.11 | 338000 | 58.72/ha. |

Therefore from table 12.6, 12.7 the cost of plan comes to **Rs. 58.72** per hectare.

**12.8 Mandays to be generated during current plan period:** As given in Para 12.4.2 the total estimated expenditure for 2018-2019 has been worked out as Rs.0.51 Crore. In forestry works the labour component is averaged as 20% of total expenditure. Therefore, taking current rate of Rs.250 for one manday as fixed by the state Government, the expected mandays employment to be generated during current plan period will be Approximately 0.408 lakhs.

**12.9 Possible Funding Agencies:** Normally the forestry activities are funded through various schemes under District, State & central sector. In the state, the district & state sector schemes are totally funded by state government. Presently 40 schemes are under operation. Assam being given special status by the central government; the central sector schemes are funded on a 90%:10% basis. Eight such schemes are

running in the state. The details are given in chapter V of Part I of the plan. Besides these schemes, funding can also be received from other sources. The following are the main agencies from where the funds may be obtained for implementation of prescriptions of this plan.

**Table 12.8. Agencies and Organisations for Funding**

| S. N. | Funding Agency | Schemes involved | Nature of works |
|---|---|---|---|
| 1. | Ministry of Forest & Environment, Government of India. | National Afforestation and Eco-Development Board(NAEB), Project Elephant, Project Tiger etc. | Ecological restoration, Wildlife & forest Protection. |
| 2 | District Rural Development Agency (DRDA) | National Rural Employment Guarantee Act(NREGA) | Community infrastructure & Forest resource |
| 3. | EAP, French Development Agency | APFBC | Biodiversity Conservation |
| 4 | Govt of Assam, Dept of Forests | States Own Priority Development Schemes | Infrastructure Development |

## 12.10. Prioritization of works

All the works prescribed in this plan are important for effective forest management. Hence, funds should be made available to carry out all the prescriptions prescribed for the sustainable management of the forest. However, scarcity of financial allocation is often felt while working plan prescriptions are followed in the division. Therefore, priority of works has been fixed to guide DFO while preparing annual budget & sending his demand. It is also suggested that DFO should carry out top priority works with the available budget:

**Table 12.9**

| Priority | Nature of works to be carried out |
|---|---|
| I | Regeneration Felling, Silvicultural operations including ANR works in Plantation and improvement working Circle. |
| II | Forest Protection i.e. protection from encroachment, illicit felling, poaching etc. |
| III | Mitigation measures for reduction in Man Animal Conflict including Regular meeting with Anti Depredation Squad members and JFMC members |
| IV | Long distance Group patrolling & Monsoon patrolling specially along interstate border of Arunachal Pradesh |
| V | Consolidation of Forest Land after implementation of Forest Rights Act 2006 and publishing of reject list by Deputy Commissioner. |
| VI | Construction of new camp at Singlijan RF |
| VII | Repair & maintenance of boundary pillars. |
| VIII | Maintenance of Forest Protection camps at Dikal, Naharjan and Radhasoo |
| IX | Maintenance of buildings & other infrastructure (Nursery etc.) in the division. |