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Natural Resource Management:
Sustainable Extraction Level of Forest Products in Assam

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MOEF **IGIDR** **WORLD BANK**

NATURAL RESOURCE MANAGEMENT --- SUSTAINABLE EXTRACTION LEVEL OF FOREST PRODUCTS IN ASSAM

A REPORT
PREPARED FOR
ENVIRONMENTAL ECONOMICS RESEARCH COMMITTEE
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MUMBAI.

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Dated Tezpur
The 10th of October, 2001.

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EXECUTIVE SUMMARY

Introduction

Since time immemorial, Assam was known for its forests and forest products. Wide varieties of valuable trees are available in the forests of Assam. It is because of such a wealth that the East India Company ventured to establish various Indian Trading organizations in Assam. Railways was extended to Assam to transport the forest products from this part of the country to various parts of the world. Assam Railway and Trading Company (ARTC) was basically engaged in the timber business. It was the officials of ARTC who discovered the mineral oil reserves in Assam . Assam is one of the world's 16 most bio-diverse regions. Apart from valuable trees, the forests of Assam is a habitat for wide range of flora and fauna.

Large-scale deforestation has become an acute problem all over the world. Forest products are being extracted in an unplanned manner, new plantations have not been taken up to replenish the depletion, more and more forests are being cleared for cultivation and habitation, less forest area has prompted the wild animals to cause damage in the human habitation, the ecological balance has been enormously disturbed, and the environment has degraded at a fast rate. India is no exception to such a deteriorating situation. Assam, which was famous for its jungles, flora and fauna is facing an unthinkable situation arising out of large scale extraction of forest products and simultaneous destruction of forests. Forest has been decreasing at an alarming rate day by day. Wild animal menace had made the rural (even urban areas in certain districts) people insecure. The Government exchequer has suffered badly. Against such a deteriorating situation, it has become essential (before it becomes rather late) to look into the problem of unplanned extraction of forest products in Assam, and to suggest measures to arrest it in order to maintain desired level of forest and forest products in the years to come. This study is an humble effort in this direction.

I. Need for the Study

Assam vis-à-vis the North-East India has been endowed with enormous natural resources like forests, minerals etc. However, the fast depletion of forest resources in the region has posed a threat to the society at large. It has already created an imbalance in the eco-system affecting the bio-diversity and the wildlife. It has, therefore, become necessary to formulate certain policies for sustainable extraction of the forest products in the region maintaining an ecological balance.

II. Objectives:

Keeping in view the problem addressed in the study, the main objectives of the study have been set as follows:

1. To portray Forest Resource Scenario of Sonitpur and Lakhimpur districts in particular and that of Assam and North East in general.
2. To identify the existing pattern of extraction of forest products in the study area.
3. To identify the reasons for fast depletion of Forests in the study area.
4. To evaluate the effectiveness of Forestation Policies and Practices.
5. To suggest models and policy reforms for sustainable extraction of forest products.

III. Methodology

Both primary and secondary data pertaining to the problem under study were collected from various sources. The study area was confined to two districts of the State, viz. Sonitpur and Lakhimpur Districts. While the secondary data were collected from forest offices, published documents and literatures, the primary data were collected from the villagers staying near the forest, NGO personnel involved with forest preservation, and government officials etc. Structured questionnaires were used for collecting the primary data. The study team also visited many reserved forests and forest villages to obtain first-hand information of forests and their uses. Data and information thus collected have been analyzed to know about the characteristics of the problem.

IV. Economic Valuation of Forest Eco-System

The benefits that the forests provide to the people are being classified into five categories : (1) Direct Extractive Benefits, (2) Direct, Non-Extractive Benefits,

(3) Indirect Benefits, (4) Optional Benefits, and (5) Passive Uses. These benefits have been quantified for the State of Assam.

V. Findings and Observations

FINDINGS FROM THE SURVEY:

A survey was conducted among Forest Villagers, Forest Employees, NGO Workers, Academicians, Social Workers, etc. The findings of the survey are presented below:

Improperly guarded forest resources (land and forest produce) attract migrants from inside and outside the country who encroach the forest land and start destructing the forests. Ill-equipped forest personnel remain mute spectator to such things. On the top of that there is the nexus between some politicians, contractors and some forest officials who help the illegal timber traders and the encroachers by way of giving protection. With the increasing involvement of unemployed youths in illegal extraction of forest products, the problem has assumed an alarming proportion. The poor people near the forests also extract fuel-wood from the forests. It is mostly the mismanagement on the part of the Forest Department that has led to such a deplorable situation of the forests.

The suggestions for preservation of forests as offered by the respondents include (a) flood control, (b) eviction of encroachers, (c) provide alternative means of livelihood to the encroachers, (d) implementation of JFM, (e) Strict adherence to forest regulations, (f) Forest Guards be well-equipped to defend the forest.

OBSERVATIONS

Assam has more area covered by Evergreen/Semi Evergreen forests as compared to other types of forests. It is clear that the forest coverage in the

State of Assam has declined after 1969. The rate of encroachment has been on the rise. It is alleged that illegal Bangladeshi migrants have occupied the fringe areas of the reserved forests.

It is observed that the per capita out-turn of firewood (as recorded in the Forest Department) over the period has gone down. The reasons for such a decline are attributed to : (1) illegal extraction has gone up; (2) there has been a decline in the fuel-wood reserve that could be licensed for extraction; and (3) because of widespread use of LPG, coal, etc. the need for firewood, specially in the urban and semi-urban areas, haS gone down.

The out-turn of timber from Assam forests has declined over the years. The reasons behind such decline are (i) decline in availability of matured trees, (ii) increase in illegal extraction, (iii) Government control in issuing licence for tree felling, (iv) use of substitute materials like steel (for door-frame and window pane, etc.), and (v) Supreme Court's ban on tree felling (after 1997). As a consequence to decline in out-turn of timber, the revenue has gone down over the years; the revenue of the Forest Department being always less than the expenditures.

The Forest Acts introduced from time to time have been focusing mainly on 'policing' the forests without trying for the involvement of the common people around the forests. However, in recent past there has been a shift in the paradigm and schemes like Joint Forest Management (JFM) have been introduced. It was observed that the common people are not much interested in JFM.

The dispute over boundaries between Assam and Arunachal Pradesh has created a situation that has helped forest encroachment and illegal extraction of forest produce. There are number of saw mills operating in the border of Assam and A.P. These saw mills are fed by logs acquired by illegal tree felling in Assam. After the ban on timber extraction, illegal hand sawing of timber is going on in full swing in the deep forests.

In case of wood-based furniture and timber shops in the two districts, it is observed that there is an overall downward trend in the consumption of timber

in all the three categories (small, medium and large) of licensed shops. The decline in consumption is more prominent after the imposition of the ban on tree felling by the Hon'ble Supreme Court. In case of three major illegal furniture markets, the consumption of timber has been increasing at a high rate due to low prices of the furniture products. It has been observed that the number of forest-based industries in the State has gone down. At the same time the volume of legally extracted forest products has also gone down due to non-availability of good quality mature trees. However, the actual volume of extraction of forest products has gone up because the illegal extractors are felling all kinds of trees.

There are few economic instruments in use in the Forest Department of Assam. The Government has a pricing policy which is revised from time to time to incorporate the changes in price. The study team observed that huge quantity of seized timber logs are lying in front of several offices of the Forest Department for long time. Some of these logs having very high value in the market are rotting there. The concept of Forest Village is another economic instrument which has been a total failure. It has been observed that illegally extracted timber is being used in huge quantity to produce furniture being sold in the weekly markets. Though there is provision in the Acts and Regulations to ask for the Transit Permit to ascertain the origin of the timber, the Forest Officials are turning deaf ears to this matter. The ban on tree felling has a mixed effect. Timber extraction activities in the organized sector have not stopped totally. But the forest extraction activities in the illegal way have increased many fold

VI. Policy Formulation

COMPREHENSIVE POLICIES FOR SUSTAINABLE FOREST MANAGEMENT

Based on the understanding of the forest produce extraction mechanism and after taking into account the viewpoints of the stake-holders, the following comprehensive policies have been suggested

CHANGING ECONOMIC ACTIVITIES

In order to implement the forest policies strictly that would debar the villagers from extracting the forest products, it would be required to provide alternative ways to these people to earn their livelihood. A few alternatives are suggested below.

.⇒ Sericulture and Weaving :

- Encourage villagers to take up sericulture and weaving
- Arrange for subsidies and loans wherever required
- Arrange for marketing of the products
- Arrange for training and workshops
- Cooperative societies may be formed

.⇒Poultry Farming, Goat Rearing, and Pig Farming

- Encourage villagers to take up poultry farming, goat rearing, and pig farming
- Arrange marketing of the products
- Provide veterinary facilities in the rural areas
- Provide training to the farmers
- Arrange for providing high breed pigs, chics, and goats

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⇒Alternative Cash Crops

- Educate the people about alternative crops
- Provide irrigation facilities
- Arrange for marketing of the products
- Monitoring by experts and professionals

.⇒Joint Forest Management

- Involve people with JFM through the community prayer houses like Naamghar, mosque, church, other social institutions existing in the tribal areas, etc. The property right be given to the Naamghar/mosque. Compounds of the community prayer houses be converted to forests.
- Competition be held with regard to achievements among communities/villages
- Train and educate the people
- Train the forest personnel

The financial involvement for each of the alternatives has been estimated and presented. Various Financial Institutions are to come forward to finance the schemes. Cooperative Socirties may be formed to implement the policies.

ECONOMIC INSTRUMENTS :

After going through the existing economic instruments (EI), and on analyzing their shortcomings, it is felt that additional EIs should be suggested and implemented. A few such instruments are mentioned below.

.⇒Tax on Timber/Wood Products :

It is proposed that a heavy tax be imposed on finished products made of wood/timber, so that buyers are discouraged to buy the same because of high amount to be paid. It would also generate handsome revenue for the Forest Department.

.⇒Sustainable Consumption and Consumption Pattern

One EI to control the consumption of forest produce could be the introduction of quota system with respect to the volume of forest-based products procured in the furniture market. Besides, certain complicated formalities could be introduced to discourage (to act as non-tariff barrier) people from buying wood-based products and to use substitutes.

.⇒Subsidies to Wood Substitution Activities

Government can formulate policies to provide subsidies to certain activities that help in saving wood. For example:

(A) In localities where illegal furniture markets operate, subsidy could be given to dealers of moulded plastic furniture by way of exemption/reduction of sales tax, reduction of municipality tax, etc.

(B) Cottage industries that would utilize agricultural wastes and cattle dung to produce ‘fuel-cakes’ may be given subsidies.

(C) Subsidies be also given on improved ‘chullah’ that would consume less fuel.

(D) Subsidies may be given on doors and window frames made of non-wood materials.

(E) Subsidies be given on bio-gas plants.

VALUE ADDITION TO FORESTS :

Whatever forest is left in Assam, and for that matter in the country as a whole, most of it is degraded or bad forest. Some forests have even been converted to barren land. Thus there is ample scope for value addition to these forests.

.⇒Value Addition Schemes By Govt.

The first and foremost task before the Government now is to protect the remaining forest and forest land from further encroachment or destruction. Next step is to draw plans for enrichment of the forests by way of planting valuable trees, emphasizing on bio-diversity, and protecting the fauna. Fresh working plan for each forest be prepared carefully and implement the same with dedication and commitment.

.⇒Value Addition Schemes By NGOs

The forests of Assam are rich in medicinal plants. The NGOs of different regions of the State may concentrate in identifying, rearing, and growing of region-specific medicinal plants. The other potential area of value addition is the growing and rearing of orchids which are available in abundance, specially in the forests bordering Assam and Arunachal Pradesh. As the forests grow, birds of various types will nest in the forests. The forests would then attract bird watchers and thus the tourism activities may grow.

.⇒Resilience of The Forests

The Forest Department should take a pragmatic view regarding resilience of the forests. For this purpose the forests be classified into five categories.

1. Encroached forest area beyond the scope of eviction
2. Encroached forest area where eviction is possible
3. Barren land created due to massive tree felling
4. Forest with low crown density
5. Thick forests

The Government should immediately concentrate on revival of the third and fourth categories of forests. Massive plantation work in collaboration with local NGOs and the villagers from the Revenue Villages should be started immediately. Along with that plantation of saplings should be carried out in the forests with lower crown density. If experts feel that by giving proper protection to the existing trees, natural regeneration could be achieved, then steps should be taken in this direction for effective natural growth. The next task should be to evict the encroachers from forestland. Areas recovered this way should be guarded by army/police personnel to prevent recurrence of encroachment. Plantation work in these areas should start immediately. NGOs and villagers from the revenue villages should be included in Vigilance Team to watch the newly created forests.

RENAISSANCE OF CULTURAL HERITAGE :

The following suggestions aimed at medium term and long term developments have been proposed :

- While framing and implementing policies at national, state, and local level, national and local cultural sentiments have to be considered.
- People may be motivated to plant more number of trees in their private holdings and the compound of their houses.
- Religious-based plantation may be encouraged among all sections of the society.
- While encouraging forest dependent people to take up non-traditional occupation, their cultural aspects have to be studied properly.

- People should be motivated to link up aforestation program with their rituals:

    a. plantation of trees by newly wed couples

    b. plantation of trees on the birth of each child in the community

    c. annual festival of forest preservation

    d. community-based forest competition should be launched.(New plantations,

    old forest maintenance, reduction in forest product consumption).

SYSTEMS APPROACH:

There has to be a consorted effort on the part of the common people, social organizations, and the government agencies. The following Short, Medium, and Long Term measures to be introduced at various levels are suggested for sustainable growth of forest

.⇒Short-Term Measures:

- Required infrastructure be provided to the forest personnel
- Strict control over the forest personnel to make them work with commitment and dedication for the noble cause.
- Train up forest employees, educate common people, and involve NGOs for successful implementation of the JFM scheme.
- Ready-made markets for marketing of minor and major products have to be created
- NGOs, Forest Guards, and Police personnel should put up joint effort to protect forests.

- Create public awareness for forest preservation.
- Transparency has to be maintained in respect of utilization of fund received for forest preservation activities.
- Take up plantation work in line with JFM.

.⇒Medium-Term Measures :

- Popularize community, farm, and private forests in Government as well as private lands.
- Administrative structure of present forest organization system be rationalized.
- Plantation of fast growing as well as medicinal and aromatic plants besides religious based plants, be popularized.
- Control mechanisms have to be strengthened to arrest corruption at all levels.
- Utilize NGOs in forest management
- Ecological revolution should be activated at appropriate place and time from grass root level to higher level.

⇒ Perspective Planning:

- Government should review and reengineer its forest policies and programs
- Relationship among various partners for the purpose has to be strengthened
- Any structural changes that are initiated at any time, should be linked with all the important sub-systems of the main system.
- Continuous efforts to maintain cultural heritage through various means, has to be strengthened.

- Bring about behavioral changes in the Department through training and by injecting ethos and values.
- Diversify organizational activities through injecting high level of moral and cultural values.
- Involvement in Value addition activities of forest
- Changing the mind-sets of the forest-dependent people.

CHAPTER 1 : INTRODUCTION AND OVERVIEW

1.1 INTRODUCTION:

Evolution of mankind, its existence, its growth, and its survival --- everything has been dependent on Nature Mother. The Nature Mother nurtured him, provided food, provided materials for shelter, provided mental peace and comfort. The Nature Mother in the form of forests provided the supports of life needed by the human beings. Life took shape according to the availability of materials in the surroundings. Thus human being continued to extract resources from the forests for survival. With the rise in population, the volume of extraction went up and resources started depleting fast. Unplanned large-scale extraction affected the growth of forests as well. And this has happened all over the world. It has led to an alarming situation warranting the need to study the situation and to find out ways and means for sustainability of forests.

1.2 THE PROBLEM UNDER STUDY :

Since time immemorial, Assam was known for its forests and forest products. Wide varieties of valuable trees are available in the forests of Assam. It is because of such a wealth that the East India Company ventured to establish various Indian Trading organizations in Assam. Railways was extended to Assam to transport the forest products from this part of the country to various parts of the world. Assam Railway and Trading Company (ARTC) was basically engaged in the timber business. It was the officials of ARTC who discovered the mineral oil reserves in Assam . Assam is one of the world's 16 most bio-diverse regions. Apart from valuable trees, the forests of Assam is a habitat for wide range of flora and fauna.

Large-scale deforestation has become an acute problem all over the world. Forest products are being extracted in an unplanned manner, new plantations have not been taken up to replenish the depletion, more and more forests are being cleared for cultivation and habitation, less forest area has prompted the wild animals to cause damage in the human habitation, the ecological balance has been enormously

disturbed, and the environment has degraded at a fast rate. India is no exception to such a deteriorating situation. Assam, which was famous for its jungles, flora and fauna is facing an unthinkable situation arising out of large scale extraction of forest products and simultaneous destruction of forests. Forest has been decreasing at an alarming rate day by day. Wild animal menace had made the rural (even urban areas in certain districts) people insecure. The Government exchequer has suffered badly. Against such a deteriorating situation, it has become essential (before it becomes rather late) to look into the problem of unplanned extraction of forest products in Assam, and to suggest measures to arrest it in order to maintain desired level of forest and forest products in the years to come. This study is an humble effort in this direction.

1.3 OBJECTIVES OF THE STUDY :-

Keeping in view the problem defined in the previous section, the study has been aimed at achieving the following objectives:

1. To portray Forest Resource Scenario of Sonitpur and Lakhimpur districts in particular and that of Assam and North East in general.
2. To identify the existing pattern of extraction of forest products in the study area.
3. To identify the reasons for fast depletion of Forests in the study area.
4. To evaluate the effectiveness of Forestation Policies and Practices.
5. To suggest models and policy reforms for sustainable extraction of forest products.

1.4 METHODOLOGY

Based on the objectives of the study, research methodology was designed and implemented accordingly. Since all the objectives are highly interrelated and more or less centered around the extraction activity, it is not easy to distinguish methodology against each of the objectives stated above. If the methodologies are to be

developed objective wise, there will be duplication. That is why methodology has not been classified objective-wise.

As part of collecting required and adequate amount of data from appropriate sources, it was planned to collect primary as well as secondary data to meet the research requirements. Secondary data were collected from number of sources. To collect data on working plan, past studies, published papers, articles, forest resource accounting including forestation, forest depletion, revenue, expenditures, stock of the species etc., many offices and institutions, as mentioned below, were visited.

1. Principal Chief Conservator, Guwahati
2. Chief Conservator, Tezpur
3. Working Plan Office, Dept. of Forest, Govt. of Assam , Guwahati
4. Research and Education Wing, Dept. of Forest, Govt. of Assam , Guwahati
5. Silviculture Office, Dept. of Forest, Govt. of Assam , Guwahati
6. Remote Sensing Application Centre, Dept. of Science and Technology, Govt. of India, Guwahati
7. Divisional Forest Offices at Tezpur, Biswanath-chariali, Lakhimpur ,
8. Range, Beat, Camp, Check Gates etc. under Sonitpur (East &West), and Lakhimpur Forest Divisions
9. ICAR, Agricultural Research Station, Barapani, Meghalaya,
10. North Eastern Hill University, Shillong.
11. Indian Institute of Economic Growth, New Delhi,
12. Indian Institute of Management, Bangalore
13. Indian Institute of Entreprenuership, Guwahati
14. Director of North-East Range Forest College , Guwahati

The collected data were tabulated and analysed by using SPSS software. Various statistical measures, tools and techniques such as mean, percentage, chi-square test, graphs, bar and pie diagrams were used appropriately to reveal the relationship among various variables.

For collection of primary data, field study and observation methods were used. Structured and unstructured interviews by using appropriate schedules and questionnaires had been carried out. Three surveys were conducted to collect primary data.

SURVEY I : Common People

Sampling Plan

Population :

Element Common People.

Sampling Unit Household.

Time From June 2000 to April 2001.

Extent Revenue villages of nearby reserved forests. Forest villages and Encroached villages within the reserved forests of Sonitpur and Lakhimpur district of Assam

Sample Size 600 households.,

Sonitpur (East) =200,

Sonitpur (West)=200, and

Lakhimpur= 200.

Sampling Procedure Convenient Sampling technique was used during the survey.

Method of survey Direct (Face to Face Interview)

Research Instrument Questionnaire

A structured questionnaire was prepared to measure the following variables from the respondents :-

(a) Socio-Economic Profile of Respondents

1. Age of the respondents

2. Gender

3. Social Status

4. Number of dependent family member (Members without any income)

5. Occupation of households.

6. Annual income of the family

7. Distance from residence to forests.

(b) Origin of Respondents.

1.Nature of settlement.

2.Sources of Migration

3.Reasons for Migration

4. Reasons for selecting the place for settlement

(c) Relationship of Respondents with Forests

Whether respondent dependent on forest products.

Nature of forest products

Sources of Extraction of forest products.

(d) Details of Forest Resource of Reserved Forest

1. Types of available forest products.

2. Trend of growth of forest products.

3. Reasons for declining forest products.

4. How to prevent depletion of forest resources.

(e) Details regarding Encroachment

1. Knowledge of illegal encroachment

2. Effect of encroachment on respondents family earning.

3. Encroachment and social problem.

4. Govt. initiative for eviction

5. Public reaction towards eviction of encroachers

(f) Details regarding Extraction of Forest Products.

(1) Nature of felling.

(2) Type of tree felling

(3) Weapons used by the people for extraction

(4) People approach to go for extraction

(5) Distance traveled to go for extraction

(6) Mode of transportation

(7) Whether any problem involved in extraction

(8) Extraction problem from forest and police personnel

(g) Details of Illegal Extraction

(1) Strategies used for illegal extraction

(2) Participated in illegal extraction

(3) Annual income from illegal extraction

(4) Peoples emotion about illegal extraction

(h) Details regarding Selling of Forest Products.

(1) Target customer for forest products

(2) Prices of the forest products

(3) Whether any problem in selling of forest products.

(4) Adequacy of earning for livelihood out of selling forest products.

(i) Details regarding Forestataion

(1) Peoples initiative and awareness about forestation.

(2) Frequency of planting of trees by the respondents.

(3) Reasons for non-plantation of trees.

(4) Knowledge of social forestry plantation in respondent's area.

(5) Whether respondent's participated in social forestry program.

(j) People's Willingness to become a Member of Common Property Resources.

To obtain data and information on extraction of forest products, total 32 numbers of questions were asked to respondents out of which 27 closed ended and 5 open ended questions.

Survey II : NGO Personnel

Sampling Plan

Population

Element	Members of NGO working for Forest Protection
Sampling Unit	Members of NGO working for Forest Protection
Time	From June 2000 to April 2001.

Extent Sonitpur and Lakhimpur district of Assam.

Sample Size **27**

Sampling Procedure Convenient Sampling technique was used during the survey

Method of survey Direct (Face to Face Interview)

Research Instrument Questionnaire

A structured questionnaire was prepared to measure the following variables from NGOs' members working for the forest protection and conservation.

(a) Major activities of the NGOs.

(b) Reasons for fast depletion of forest resources

(c) Measures to stop forest depletion

(d) Who are responsible for depletion of forest resources in Assam

(e) Steps taken by the NGOs to protect forest.

(f) Awareness about Joint Forest Management Scheme.

To obtain data and information on extraction of forest products total 25 numbers of questions were asked to respondents out of which one closed ended and rest questions were open ended questions.

Survey III : Forest Personnel

Sampling Plan

Population

Element Persons worked in the forest department.

Sampling Unit Forest department personnel directly involved in forest protection and development.

Time From June 2000 to April 2001.

Extent Three Forest Division of Sonitpur and Lakhimpur district of Assam namely, Sontipur (East), Sonitpur(West) and Lakhimpur forest division.

Sample Size **49**

Sampling Procedure Convenient Sampling technique was used during the survey

Method of survey Direct (Face to Face Interview)

Research Instrument Questionnaire

A structured questionnaire was prepared to measure the following variables from Forest Department personnel working for protection and development of forest.

(a) Division wise distribution of employees

(b) Service experience of the respondents.

(c) Reasons for fast depletion of forest resources

(d) Responsible for fast depletion of forest resources.

(e) Measures to stop depletion of forest resources.

(f) Problems faced by forest officers/employees in protecting the forest.

(g) Fall outs of deforestation

(h) Comment on Joint Forest Management.

To obtain data and information on extraction of forest products total 20 numbers of questions were asked to respondents out of which 6 closed ended and 14 questions were open ended questions.

As per the objectives of the study, research instruments were used by incorporating closed and open ended questions. Pilot study was conducted to test the validity and accuracy of the instruments and final survey was conducted accordingly.

The geographical area selected for the study were two districts in Assam--Sonitpur and Lakhimpur. In the two districts, there are seventeen reserved forests governed by three Forest Divisions (Sonitpur East, Sonitpur West, and Lakhimpur). There are 53 forest villages in these seventeen reserved forests. Tribals, Adivasis, Nepalese are staying in large number in those forest villages. Encroachers are also part of the village communities.

The segments selected for collection of the primary data comprise of villagers from forest villages, NGO workers, Officers and field workers from forest department besides social scientists and academicians. The respondents represent both men and women.

Survey IV : Furniture Shops and Timber Dealers

Population

Element Persons involved in legal and illegal furniture trade.

Sampling Unit Furniture shops and markets.

Time From June 2000 to April 2001.

Extent Three Forest Division of Sonitpur and Lakhimpur district of Assam namely, Sonitpur (East), Sonitpur(West) and Lakhimpur forest division.

Sample Size **143**

Sampling Procedure Convenient Sampling technique was used during the survey

Method of survey Direct (Face to Face Interview)

Research Instrument Questionnaire

Sampling techniques used in selection of the respondents were : respondents from various social strata like Tribal, SC, S T, Adivasi, and others were selected. Simultaneously, cluster of people living in different forest areas have also been selected. While selecting people from various strata and clusters, simple random sampling was used. Besides, simple random sampling technique was used to

select NGO workers for the related causes. Non probability sampling technique, convenience and justified techniques were used to select the forest officers and field workers, Social scientists, and academicians who are working in this field. Keeping in view the constraints from time, and accessibility to various segments, number of respondents had been determined. The details of the samples are presented in Table 1.1.

Table – 1.1

Break-up of Respondents

	Category	No. Of Respondents (Division-wise)			
		Sonitpur (East)	Sonitpur (West)	Lakhimpur	Total
a.	Villagers	200	200	200	600
b.	Forest Officials and Guards	17	18	14	49
c.	NGO workers	8	7	12	27
d.	Social Scientists and Academicians	9	10	5	24
e.	Furniture Shops & Timber Dealers	65	29	23	117
f.	Exit Points of Fuel Wood	8	10	8	26
g.	Illegal Furniture Markets	-	3	-	3
	Total	307	277	262	846

1.5 SCOPE AND LIMITATIONS OF THE STUDY

Since the aspect of sustainable forest management is having multi-dimensional character, it is not possible to cover all the dimensions in a single study. That is why, the study mainly focuses on how extraction of forest products and conservation of forest resources have been going on. The very structural reasons responsible either for conservation or illegal extraction could not be studied in detail. Though the present study has addressed to the extraction pattern of forest products of Assam, due to time constraint and vastness of the area, the study has been confined to two districts, namely Sonitpur, and Lakhimpur Districts of the State. These two districts are not uniform in all characters with other districts of Assam. but more or less

represent the forest scenario of Assam. The study takes into account the wood products only. The major constraints for this study have been paucity of data, inaccuracy of data, and obstructions from natural calamities like flood besides problems of insurgency .

1.6 SUSTAINABLE EXTRACTION :

Sustainable extraction of forest produce may be defined as the quantity to be extracted to meet the present need without compromising the ability of future generations to meet their own needs. Three most important aspects of sustainable extraction are : (I) Environment, (ii) Economy, and (iii) People.

"The guiding rules are that people must share with each other and care for the Earth. Humanity must take no more from nature than nature can replenish. This in turn means adopting lifestyles and development paths that respect and work within nature's limits. It can be done without rejecting the many benefits that modern technology has brought, provided that technology also works within those limits" [Source: Caring for the Earth, IUCN, Gland, Switzerland, p8.]

1.6.1 WHO ARE INVOLVED ?

1.6.1.1 The Individuals

It is the mind-set of the individuals that affect the extraction level of forest produce. If majority of the people are not aware of the impact of reckless extraction of forest produce it would be extremely difficult to retain the forest through policing only.

1.6.1.2 The Voluntary Sector

Social, ethical and environmental organisations are directly involved in lobbying and promoting the cause of sustainable extraction of forest produce. They can play a vital role in preserving the environment.

1.6.1.3 The Forest-Based Industries

Forest-based industries carry out their business activities keeping in view the type and volume of market demand. For sustenance of forests it is essential that they give attention to the availability of the forest produce and their replenishment.

1.6.1.4 Local Authorities

The local authorities include the law implementing agencies and the local administration. Their role would decide the status of the forest resources.

1.6.1.5 National Government

National government plays the most crucial role in formulating the forest policies. It must not ignore or deprive the segments whose involvement and attachment are needed for maintaining the forests. A long-term view in planning is essential.

1.6.1.6 International Agreements

Preservation of forests is a global concern now. International organizations have been taking up the issue of environment preservation in various forms.

1.7 SUSTAINABLE FOREST MANAGEMENT (SFM) :

In the light of increasing problem of ecological degradation, the concept of SFM has become very significant to debate and to develop its conceptual framework to get maximum benefits. SFM should ensure that values derived from forest meet the present- day need while ensuring that forests maintain the desired quantity and quality that would contribute to long term development needs. A rational and balanced combination of the different functions of forest-production, protection, conservation and provision of environmental amenities is essential to help conserve sustainability of forests. The concept is holistic and the task is multi-disciplinary.

Components of SFM depend on climate, ecological, social and economic conditions. SFM should cover all aspects of forestry in an appropriately balanced manner. It needs to incorporate large plants, animals, micro flora and fauna, water and soil as well as traditional knowledge and heritage.

1.7.1 Criteria and Indicators (C&I) for SFM :

In order to make the process of SFM more meaningful and purposeful, several efforts have been initiated to develop and test the package of criteria and indicators for its success. Through evolutionary process, the following C&Is have been considered to be appropriate for SFM.

- Extent of forest resources
- Biological diversity
- Forest health and vitality
- Productive function of forests
- Protective functions of forests
- Socio-economic benefits and needs
- Legal, policy and institutional framework

Besides the above C&I, after having a series of deliberations and meetings eight national level criteria and fifty one related draft indicators, under the Bhopal-India Process have been identified. This set of C&I is relevant for South Asian nations including Bangladesh, Bhutan, India, Sri Lanka, Pakistan. The C&I generated under the Bhopal-India Process (1992) are as follows :

Criterion 1: Extent of Forest and Tree Cover

1. Area and type of natural and man-made forests.
2. Forest area under fragile ecosystem
3. Area of dense and degraded forest.
4. Forest in non-forest area
5. Area rich in NWFP species
6. Forest area diverted for non-forestry use.
7. Community managed forest areas.

Criterion 2: Eco-system Function and Vitality

1. Status of natural regeneration
2. Status of natural succession

3. Status of secondary forests.
4. Weed, pest, disease, grazing, fire, etc.
5. Maintenance of food chain.

Criterion 3: Bio-diversity Conservation

1. Number of rare, endangered, threatened and economic species including tiger population.
2. Level of species richness and diversity.
3. Canopy cover
4. Medicinal and aromatic plants and other NWFPs
5. Level of non-destructive harvest

Criterion 4: Soil and Water Conservation

1. Soil moisture
2. Soil compaction
3. Status of erosion
4. Run-off (water yield)
5. Soil pH
6. Soil organic carbon
7. Nutrient status of the soil
8. Soil flora, fauna and microbes
9. Level of water table
10. Sediment load.

Criterion 5 : Forest Resource Productivity

1. Growing stock of wood and NWFPs
2. Natural regeneration status
3. Increment of wood and non-wood products
4. Area of forestation and new plantations
5. Level of material and technological inputs
6. Extent of protection measures
7. Level of tangible benefits

Criterion 6 : Forest Resource Utilization

1. Aggregate and per capita wood and non-wood consumption
2. Import and export of wood and non-wood forest products
3. Recorded and unrecorded removals of wood and NWFPs
4. Direct employment in forestry and forest industries
5. Contribution of forest to the income of forest dependent people

Criterion 7: Social, Cultural and Spiritual Needs

1. Well-being in terms of livelihood, recreation, cultural and aesthetic needs.
2. Degree of economic. Social, gender and participatory equity
3. Common management mechanisms
4. Traditional (Indigenous) Knowledge application

Criterion 8 : Policy, Legal and Institutional Framework

1. Existing policy and legal framework
2. Extent of community, NGO and private sector participation
3. Investment in research and development
4. Human resource accounting
5. Forest resource accounting
6. Monitoring and Evaluation mechanisms
7. Status of information dissemination and utilization

An analysis of SFM with reference to the area under study has been presented in a later chapter.

1.8 AN OVERVIEW OF THE REPORT :

This report is an outcome of the study conducted in two districts of Assam, namely, Sonitpur and Lakhimpur Districts, regarding forest extraction and generation in the two districts. These two districts have been taken as representative of the whole State of Assam. The report has been presented in seven chapters. An overview of the report is presented below.

Chapter 1 presents the problem under study and the objectives to be achieved from the study. A definition on sustainable extraction has been put forward for a clear understanding of the problem. The methodology adopted, and the scope and limitations of the study have been presented in this Chapter. Data sources and the surveys conducted to obtain data have been mentioned here. The criteria and indicators of sustainable forest management have been presented in this chapter. The scope and limitations of the study have also been discussed here. The chapter ends with an overview of the report.

Chapter 2 attempts to introduce the North-East (NE) region of India to the readers. The socio-economic environment of the region has been described in this chapter.

The resources available in this region have been described and the way these resources are being utilized have been narrated. The entities which could influence the extraction of forest products directly or indirectly have been identified.

Chapter 3 attempts to present the current forest scenario in the two districts under study. The status of the reserved forests in the study area has been described here. The forest areas have been depicted in maps of the area under study.

Chapter 4 presents an analysis of the forest policies and their implementation since the British rule in India. The salient features of the Forest Acts and Regulations framed and implemented since 1855 have been described. The past working plans for Assam forests have been discussed here. The purpose of setting up of Forest Villages and the actual role they are playing have been analyzed. A critical analysis of the aspects of implementation of these Acts and Regulations has also been presented. The data available on extraction of forest products have been analyzed to recognize the pattern of forest resource utilization. The chapter presents the concept of Economic Instruments (EI) and describes the EIs prevailing in the country at present. The secondary data collected have been analyzed in the light of he EIs.

Chapter 5 presents and analyzes the primary data collected for the study. The data have been presented in tabular and graphical forms and the same have been interpreted in the light of the problem under study.

An attempt has been made in Chapter 6 to quantify the benefits, direct as well as indirect, obtainable from the forest. The activities related to forest resource extraction have been quantified. A cost-benefit analysis of alternative use pattern of forest land has been presented in this Chapter.

Chapter 7 summarizes the observations and findings of the study. Findings from the survey like Forest-Villagers' responses, NGO personnel's responses, Forest Personnel's responses, and Social Scientists' and Academicians' responses have been presented here. The findings regarding Forest Policy Implementation have been summarised here. Discussions on extraction of forest products trends, economic instruments, have been presented in this chapter. The summary on economic valuation of various forest-based activities has been placed in this chapter.

Chapter 8 suggests policies for sustainable extraction of forest products in Assam. One Econometric Model, one System Dynamics Model, and one Behavioral Model have been proposed for the purpose of formulation of policies. Various economic instruments to achieve the goal have also been discussed in this chapter. Comprehensive policies for sustainable extraction of products have been presented in this chapter.

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CHAPTER – 2:REGIONAL OVERVIEW OF NORTH-EAST INDIA

2.1 PREAMBLE :

The North Eastern region of the country is a unique balance of hill and plain–river-valley geo-physical features. Assam, the central river valley State, surrounded by the six Hill States namely Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura, is the heart of the NE region for bipolar exchange of goods and services more specifically the agricultural produces. The position of the North-East in relation to the rest of the country has been portrayed in Fig. 2.1.

The Hill economy demanding food from the plains, harness their natural resources, primarily the forest wealth comprising timber and minerals, for exchange. Such balance of exchange was maintained for a long time. But with the phenomenal growth of population of the region during the past four decades due to large scale influx from the neighboring countries of Bangladesh and Nepal coupled with the limitation on the production and the productivity in both primary- agricultural as well as the secondary-industrial sector has led to excessive exploitation of these natural resources for economic reasons. The economic pressures on these natural resources have been so much so that these resources have lost their capacities to regenerate.

2.2 SOCIO-ECONOMIC ENVIRONMENT OF NE STATES :

The NE region of the country is an assembly of ethnic diversity. It also represents a multifaceted scenario from the points of resource availability, occupation, land-use pattern, custom, beliefs and cultural heritage.

2.2.1 SOCIAL ASPECTS OF THE REGION:

The plain regions of North-East India are inhabited by people who could be ethnically grouped into tribal and non-tribal. Bodos form the major group of tribe in the plains where as the hills are inhabited by a large number of tribes. Over 400 tribes of distinction have been identified in the NE region. Although each tribe has its own dialect but the major languages are Assamese, Bengali, English, Manipuri,

Nagamese, Khasi, Mizo, Bodo and Hindi. It is observed that 43% Hindu, 35% Muslim and 20% Christians form the population composition of the region based on the practice of religion. The distribution is such that while the plain, river valleys are dominated by the Hindus and Muslims, the hills are occupied by the Christians.

The population in the NE region has been growing at a higher rate as compared to the national growth rate. As per 1991 census, the total population of the entire NE region was 3.15 crores which constituted nearly 3.7 per cent of the national population. The density of population was highest in Assam, amongst the north eastern states with 286 persons per sq. km followed by Tripura with 263 persons per sq.km.. The density of population of the other N.E states were , 82 per sq. km in Manipur, 79 per sq. km in Meghalaya, 73 per sq. km in Nagaland, 33 per sq. km in Mizoram, and 10 per sq. km in Arunachal Pradesh. The population of Assam constituted 71. 3 per cent of the entire population of NE region. The ratio of urban to rural population of the State was highest in Mizoram at 46.2 per cent followed by Manipur at 27.7 per cent, while that for Assam was 11.1 per cent. Mizoram enjoyed the status of having the highest percentage of literacy in the country. The literacy rate in Assam was 43.20 per cent . The female literacy rate in Assam was however only 35.18 per cent only. Out of the total working population, cultivators and agricultural labourers together accounted for 64.16 per cent in Arunachal Pradesh, 54.44 per cent in Assam, 62.45 per cent in Manipur, 64.06 per cent in Meghalaya, 56.15 per cent in Mizoram, and 73.1 per cent in Nagaland and 57.34 per cent in Tripura.

2.2.2 NATURAL RESOURCES OF NORTH-EASTERN INDIA

In respect of natural resources, the North-Eastern region is well-blessed by the nature. The important natural resource of this region include Forest resources, Mineral resources, and Water resources.

2.2.2.1 Forest Resources of North-Eastern India

North-Eastern region was very rich in forest resources. About 45.17 per cent of the total geographical area of the NE region is covered by forest. AS per the 1991 census the total area covered by forest in the NE region was 11,146.81sq. K.M.. Amongst the seven states of NE region, Arunachal Pradesh has the highest

percentage of area under forest cover with 52000 Sq Km accounting for nearly 62.11 per cent of the total geographical area of the state. In Assam, the area covered under forest is nearly 19300 Sq Km which is 24.60 per cent of the total area of the state. In the other five north-eastern States, the percentage of area under forest is 52.05 per cent for Nagaland, 75.80 per cent for Mizoram, 60.10 per cent for Manipur, 42.37 per cent for Meghalaya, and 57.76 per cent for Tripura. Various valuable trees like Sal, Chegun or Teak, Bansom, Simul, Sishu, Gamari, Sarol, Halokh, etc., Bamboo, cane, valuable medicinal plants, birds and animals are available in plenty in the forests of NE region. As per the available statistics in recent years, on an average, the forest of the region provide 8 lakh cubic meter of ordinary timber, 70.5 lakh tonne bamboo, soft wood for the production of 1.6 lakh cubic meter plywood, 3.1 lakh cubic meter industrial hard wood, 5.6 lakh cubic meter pulp wood, 12.5 thousand cubic meter of soft wood for the production of Match sticks and 2.5 lakh cubic meter of fire wood annually. Based on the forest resources of the north-eastern region, various types of forest based industries viz., Ply wood industry, paper mills, saw mills, furniture manufacturing units etc. have been established both within and outside the region.

2.2.2.2 Mineral Resources of the North-Eastern Region

The NE region is quite rich in respect of its deposit of natural resources. Various types of mineral resources are available in different North-Eastern states. Available mineral resources in this region include coal, petroleum crude, natural gas, lime stone, siliminite, dolomite, uranium, china clay, kaolin, fuller's earth, feldspar, etc. Although a large deposits of coal are available in the NE region, the coal has got high sulphur content and hence is not suitable for steel plants and power generation. Among the various States of this region, the maximum amount of coal is produced in Assam and Meghalaya. Apart from Assam, small reserves of petroleum crude is also available in the upper part of Arunachal Pradesh and in Nagaland. Gas reserved have also been tapped at Baramura area in Tripura. Total reserve of crude oil and natural gas in the proven oil fields of NE region is estimated at 158 million Mtons and 23000 million cubic metres respectively.

2.2.2.3 Water Resources :

North-Eastern region is quite rich in respect of water resources. Due to the favorable impact of monsoon, the entire NE region receives ample quantity of rainfall. Moushingram of Meghalaya is recorded to have highest annual rainfall in the world. The two major rivers Brahmaputra and Barak, and their tributaries are the major sources of surface water of this region. The fresh water lake system comprising over 0.1 million ha in Assam alone form a major source of water. The Loktak lake system in Manipur has drawn international attention due to its size and significance. The under-ground water potential of this region is also quite rich. On the basis of water resources, some hydro-electric power projects, irrigation projects, and water transport system have been developed in this region. Although the NE region is having a huge potential for the development of water resources, yet it remains to be harnessed.

2.2.3 ECONOMIC ACTIVITIES OF NORTH-EASTERN REGION

2.2.3.1 Agriculture

The economy of NE Region is mainly dependent on agriculture. About 70 percent of the working population of NE region are earning their livelihood directly from Agriculture.

(A) Land Use Pattern :- Total geographical area of the NE Region is 235 Lakh hectare, out of which 111.46 lakh hectare is under forest cover. Barren and uncultivable land comprise of 22.77 lakh hectares and about 53.83 lakh hectares of land is suitable for cultivation. The net area sown in this region is 39.44 lakh hectare which is about 73.26 per cent of the total cultivable land.

(B) Agricultural Production :- Agricultural production in NE region can be broadly classified into food crops and commercial crops. The major food crops of the region include rice, wheat, pulses etc. and non-food crops include tea, jute, sugarcane, oil seed etc. Total production of food crops of this region has been increasing gradually from 17.0 lakh tonnes in 1950-51 to 35.26 lakh tonnes in 1980-81 and then to 56.76 lakh tonnes in 1999-00. Among all the food crops produced in the NE region rice is the major crop. In 1999-2000. Out of the total food crops produced in the region

amounting to 56.78 lakh tonnes, the production of rice alone is to the extent of 52.45 lakh tonnes accounting for nearly 92.37 per cent of the total food crops produced in this region. The NE region did not experience any impact of the Green Revolution which occurred mostly in Punjab, UP and some other States of India. The average yield of rice per hectare of land in Assam, Manipur and Tripura during 1999-00 were 1470 Kg, 2290 Kg and 2350 kg respectively.

2.2.3.2 Industrial Activities of North-Eastern Region :-

Important industries of the region include petroleum, coal, jute, cement, fertilizer, sugar, paper, paper-pulp, and petrochemicals. Among the North-Eastern States, Assam and Meghalaya are rich in mineral resources. At present there are four oil refineries in Assam with installed refining capacity of 6.75 M T per annum. The amount of coal produced in the coal fields of Assam alone is about 860,000 tonnes per year.

Tea industry is the oldest industry in Assam and is the most important one among all other industries. The North-East India, especially Assam, is world famous for its quality tea. It produces around 54% of the total tea produced in the country. There are 845 tea gardens in Assam, while there are 49 tea gardens in Tripura. Besides earning scarce foreign exchange for the country, and providing a cheap beverage to the common people, this industry generates huge employment to the rural women.

There are two jute mills in operation in the North-Eastern region. A few new jute mills are proposed to be located in the region shortly. Two major cement industries are producing cement using the available lime–stone of the region. There are three sugar mills in the region. There are two fertilizer factories in Assam run by Hindustan Fertilizer Corporation Limited and Assam Petro-chemicals Limited. Besides these, a few factories have come up for manufacturing synthetic fibers, edible oil, spun silk, cotton yarn, beer and spirit etc. The North-East India has various other small scale and cottage industries of which handloom weaving is very important. Apart from this, other industrial activities include sericulture, bamboo and cane work, bell metal and brass work, biddi making, toy making, food processing and canning.

2.2.3.3 Forest-Based Industry :-

Forest-based industries of North-East include Plywood Industries, Sawing Mill, Paper and Pulp Industry, Match Industry, Leather Industry, Hard Board Industry, Furniture, and Construction etc. Plywood industry had been the major forest-based industry in the region. Plywood is mostly used in the manufacture of tea chest, boxes, furniture, panels, board, flush door, bodies of vehicle and railway compartment etc. With the increase in the demand for plywood, the plywood industry of Assam gradually expanded during the seventies of last century. Assam had 620 wood based industries of which 485 were saw mills 62 veneer mills 46 plywood factories, and 35 saw-cum-veneer mills. The forests of Assam are supplying raw materials to different paper, paper and pulp mills within and outside the State. The two 300 TPD paper mills of Hindustan Paper Corporation at Jagiroad and Panchgram and Ashok Paper Mill at Jogighopa produce about 600 tons of paper every day. The forests of Assam provide the raw materials for production of about 7 per cent of the total matches in India under WIMCO at Dhuburi.

2.2.3.4 Assam's Economy :-

The growth of the State's economy in real term had not been so much encouraging as was expected during the period. The State's economy in terms of Net State Domestic Product (NSDP) has registered an annual average growth rate of 2.28 percent at constant (1980-81) prices during the Eighth Five Year Plan period as against a marginally higher growth rate of 2.3 per cent during the Seventh Five Year Plan period. The menace of flood in Assam which is a regular feature during the monsoon period and occurrence of draught at times, continue to affect the agricultural sector of the state adversely. As regards the performance of Industrial and mineral sectors, the overall output level during these year was not encouraging as the same revealed a mixed performance in the output. The performance in the power sector also did not show any improvement during these year. The power generated within the State is not enough to meet the domestic demand. The State continues to purchase power from other sources. So far as the rural electrification is concerned, nearly 77 per cent of the villages of the State have been electrified.

The Credit-Deposit ratio in the State continues to be very unsatisfactory as compared to the National level. For instance, as against the all-India credit-deposit ratio of 55.5 per cent at the end of March 1998, the same for Assam has been 32.7 per cent only. As regards to the employment sector of the State, the number of persons employed in the organized economic activity (comprising of both public and private sectors) has increased marginally to 11.66 lakhs at the end of March 1997 from 11.52 lakhs at the end of March 1996, i.e. a marginal increase of 1.2 percent over the period. However, the problem of growing unemployment continues to be a matter of great concern for the State.

2.3 MIGRATION TO NE REGION :

The British started tea plantation in Assam in the thirties of the nineteenth century. Within a very short time the tea industry flourished and it demanded a huge labour force. As the local people were reluctant to work as tea labourers, thousands of labourers had to be brought from other parts of the country. This was the first large–scale migration of labourers to Assam. However, these labourers were fully engaged in the tea industry only.

Assam vis-à-vis the North East being endowed with plenty and varied natural resources, people from other regions of the country became attracted to take up economic activities in this region. Initially migrants from other parts of the country were engaged in tea and timber trade only. Gradually they got involved in various other economic activities. As the economy flourished, more and more migrants kept coming and people from all parts of India intermingled with the population of the region.

As stated earlier, the population density in Assam vis-à-vis the north- east was very low in the early part of last century. Vast areas suitable for cultivation were lying unutilized. In order to utilize such a resource for the economic development, the then Government of Assam encouraged farmers from East Bengal (presently Bangladesh) to migrate to Assam. That was just the beginning. The migration gradually gained momentum and continued for the past five decades and is continuing even till today.

The earlier migrants settled down in the river banks where sprawling cultivable areas were available. As migration continued, such land became less and less available. Then the migrants started settling down near the villages of the indigenous people who used to engage them as agricultural labour. These migrants also used to take land on hire from local people and cultivate various cash crops. This practice is going on even today. Gradually the migrants started settling down and cultivating in the fringe areas of the forests. These fringe areas belonged to the forests and were left unused so that the wild animals did not disturb the human settlement. Unfortunately the Government did not take timely action against illegal encroachment of forest land by the migrants. Once an area is occupied by migrants, fresh migrants used to pour in and take first shelter in these areas local. Then they would go for farther encroachment of forest areas. The migrants would depend upon the nearby forests for their own requirements as well as for livelihood.

The migrant–farmers being land–hungry people would go for felling of trees to use as fire–wood or for sale. Once cleared, these forest areas would be used for cultivation. The number of such illegal settlers have grown large, and at the same time having received political patronage over these years no government action could be taken against them. The process of migration and cultivation is continuing unabated. This has resulted in large–scale destruction of forests and the consequent threat and damage from wild animals .

2.4 EXPLOITATION OF FORESTS IN THE NE REGION :

The forest resources in Assam vis-à-vis India are being exploited since the British rule. In fact the British Traders were attracted to this region of the country because of the natural resources only. Over the years, the forest resources of Assam have depleted in many ways :

a) Tree felling against permit

b) Illegal tree felling

c) Encroachment

d) Loss due to natural calamities

e) De–reservation of forests

Before the ban on felling of tree imposed by the Hon'ble Supreme Court of India, along with many other states, Assam used to allow felling of trees against permit. This was one of the major revenue–earning avenues for the Govt. However, there were enormous corruption on the part of many forest officials and the unscrupulous timber merchants. Young trees were felled, areas not covered by the permit were also harvested, valuable trees were felled against permit for less–valued trees. The forest officials if not a willing party were either forced to be a party or a mute spectator to such activities practiced by unscrupulous timber merchants.

Then there were large scale illegal tree felling activities carried out by persons who found the timber trade to be a lucrative one. Such groups were well-equipped with lethal weapons and were well-organized to carry out such activities fully ignoring the ill-equipped, less-bothered forest employees. It is alleged that even some Forest Officials and Politicians used to help such traders in their illegal acts. Gradually, some extremists also joined in this trade and the Forest employees had to be silent spectators to the destruction of forests. Such activities have assumed a uncontrollable dimension leading to a very pathetic forest scenario in the whole of North-East.

Encroachment of forest areas of Assam started since 1950. The encroachers could be categorized into four groups: (I) migrants from erstwhile East Pakistan (now Bangladesh), (ii) Flood-affected people from Assam, (iii) migrants from neighbouring States, and (iv) people from nearby villages. Practically there has been no serious effort on the part of the government to evict the encroachers. It is alleged that the encroachers were and still are backed by one or the other political party. Even if they were not, the Government action was so late that the encroachers became a force to be reckoned with by the time the Government decided to take any action. It is also alleged that there were corrupt officials to protect the encroachers.

A few forests, specially those on the banks of the river Brahmaputra have been badly affected by the erosion of the river banks. The erosion of the river bank is again a result of large–scale deforestation. The rainwater from the catchment areas of the river flows to the river at a high speed in absence of any resistance that was earlier offered by the trees of the forest. Such rapid flow of water causes erosion in the hills, floods and cumulatively increasing siltation of river bed in the plain. Siltation raises the river bed which decreases the water carrying capacities of the rivers and thereby increases the havoc caused by the floods.

The partition of the country in 1947 brought in many refugees to Assam. Many reserved forests were de-reserved to rehabilitate the refugees. In the process, some ethnic landless farmers were also allotted land in these reserves. For the first time, people of Assam got the impression that "reserves are not inaccessible''. This change in the concept about government land or property title had a great impact on the forests. Besides, the consecutive batches of refugees from erstwhile East Pakistan cleared-off many forests and settled there. Many of these refugees, who were good at carpentry work, had set up carpentry shops and used to extract timber from the forests to carry on their business.

Plantation (undertaken by the Forest Department) was a great farce. Plantation works were shown in papers; in reality there was no plantation work for years together. The records regarding new plantation do not match with the real work carried out in the field. The money meant for plantation had been diverted elsewhere. Even if planted, the saplings were never protected. Such callous act on the part of the Government led to degeneration and eventual diminishing of forest areas in the state.

2.5 CONCLUSION :

N E Region is unique in its feature compared with other parts of the country. This region reflects the ethnic diversity and their economic conditions are very much varied. It consists of rich natural resources which are not utilised effectively and efficiently. Since the region has vast untapped natural resources and high amount demand potential, people from different parts of the country and neighbouring nations specially Bangladesh have maigrated to this region to exploit the situation.

This ultimately resulted in excess exploitation of resources which ultimately resulted in unsustaianbel extraction of forest products and services.

CHAPTER - 3 :STUDY-AREA PROFILE

3.1 DISTRICT PROFILE :

Assam has twenty three districts at present. Each and every district is more or less equally endowed with natural resources – specially forests. In this study, two districts namely Sonitpur and Lakhimpur have been taken up for detailed study for the reasons of (1) large forest coverage, (2) proximity of the study team's location to the forests (3) Area bordering another State, (4) prone-ness to natural calamities like flood, erosion, etc; and (5) heterogeneous demography. These two districts are also insurgency-affected districts. From topography point of view also these two districts represent the hill-plain-riverine characteristics prevalent in most districts of Assam. The location map of Assam and its forest areas, location map of Lakhimpur District, and location map of Sonitpur District are presented in Annexure II. The brief information and statistics of the two districts considered in the study are as under:

3.1.1 LAKHIMPUR DISTRICT :

This district is located in the north bank of the mighty river Brahmaputra.

A. Location and Extent :

The district is situated in the north eastern part of Assam.

Latitudes : 26° 45′ N and 27° 35′ N

Longitudes : 93° 40′ E and 94° 53′ E

Area : 3,00,800 ha (3.84 % of area of the State)

B. Total Population : 7, 51, 517 (3.35 % of the State)

Male : 3, 89, 125 (51.78 % of total)

Female : 3, 62, 392 (48.22 % of total)

Rural population : 7, 02, 387 (93.46 % of total)

Urban population : 49, 130 (6.54 % of total)

Percentage of Growth : 55. 91

C. Literacy (1981-91) :

Total Literate 3, 54,137 (47.12 %)

Male : 2, 13,460

Female : 1, 40, 677

D. Administrative set-up

No. of sub-divisions : 2

a) North Lakhimpur b) Bihpuria

No. of Blocks(1997): 7

No.of Revenue circles: 7 (1991)

Mahkuma Parisads : 2 (1997)

No.of Gaon Panchayats 60

Total Villages : 1177

Inhabited villages : 1140

Uninhabited villages : 37

Density per.Sq.K.m. : 330

No.of occupied

Residential houses : 1,19,270

No. of households : 1,20,663

3.1.2 SONITPUR DISTRICT

This is an adjoining district of Lakhimpur district and is also located in the north bank of the mighty river Brahmaputra.

A. Location and Extent :

The district is situated in the northern part of Assam.

Latitudes : 26° 30′ N and 27° 02′ N

Longitudes : 92° 17′ E and 94° 47′ E

Area : 492145 ha (6.27% of geographical area of the State)

B. Total Population: 1, 424,287 (6.35 % of the state)

Male : 7,44,778 (52.30 % of total)

Female : 6,79,509 (47.70 % of total)

Rural population: 1, 320, 379 (92.70 % of total)

Urban population: 103, 908 (7.30 % of total)

Percent of Growth: 56. 49

C. Literacy (1981-91) :

Total Literate 5, 53,471

Male : 3, 43,761

Female : 2, 09,980

D. Administrative set-up

No. of sub-divisions : 2

a) Tezpur b) Biswanath Chariali

No. of Blocks (1997): 14

No.of Revenue circle: 7 (1991)

Mahkuma Parisad : 2 (1997)

No.of Gaon Panchayat 159 (1997)

Total Villages : 1753

Inhabited villages : 1691 (1991)

Uninhabited villages : 62 (1991)

Density per.Sq.K.m. : 268

No.of occupied

Residential houses : 2,48,936

No of households : 2,52,000

3.2 FOREST PROFILE OF SONITPUR DISTRICT :

Being located at the foothills of the Himalayan range extended up to Arunachal Pradesh, this district is rich in forests. Various kinds of trees and wild animals are found in the forests of this district. The main belt of forests are situated on the Northern part of the district along the interstate boundary between Assam and Arunachal Pradesh whereas Bhomoraguri R.F. is situated at the Nothern fringe of the river Brahmaputra. The isolated Singri Hills R.F is situated near Brahmaputra. All the R.Fs except the Bhomoraguri and Singri Hill are intercepted by numerous streams most of which are perennial in nature generally running from North to South to drain into the Brahmaputra on the south.

3.2.1 GREEN/SEMI EVER–GREEN FOREST

The forests in the district are confined to the northern part in the foot hills of Arunachal Pradesh. There are ten R.Fs in the district of which five R.Fs namely Chariduar R.F., Balipara R.F., Naduar R.F., Behali R.F., and Biswanath R.F. have semi evergreen forest. The species grown in these areas are Bansum (*Phobe Goalparendia*), Mekhai (*Phobe Booferiana),* Khakan (*Duabanga Sonnerationdes*), Gamari (*Gmolina Arborea*), Nahar (*Mesua Ferra*), Bola Sopa (*Morus Laevigate*), Tita Sopa (*Michelia Champace*), Bhelu (*Terramelia Nudiflora*), Jutuli (*Alitingia Excelya*), Gonsoroi (*Cinnamomum Cecidodpana*) and miscellaneous species. There are large scale encroachments in the these R.F.s. The entire Gohpur R.F. has been encroached, and now there is no trace of any forest., there is no existing forest as the entire area has been converted into cropland. There is large scale encroachment in the Balipara R.F. also. The area occupied by the semi evergreen forests are 76231 hectares or 15.49 percent of the total geographical area. There are also evergreen forests outside the R.F. boundary. The forest area estimated outside R.F. boundary is 155 hectares. Sonai-Rupai wild life sanctuary existing to the north of Chariduar R.F. have also evergreen species. The area covered by semi evergreen forest within the notified boundary is estimated to be of the order of 76076 hectares or 58.68 per cent of the notified forest area.

3.2.2 DECIDUOUS FOREST :

Only in the Laokhowa R.F. deciduous species are seen. This reserve falls mainly in the Nagaon district of Assam and is situated in the southern bank of the river Brahmaputra. A small portion of this reserve forest falls in the Sonitour district. The dominant species of this R.F. are Ajar (*Lagerstraoomia Fkisregihas*), Sisoo (*Dalbergia Sissoo*), and Teak (*Testona Grandias*). Grassland occupies a considerable area in this RF. The Panpur R.F. situated on the northern bank of the Brahmaputra is covered mainly by grasses. The area occupied by deciduous species is 313 hectares or 0.24 per cent of the total notified forest area. The grasslands occupies 3969 hectares accounting for 3.11 per cent of the notified forest area.

3.2.3 DEGRADED FOREST OR SCRUB LAND :

It is believed that large tracts of once luxuriant forest have now become degraded forest or scrub land due to encroachment or unauthorized cutting of trees. Such areas are seen in almost all R.Fs. These areas are distinctly identified due to variation in contrast to the notified forest boundary. The area under this category is estimated to be 22,156 hectares covering 17.13 percent of the total notified forest area.

3.2.4 FOREST PLANTATION :

Forest plantation has been taken up inside the notified forest boundary as well as outside the R.Fs. These are seen mainly in Balipara R.F.s for Sal (*Shorea sobusta*) and in the Singri hills for Teak (*Testona Grandias*) plantation. The area estimated under this category is 2313.00 hectares. There are forest plantations outside the notified forest area of the order of 125 hectares. Inside the notified forest boundary the area estimated is of the order of 2188 hectares or 1.69 percent of the total notified forest area.

3.2.5 MARSHY/SWAMPY LAND :

These are wasteland formed in natural depressions within the flood plain. Locally these areas are known as " beels ''. The water spreads in those areas are distinct in the kharif season, aquatic plants like water hyacinth are spread over the water in the kharif season. Generally Rabi Crop such as Boro paddy is cultivated near these areas when water level recedes during this season. The area estimated under this category is of the order of 7688 hectares or 1.56 per cent of the total geographical areas.

3.2.6 LAND WITH OR WITHOUT SCRUB :

These areas considered as wasteland, occupy mostly the uplands. This type of land exists mainly in the Missamari area of the central part of the district. These areas look like degraded forests in certain parts. The area under such category is estimated to be 7813 hectares or 1.59 per cent of the total geographical area.

3.2.7 WATER BODIES:

Rivers/Stream, lake and river sand are included in the category of water bodies. The area estimated under the category of water bodies for rivers and lakes are of the order of 72044 hectares and 813 hectares respectively covering 14.64 and 0.17 per cent of the total geographical area. The area estimated under river sand are of the order of 424669 hectares.

3.2.8 GRASSLAND/GRAZING LAND :

Grasslands are normally seen on the sandbars of the river Brahmaputra and along its banks. Reserve forest such as Panour R.Fs are covered mainly by grasses. Small patches of grazing land where fertility is not enough for cultivation remain barren. The area estimated under this category is of the order of 24375 hectares or 4.95 per cent of the total geographical areas.

3.3 FOREST MANAGEMENT IN THE SONITPUR DISTRICT :

Sonitpur(East) and Sonitpur (West) Forest Divisions were earlier a part of the Darrang Division which included forests of present Darrang, Sonitpur, and Lakhimpur Districts. In the year 1971 Darrang Division was reconstituted along with the creation of present Lakhimpur Division. The Darrang Division was eventually splitted into two forest divisions taking Jia-Bhorali river as the inter-Divisional boundary. The western part of river Jia-Bhoroli is called Sonitpur West Forest Division with head quarter at Tezpur and the eastern part of Jia- Bhoroli river is called Sonitpur East Forest Division with head quarter at Biswanath Chariali. Both the offices are under the administrative control of Central Assam Conservator of Forests, Tezpur.

3.3.1 SONITPUR (EAST) FOREST DIVISION :

The Divisional Forest Office is situated at Biswanath Chariali. The Division has three Ranges. The Range Offices and the Beat Offices under them are mentioned below:

Range offices :

1. Diplonga Range Office
2. Pabhoi Range Office

3. Borgang Rang Office

Beat Offices :

Under Diplonga Range Office	a) Hatipati Beat Office
	b) Morisuti Beat Office
	c) Mahalaxmi Beat Office
Under Pabhoi Range Office	a) Tarajuli Beat Office
	b) Diring Beat Office
	c) Samajuli Beat Office
Sub Beat Office	i) Upper Diring Sub- beat Office
	ii) Mikir Sub-beat Office
	iii) Bharalijuli Sub –beat Office
Under Borgang Range Office	a) Rangaraha Beat Office
	b) Bedati Beat Office
	c) Singlijan Beat
Check Gate	1. Jia –Bhoroli river bridge (Eastern side)

3.3.2 SONITPUR (WEST) FOREST DIVISION

The Office of the Divisional Forest Officer is situated at Tezpur. The Range Offices and the Beat Offices under this Division are mentioned below:

Range Office :

1. Central Range Office at Amaribari.
2. Charduar Range Office at Charduar
3. Dhekiajuli Range Office at Dhekiajuli
4. Sadar Range Office at Tezpur
5. Departmental Logging Range at Bhotapara (Dhekiajuli)

Beat Offices :

Under Central Range Office 1. Gabharu

Under Charduar Range Office 1. Bhalukpung 2. Gamani

Check gates : Chariduar, Dhekiajuli, Gabharu beat, Amaribari, Koliabhomora, Gotlong, Hugrajuli,

3.4 THE RESERVED FORESTS OF SONITPUR(WEST) DIVISION

3.4.1. CHARDUAR RESERVED FOREST

Area :- 46,107.24 ha.

This RF is a semi evergreen forest with the Bonsum and Amari along with other economically important tree species like Mekhai, Khakan, Gamari, Nahar, Bhola sopa, Tital sopa, Bheleu, Jutuli etc. There are 7 Forest Villages in this R.F. with total area of 996.281 ha. Initially, this R.F was very big R.F and was very rich in forest wealth. But now about ten thousand encroachers have entered into this R.F and felled valuable trees and have illegally occupied about 6855 ha of land. Large scale, organised encroachment started in this R.F from the early part of 1966. Large group of people belonging to Bodo community coming from different districts of Assam illegally entered into this R.F and started felling of trees and clearing of forest land for settlement in a very organised manner. The encroachers have formed societies and it would be next to impossible for the Govt. to evict the encroachers. Unabated tree felling and dispatch of timber by the passenger trains are going on. A meager seizure of 918.5 cubic metre of timber valued at Rs. 80.5 lakh has been reported during the years 1996 to 1999. In this R.F under Amaribari range 725 ha of land has been encroached by Arunachal Pradesh Forest Department and they have built their offices and have planted 100 ha plantation.

This R.F., located in the foothills of A.P., has been encroached by unscrupulous encroachers for extension of cultivable land resulting in decreasing of habitat for the large herds of wild animals. Wild elephants have caused extensive damage to crops and residential of villagers and have killed many persons each year.

3.4.2 BALIPARA RESERVED FOREST

This R.F., having an area of 18,974 ha, was constituted as Reserved forest by notification on 28 th January, 1874. It is the oldest R.F of the Sonitpur(West) division and one of the oldest reserves in the province of Assam. This RF is a semi evergreen forest having Bonsum and other economically important tree species like Mekhai, Khakan, Gamari, Nahar, Bhola sopa, Tital sopa, Bheleu, Jutuli etc. There are 7 forest villages in this R.F. covering a total area of 992.543 ha. In the

year 1893 or so one Saw Mill was established at Balipara for supplying of packing cases and other timbers to the tea industry. Earlier, this forest supplied timber for plywood industry and railway sleepers besides the supplies for local construction works. onwards demand of Bonsum increased. In the year 1928 about 20sq. Miles of Balipara Reserve forest was deforested for rubber plantation. With the introduction of Rangia-Rangapara section of Eastern Bengal Railway line this reserve forest drew attention of encroachers and illegal timber traders. Systematic encroachment in this R.F by people belonging to Bodo community from far flung areas and people from other country and states have reduced the forest area. In Bhalukpung area, A.P government encroached 300 ha of land for construction of Tourist Lodge, Road, Gate and Police station. Now-a-days wild elephant have caused extensive damage to crops and residential areas in the vicinity of the forests..

3.4.3. SINGRI HILLS RESERVED FOREST

Area :- 486 ha.

This R.F was constituted in 1883. At that time Sal was mostly available in this R.F. In the year 1935 the Singri Hill Reserve was allotted to the Sal Conversion Working Circle for annual plantation of teak. So, this forest have an area with teak plantation also. It is situated by the side of the river Brahmaputra and has been eroded heavily. Almost 50 percent of the R.F has been merged on the river bed. The nearby flood affected people have settled down in the R.F areas and are earning livelihood by extracting and selling the forest produces. Only one forest village with an area of 44.955 ha was found in this R.F during the survey.

3.4.4 BHOMORAGURI RESERVED FOREST

Area :- 156 ha.

This R.F was constituted in 1875 to provide fuel-wood for Steamers plying on the river Brahmaputra at that time. There is no forest village in this R.F. At the time of construction of National Highway 37-A (to connect the Koliabhomora bridge with NH-37 and NH-52), through this RF, a portion of the forest had been destroyed. This R.F

is surrounded by villages inhabited mostly by Bangladeshi immigrant. They depend on this R.F for fodder and fuel. Now this forest has a good teak wood plantation.

3.4.5. CHENGALIMARI RESERVED FOREST

Area :-340 ha

The Sal bearing areas of this R.F was brought under Sal improvement Working Circle under Jacob's Working Plan (1941-42 to 1950-51). Earlier this R.F had a good forest coverage but from 1980 this forest has lost considerable area due to the illegal extraction and encroachment. More than 50 per cent of the forest area has been destroyed due to illegal extraction. People from various parts of the State have encroached this R.F. There is no forest village in this R.F.

3.5 THE RESERVED FORESTS OF SONITPUR (EAST) DIVISION

3.5.1. NADUAR RESERVED FOREST

Area :- 28,142 ha

Earlier this R.F. was an evergreen and semi-evergreen forest with softwood bearing tree species suitable for plywood industry, and hardwood trees for railway sleepers. Besides, wood from this R.F were being used for local construction works in the Darrang district. Earlier, Simul was the main species under this R.F with good yield and natural regeneration. But People from Assam, Nepal, and Arunachal Pradesh have encroached more than 60 percent of the R.F in a systematic manner. Encroachers have established villages and constructed more than three thousand huts besides converting good forest land into agricultural fields. There are four Forest Villages in this R.F

3.5.2. PANPUR RESERVED FOREST

Area :- 6095.50 ha

This R.F is covered mainly by grasses, small patches of grazing land where fertility is not enough for cultivation. Forest Department of Assam has given proposal to the Central Govt. for merging this R.F with the Kaziranga National Park. This R.F is bounded by various rivers and is under the threat of erosion. During flood, animals

from Kaziranga National Park come to this R.F for shelter. This forest does not have valuable trees. Simul, Azar, Sisso trees are available in this R.F. More than 30 per cent of the R.F land under this R.F has gone to encroachment. Scheduled caste community depending mainly on fishing occupies the forest area. These people cultivate rabi crops in winter season in the char area of the R. F.

3.5.3. BEHALI RESERVED FOREST

Area :- 14016 ha

This R.F was of evergreen and semi-evergreen type. Earlier many of the species available in this Reserved forest were used for plywood industry and as railway sleeper besides being used for local construction works.. An area of 1360 ha of Behali R.F with stock of Pansopa was brought under Pansopa working circle in Jacob's Working Plan (1941-42 to 1950-51). Selection-cum-improvement felling was prescribed with assisted natural regeneration. Rotation 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. The regeneration of Pansopa etc. were found to be very satisfactory at the time of removal. The evergreen and semi-evergreen forests of Behali R.F was brought under Local Trade Working Circle in Mr. M. Islam's Working Plan (1961-62 to1976-77). Encroachment in this R.F started from 1980. According to the forest department the total encroached area is 3,375, ha but in reality the actual encroachment area is more than 3500 ha. Nepali, Karbi, Bodo and Ex-tea garden communities encroached this R.F and constructed more than 1000 huts. In Behali reserved forest, people from Arunachal Pradesh have encroached huge area and have settled there by constructing permanent buildings. A.P govt. has constructed many Govt. Offices and Schools in this R. F by clearing large R. F areas.

3.5.4. CHENGALIJAN RESERVED FOREST

Area :- 1400 ha

This R.F was evergreen and semi-evergreen, tree species like Uraium, Gandasaroi, Sisso were available in this R.F.People from various parts of Assam mainly Bodo, Ex-tea Garden labourer and Nepali encroached more than 300 ha of this R.F area

since 1980 onwards, they cleared forest areas and cultivated crops in summer as well as in rabi seasons. Arunachal Pradesh govt. encroached 100 ha of forest area constructing some buildings over it.

3.5.5. GOHPUR RESERVED FOREST

Area :- 13,310 ha

Gohpur R.F. was constituted in 1915. At the time of creation of this R.F, it was a dense forest, with dry Sal bearing trees in one patch of the R.F. There are 17 numbers of forest villages in this R.F. Gohpur R.F was brought under Kathalsopa Working Circle under Jacob's Working Plan (1941-42 to 1950-51). The Sal bearing areas of this R.F was brought under Sal improvement working circle under Jacob's Working Plan (1941-42 to 1950-51). The patches of Sal areas of this R.F. were allotted to Sal Working Circle under Mr. M Islam's Working Plan (1961-62 to 1976-77). A large area of this R.F is covered by grasses (hay). Earlier, people from various parts of the State used to collect hay from this R.F. Presently, there has been large scale encroachment in this R.F and entire forest land (100 per cent) had been converted to residential areas and crop land. Encroachment in this RF started since 1970.. Ethnic clashes between two communities in 1983 and 1989 resulted in more encroachment by Bodo community in this R.F with a view to occupying more area of the R.F and to become a major community in this R.F. Several temples, churches, School buildings have been constructed within the R.F. People from Arunachal Pradesh have encroached 245 ha and have constructed more than 200 buildings.

3.5.6 BISWANATH RESERVED FOREST

Area :- 10,561 ha

In the year 1917 this was forest was declared as R.F and first addition to this R.F was done in 1933. This R.F was earlier covered with valuable trees. Area of this R.F has been reduced due to erosion, encroachment, and destruction by illegal extraction. More than 9000 ha of land has been encroached by various communities, and is inhabited by more than 1000 households. The remaining area is covered by highly degraded forests and is also being encroached at a fast rate. It is

feared that within a short time no forest land will be left out just like the case with Gohpur RF. There are two forest villages in this R.F

3.6 FOREST MANAGEMENT IN THE LAKHIMPUR DISTRICT

All forests of Lakhimpur district fall into Evergreen and Semi-Evergreen category and take a striking prominent appearance in the Ranga, Kakoi and Dulung Reserved Forest. Holong (Dipterocarpus macrocarpus) Sam (Artocurpus chaplasha) are the major species found in the district. The total area under this category is 20,889 hectares and occupies 6.94 per cent of the total geographical area of the district. Degraded forest consists of an area of 1,629 hectares and accounts for 0.54 per cent of the total geographical area of the district. The area under Marshy/Swampy land is estimated to be around 4,109 hectares covering 1.37 per cent of total geographical area.

In November, 1952 the Reserves of North Lakhimpur Sub-division were transferred to Darrang Division prior to which they were under the D.F.O Lakhimpur Division with head quarter at Dibrugrah. In October, 1971 the Reserves under North-Lakhimpur sub-division but administrated by D.F.O Darrang division were again handed over to D.F.O Lakhimpur Division with head quarter at North Lakhimpur Town. Following are the RFs of Lakhimpur Forest Division

1. Ranga Reserved Forest

2. Kakoi Reserved Forest

3. Dullong Reserved Forest

4. Pabha Reserved Forest

5. Kadam Reserved Forest

3.6.1 RANGES AND BEATS OF LAKHIMPUR FOREST DIVISION

Range Offices

1 NORTH LAKHIMPUR

2 HARMUTTY

3 PROTECTION

4. HEADQUARTER

Beat Offices under NORTH LAKHIMPUR RANGE

1. Pathalipam

2. Tarioni

3. Kakoi

Beat Offices under HARMUTTY RANGE

1 Harmutty

2. Phulbari

3. Bagali

4. Kimin

3.7 THE RESERVED FORESTS OF LAKHIMPUR DIVISION

3.7.1. RANGA RESERVED FOREST

Area :- 8529.71 ha

This forest was declared as RF in 1919. The type of forest under this RF was included in Tropical Evergreen forest type, but due to wanton felling of trees and the large scale encroachment, the type of forest has been changed gradually. As of now, the encroached area in the R.F. has been estimated to be 1518 ha. This RF faced the problem of encroachment by the Nishi people of A.P who have formed a few villages at the foothills across the interstate boundary. Govt. of A.P has erected High power electric line through this R.F for which they destroyed part of the R.F which violated the Forest Conservation Act 1980 and the Rules there under. The RF has got a good population of wild animals like elephant, Samber, Barking deer etc. with rich fauna and reptiles.The entire patch of this R.F is an effective elephant corridor which facilitates movement of wild elephant from Ranga RF to A.P. and

vice versa. The said electrical transmission line has caused a barrier all across the said elephant corridor. This R.F is also the home of many endangered, beautiful wild orchid which bears great value.

3.7.2 KAKOI RESERVED FOREST

It was constituted as RF in the year 1919 covering an area of 4415.03 ha, to which later on another 524 ha area was included. Earlier, this RF was rich with thick forestry comprising of hundreds of valuable trees. Encroachment took place in Kakoi R.F area since long ago and the encroachers constituted villages there. As per the present position of encroachment there are 69 no of households of Nishi people occupying an area of 870 ha. Fresh encroachment is going on unabated and the Government of Assam has failed miserably in evicting the encroachers.

3.7.3 DULLONG RESERVED FOREST

Area :- 9900.03 ha

It was declared as RF in the year 1913. Earlier, this RF was a beautiful one with thick forestry comprising of varied valuable species. In this forest, varieties of wild orchid existed earlier, but due to heavy deforestation, orchid species have also been destroyed in large scale. Since 1977 this R.F has been also facing encroachment problem. The Adi tribe of A.P had encroached the R.F land and constituted many villages. According to the forest officials, the encroachment is continuing in a well planned and organized manner.

3.7.4 PABHA RESERVED FOREST

It was constituted in the year 1920. In 1959 it was converted to game reserved forest status by Corn. Mill Roy. Out of the total area of this R.F., presently sixty per cent area is under encroachment. Now it is alleged that political leaders had helped encroachers to settle in the R.F. Status of Forest is semi deciduous wet land evergreen forest. At present there are 2 beels in place of original 17 beels. Encroachment in this RF started since 1970 and then in the later part of the 1980s, and reached its peak in the middle of 1990s.

3.7.5 KADAM RESERVED FOREST

Kadam R.F. was constituted in 1920 with an area of 3625.91 ha. Major plant species in this R.F are Owtenga, Borpat, Gamari etc. This R.F was earlier beautiful with thick forestry comprising of hundreds of valuable tree species. Now only 25 per cent of the area is free from encroachment, and rest 75 per cent area has been encroached. This R.F is also affected by flood every year. Forest department has undertaken 40 ha of new plantation successfully. The neighbouring village people are very much poor and they depend on this R.F for their fuel wood. Fuel wood is also extracted regularly for sale in the urban markets. According to the DFO, every effort in motivating the land-less flood affected people towards plantation work had gone in vain. In Jan, 2000 a meeting was convened at Kadam with the nearby villagers in which JFM policy was discussed. Though everything seemed to be all right, in night on 12.1.2000 the 100 ha plantation at Kadam R.F. raised during 1998-99, was set on fire by unknown miscreants, where 11 ha of plantation area got completely burnt. Moreover, illegal ploughing in the plantation area is still going on. According to the DFO, illegal activities of the encroachers are to be dealt with strong hands which is not possible with the existing manpower and infrastructure of the forest department.

3.8 CONCLUSION :

The scenario of reserved forests in the study area has undergone a tremendous change during the last twenty years. There were abundance of forest resources in these seventeen RFs but due to heavy encroachment as well as failure on the part of the State machinery to regulate and check them led to huge destruction of these resources. At present, most of the areas have been transformed into habitats. Continuous felling of trees is going on unabated. Though the Government records indicate huge cover of forests in the area, the physical verification by the study team reveals a complete different picture.

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CHAPTER 4: FOREST POLICY IMPLEMENTATION AND ECONOMIC INSTRUMENTS

4.1 MAN AND ENVIRONMENT

Man and environment are the two subsystems of the global system. The human race has evolved and has been developing through ages with the blessings and resources offered by nature. The science and technology have been developed through the understanding of the natural phenomenon. Sir Isaac Newton developed the theory of gravitation from the natural event of falling of an apple. Since the beginning of the human race, human being has been realizing its dependence on nature's wealth. Right from the nomadic life till today the human society has been dependent on the environment. Realizing the importance of a healthy and resourceful environment, human society has been practising certain norms, rituals, and functions to ascertain that the environment does not degrade to a state that could be disastrous for the human society to survive. In Hindu mythology, there are numerous stories of great Sages who were concerned about preservation of the ecological system. The Sages were living in 'Ashrama' wherein high order bio-diversity was maintained.

The human society developed various ways and means for the conservation of the environment. It is interesting to note that in various societies throughout the world , there are certain customs meant for conservation of bio-diversity. Some of these customs were framed as part of religious faiths, while some other norms were in practice as 'superstitions'. But all these measures worked very effectively and could contribute to the preservation of the environment. Unfortunately, the civilized society has started ignoring these norms and has been engaged in destroying the environment for short-term benefits.

4.1.1 TRADITIONAL APPROACH TO ENVIRONMENT PRESERVATION

In each and every ethnic society of India , various traditional practices are prevalent which are meant for preservation of the environment. In many societies certain species of trees are considered as god , and is worshiped . For example, the Banyan tree is generally treated as abode of gods, and hence this species is protected. In lower (Eastern) Assam , there is a festival called *'Bhotheli'* in which the Banyan tree

is worshipped and people take pledge to protect it. The Tea Tribes in Assam celebrates a festival known as '*Karam Puja'* in which a certain species of tree is to be planted and worshiped. Assamese people celebrate '*Kati Bihu*' in the month of October, and as a part of the function "*Tulsi*" is to be planted in each household. Again in the Assamese society , there is a custom that on the seventh day of attaining puberty by young girl, the girl is given a holy bath near a newly planted banana tree.

Since people were highly dependent on herbal medicines, certain species of tree were planted and protected for their medicinal values. There were certain customs meant for protecting fruit-bearing trees from various insects and diseases. Many customs were introduced to protect mother nature from haphazard destruction, though the common people did not know the significance.

In Assam, the concept of 'reserved forest' is very old. Some forests in each locality used to be declared as the abode of evil spirit or gods. People were told that entering into the forest or extracting any product from that forest would lead to death of the intruder and his family members. Thus the bio-diversity in these forest was preserved. These forests were the store houses of various flora and fauna. These species used to propagate to other forests through the natural phenomena. In a similar manner certain ponds or water bodies were declared to be inhibited by evil spirit and people were cautioned not to retrieve anything from that. During flood, water from these ponds used to spill over and the aqua species could be propagated to other areas.

A religious faith in the Assamese society prohibits cutting of any plant during the four days starting from 22n^{d} of June (longest day of the year) each year. People won't cut bamboo plant on Tuesdays and Saturdays throughout the year. Cutting of bamboo is also not done when the shoots come out from the mature roots of the bamboo.

There are many such practices prevailing in various societies which were introduced with a view to preserve forests. In many communities forests was considered to be a community property and the whole community felt itself responsible towards its preservation. However, with the increase in population, and with the spread of

modern education, people started defying the customs and indiscriminate destruction of such community property began.

4.1.2 GOVERNMENT EFFORTS FOR FOREST PRESERVATION

The British took control of the North-East in the year 1826. Initially they were interested in tea plantation in this region. Seeing the huge reserves of forest resources, however, they began to exploit the timber from this region . With the laying of railway lines, the exploitation rate also increased. Soon they realized that unplanned extraction of forest products might lead to a situation of non-availability of the required species. Thus came the need for forest control.

4.1.2.1 Initiation of Forest Management Schemes:

Forest management was visualised in Assam for the first time in the year 1850 when the then District Collector of Kamrup District suggested to 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 cess as was prevailing at that time. The tax proposed was two and half annas for each tree. In addition, the collector also proposed to establish a check on the felling of young trees so as to ensure natural reproduction of the forest and to prevent deterioration of the forest. During 1852 the above system was abolished by the Board of Revenue and that of forming certain tracts of forests to the higher bidder for a period not exceeding 5 years at a time was introduced. Restriction as regards sizes were abolished, it being left for future consideration. This system was extended to Darrang District by 1861. In 1861 a new revenue system was introduced and Mauzadars were appointed and the forest and their protection were left to their care, along with the rent of the land. A scheme of preparing a general forest map of the lower provinces in Bengal was completed in 1868-69 as prelude to the appointment of the first forest officer in Assam in the same year. With his arrival, special examination with a view to selecting forest (Reserves) commenced in 1870-71 and experimental timber and plantation work were started in the provinces in the same year i.e. 1870-71. As a result of the above special examination, Balipara, was constituted as Reserved forest by a notification dated 28th of January, 1874. Balipara is the oldest reserve forest of the

division and one of the oldest reserves in the province of Assam too. In the year 1874-75 the then Tezpur Division was formed with an area of 179.6 square miles of Reserved Forest embracing the reserved forests of present Nagaon District with its head quarter at Bhairabighat. As a first step towards forest conservancy rigid fire protection along with pressing down the grasses surrounding the Sal area of Balipara was introduced in the year 1874-75.

4.1.2.2 Introduction of The Working Plans

Forest Working Plans were introduced in order to manage the forests in a scientific way. The plans used to contain the plantation scheme, harvesting norms and quantity, and other forest maintenance related matters. The department of forest prepares working plan with objectives to provide for a sustained yield of timber and fire-wood to meet the existing demand in the market as far as possible, without deteriorating the existing growth stock and also for preserving the existing limited stock. The Working Plan prescribed following methods of treatment for sustainable growth of forest.

a. Concentrated operations for assisted natural regeneration in a specifically earmarked regeneration block in the semi-evergreen forests and selection marking in areas outside the regeneration block.

b. Clear felling and raising of plantation of mixed hardwood, match-wood and integrated industrial wood-cum-plywood in compartments specifically selected for each.

c. Exploitation of Simul and Borpat subject to a limit of minimum exploitable girth in overlapping working circle.

d. Planting up the Euphorbiaceous scrub area by quick growing species with the aim of getting firewood.

Working Plans so far covered in the District are as below:

1. Conventry's Plan for Sal Forests (1906–07 to 1915–16)
2. Bor's Working Scheme (1935–40)
3. Jacob's Working Plan (1941-42 to 1950–51)

In these Working Plans as many as 10 Working Circles were constituted as mentioned below :

i) Bonsum Amari Working Circle.
ii) Amari Working Circle
iii) Pansopa Working Circle
iv) Kathalsopa Working Circle
v) Sal Improvement Working Circle.
vi) Khair Working Circle
vii) Soft Wood Working Circle
viii) Mixed Evergreen and Deciduous Working Circle
ix) Plantation Working Circle
x) Firewood Working Circle

4. Mr. M. Islam's Plan (1961-62 to 1976-77)
5. Working Plan by Mr. K.C.Das (1980-81 to 1994 –95)

After the working plan of Mr. K .C. Das no working plan has been prepared by the Forest Department of Assam. According to the forest officials, due to the paucity of fund Govt. has not been able to prepare the Working Plan.

4.2 SALIENT FEATURES OF VARIOUS FOREST ACTS:

4.2.1 THE GOVERNMENT FOREST ACT, 1865:

The major objective of this Act was to establish government's control over forests. This Act empowered the government to declare any land covered with trees, bushwood or jungle as government forest by notification. It was stated in the Act that such notification should not affect any existing rights of individuals or communities. At the same time the governments could prescribe punishment for the breach of the provisions of the Act and rules were laid down for confiscation of implements used in the offences and for the arrest of offenders. Restrictions were imposed on all the basic activities carried out in the forests by the tribal people.

4.2.2 INDIAN FOREST ACT, 1878 :

In this Act, forests were classified into the following three categories:

1. Reserved forests
2. Protected forests
3. Village forests

Government had powers to reserve any forest according to the provision of the Act. Reserved forests can be defined as --- forests, where everything is restricted unless permitted. Protected forests are forests where everything is permitted unless restricted. This Act gave he authority to the government to cancel or assign the rights to village community to extract forest produce from the village (communal) forests. Thus the communal ownership of forests was de-recognized. Even the large areas of forests under the Princely States were also drawn in to the control of the British rulers.

4.2.3 NATIONAL FOREST POLICY, 1894 :

The policy recognized the close relationship between forestry and agriculture and argued that the justification for forestry activities springs from their direct and indirect contributions to the development of agriculture. Therefore, even if certain areas were found to be suitable for growing good quality timber, they were not utilized for forestry.

The basic aims of this policy were :

(a) State forests are to be administered for public benefits.

(b) Forests situated on hill slopes should be maintained as protected forests to preserve the climate and physical conditions of them from the devastating action of hill torrents,

(c) Forests which are reservoirs of valuable timber should be managed on commercial lines as a source of revenue to the State,

(d) Wherever the effective demand for cultivable land exists and can only be supplied by forest area, the land should ordinarily be relinquished without

hesitation. It should be done (i) without honeycombing the forest, and (ii) without any encroachment to the forest area.

(e) Forests that yield only inferior timber, fuel-wood or fodder or are used for grazing should be managed mainly in the interest of the local population.

The policy had classified the forests into the following four categories:

(a) Forests, the preservation of which is essential on climatic or physical grounds. These forests are beyond any comparison with any other interests.

(b) Forests, which afford a supply of valuable timber for commercial purposes. This type of forests included great tracts from which supply of valuable timber like teak, sal, deodar and the like was obtained.

(c) Minor forests included tracts which produced only inferior sort of timber used mainly as fuel-wood.

(d) The Pasture lands were forests only in name, and were suitable as pastures and grazing grounds.

4.2.4 INDIAN FOREST ACT, 1927 :

It was a modified version of the Indian Forest Act, 1878 to the effect that degree of punishment for the 'acts in contravention of notification' in the Protected Forests was raised.

4.2.5 THE NATIONAL FOREST POLICY, 1952:

Though this Act was formulated and passed by the indigenous government in the post independent era, it affirmed that the fundamental concepts of the 1894 "still hold good". The policy of 1952 was formulated on the basis of six paramount needs of the country. They were :-

(1) the need for evolving a system of balanced and complementary land-use.

(2) the need for checking --

(a) denudation of mountainous regions,

(b) the 'erosion progressing space' along the treeless banks of the great rivers leading to ravine formation.

(c) The invasion of sea-sands on coastal tracts.

(3) the need for establishing tree lands, wherever possible.

(4) The need for ensuing progressively increasing supplies of grazing, small wood, and firewood.

(5) The need for sustained supply of timber and other forest produce required for defence, communications and industry.

(6) The need for the realization of the maximum annual revenue.

The policy suggested the following classifications of forests.

(1) Protection forests, --- forests which must be preserved or created for protection of physical and climatic conditions.

(2) National forests --- forests to be maintained and managed to meet the needs of defence, industry, etc.

(3) Village forests --- those which have to be maintained to provide firewood

(4) Tree lands --- patches needed for the amelioration of the physical conditions of the country.

4.2.6 THE NATIONAL COMMISSION ON AGRICULTURE, 1976 :

The Commission advocated commercialization of agriculture at all costs with almost a total disregard for the sustenance of the forest-dependent people. The Commission holds the villagers near the forests, specially the tribal, for the depletion of forest wealth. The Commission insisted that “no occupancy or permanent rights should be conferred upon the forest villages settled in forest.” The Commission suggested the following classifications for the forests:

Protection Forests -- it includes forests on hill slopes, watersheds or rivers, river-banks, sea-shores, and other localities vulnerable to erosion and degradation.

Production Forests – which are essentially the commercial forests comprising valuable or potentially valuable timber-bearing stands. Production forests have been sub-divided into three categories : (a) mixed quality forests, (b) valuable forests, and (c) inaccessible forests meant for commercial purposes only.

Social Forests --- these would cover waste lands, panchayat, village, common lands on sides of roads, canal-banks, railway lines, etc. The objectives of these forests will be :

a) agricultural timber and fuel-wood,

b) grazing and grass,

c) recreation.

4.2.7 THE SUPREME COURT'S BAN ON FELLING OF TREE :

In order to curb the rapid depletion of the country's forest cover, the Supreme Court had banned felling of trees in all forests except when in accordance with the working plans of the State Government. It ruled that running of saw mills of any kind, including veneer or plywood mills, and mining of any mineral are of non-forest purpose; and are therefore, not permissible without prior approval of the Central Government and must cease forthwith. A complete ban on tree-felling was imposed in the tropical wet evergreen forests of Tirap and Chaglang in Arunachal Pradesh because of the region's specific need to maintain ecological balance necessary to preserve its biodiversity. All saw mills, veneer mills and plywood mills in this region and within 100 km from the border in Assam were closed immediately. Also, movement of cut trees and timber from any of the seven north-eastern states to other parts of the country by rail, road or waterways was completely stopped.

4.2.8 IMPACT OF THE ' BAN ON FELLING OF TREES ' :

The order had far-reaching impact on local carpenters, timber product manufacturers, interior designers and the common man who are the end-user of wood products. The prices of wood-based products spiraled. The supply was too meager to meet the demand . Substitutes such as steel, plastic, wrought iron and aluminum could not really replace wood, and inferior quality wood flooded the market.

- The general belief of the trading community dealing with forest products contend that the ban has affected the livelihood of those who depend on timber and other related activities for their daily existence.

- A traders' association of Meghalaya, one of the North-Eastern States held a massive rally recently in Shillong to protest the order, and they had also written to the Government to take up the issue with the Apex Court for a review of the directive.

- The Supreme Court's ban on tree-felling has put timber and wood products manufacturing industries under pressure, despite the duty-exemption granted for timber imports. But the apex court's decision has been hailed as timely for the country's depleting forest cover.

- With the Government granting open general licence and exempting timber from customs duty, equally good quality imported wood is now available at a reasonable price. This has been a conscious move by the Government to reduce pressure on Indian forests.

- `The ban has killed two birds with the same shot as imported wood is cheaper and at the same time our forests are being preserved. Earlier, Imphal teak was being sold as Burma teak but after the ban we are actually getting teak from Burma," tells a trader.

  The worst-affected have been timber product manufacturers.

- The industry has been mainly affected in the north-east region, but as most of the timber comes from those seven states, the impact has been felt throughout the country.

- The ban order came as a shot in the arm for forest conservation and sustainable forest management. Our wood resource is depleting, but is replacement the answer? For wood can still be replenished unlike minerals. As one philosopher wrote, ``Everybody wants to go back to nature but not on foot."

4.3. FOREST VILLAGES :

Forest villages (FV) play an important role in forest development. FVs may be established within the limits of any reserved forest which shall be approved by the Conservator of Forest in writing. Fvs are designed for the purpose of providing a

source of income to the suitable local labour and for forming and maintaining plantation. People who are not habituated to living and working in the forest area are not eligible for admission. DFO may admit new entrants to existing Forest Villages in accordance with the executive orders of Conservators. Boundaries of forest village should be demarcated by boundary pillars. An allotment upto 5 bighas of land to include homestead or '*bari'* will first be made for each resident household. Land revenue shall be levied for the land given to a Forest Villager at such rates as have been approved by the Govt. Each adult Forest Villager shall if called upon, render 20 days of labour per annum at the current rate of wages prevalent locally as per the prevailing rule. In addition to cultivating land at concession rates of revenue for which an annual patta will be issued by the D.F.O., each householders in a Forest Village will be allowed free grazing for necessary plough-cattle and ten heads of other cattle. Adult male Forest Villagers should pay for all forest produce taken by them at ordinary rates in force in the reserved forest concerned. D.F.O can evict Forest Villagers, without giving any compensation, for breach of any provision of Assam Forest Regulation Act.

4.4 CRITICAL ANALYSIS OF FOREST POLICIES :

Since the British period, the process of alienating the forest dweller from the forests was given legitimacy by the Indian Forest Act. The Forest Act, the Forest Working Plans, the Survey and Settlement Operations in the forest regions, were all aimed at limiting the rights of the people and transferring ownership of forest to the State. The alienation of forest lands from the people who needed it for satisfying their needs, and consequently forests turning into open access lands has been one of the main causes for degradation as well as for increasing the misery of people.

The global perspectives on sustainability of forest produces have made our national policies and priorities highly dynamic and receptive to eternally changing issues in the management of sustainable development. The national policy on forest and forest dwellers has also witnessed maximum responses to global concerns. These responses have been conditioned by the concerns emanating from depleting forest resources, meeting fuel-wood and other energy needs of the people, the promotion of social, agricultural and farm forestry as a commercial venture and JFM responses in the naturally regenerating regions. From a policy of policing against the forest dwellers, we

are now shifting to policing by people themselves. The paradigm shift of forest policies in the country over the last five decades is presented in Table 4.1.

Table – 4.1

PARADIGM SHIFT OF FOREST POLICIES

	Period	Main Focus
1.	1865 – 1878	Introduction of 'Scientific Management', Tribal considered as hindrance, More power to Govt.
2.	1878 – 1894	Communal ownership of forest de-recognized
3.	1894 – 1927	Emphasis on revenue aspects of forests and commercialized supply of major forest produce
4.	1927 – 1952	More stress on forest policing to debar the villagers and common people.
5.	1952 - 1976	Forests for Timber, neglect of village commons
6.	1976-1988	Commercial Forestry on Forest lands, but more funds for social and farm forestry on non-forest and private lands
7.	1988 onwards	Joint Forest Management and integrated forestry

4.5 IMPLEMENTATION OF FOREST POLICIES :

The success of implementation of any policy depends mainly on two factors : (1) Acceptability of the policy to the people concerned, and (2) Adequacy of the infra-structure required to implement the policy. Besides, the sincerity of the people of the implementing agency would also be required to make the policy implementation successful. In the cases of forest policies the first party comprises of the common people living in the villages near the forests who are dependent in some way on the forests. The other party is the Forest Department of the State Government which is responsible for the implementation and execution of the policies. It is this group who requires the appropriate infrastructure to carry out the operations as part of the policy implementation.

4.5.1 ACCEPTANCE OF POLICIES BY COMMON PEOPLE :

An overview of the various Forest Acts and Forest Policies framed and implemented by the Government from time to time reveals that the most important factor regarding the attachment and dependence of rural people in general and tribal people in particular has been totally ignored. For instance, the Forest Act of 1865 imposed restrictions on the forest dwellers converting them to forest beggars from forest owners. The feeling of loosing the right to use the forest produce alienated them from the implementing agencies. The Act of 1878 went even one step further. This Act extended the right of the government to the village forests and snatched away the right of the village people on the forests which they had been owning for generations. This rule made the village people more frustrated. Thus the belongingness of the village people towards the forests was destroyed through these Acts. As a result the villagers started in indulging in the destruction of the forests. At the same time the unscrupulous timber merchants reaped the maximum benefits from the forests.

Against the continuance of extraction of forest products by the villagers the government imposition became more stringent, and it modified the Act of 1894 to increase the degree of punishment to offenders of the forest rules vide the Forest Act of 1927. Thus the confrontation between the common people and the government kept rising. The Act of 1894 and 1927 also introduced the scope of punishing the Forest Officials involved in the seizure of legally extracted forest produce. Indirectly, it acted as a cover for the illegal trader who did not have much problem to prove an illegal consignment to be a legal one.

Common people, dependent on forests, were optimistic that the Government of free India would draw up policies to revive the original practice of vesting the ownership of forests to the villagers. However, the Forest Act of 1952 was quite frustrating in the sense that this Act adopted the same policies as were framed by the British. This Act gave more emphasis on forest products for Industrial use rather than looking into the interest of the indigenous people. Forests were exploited at a large scale by the industrial houses than by the common people.

The Forest Act of 1976 emphasized that no permanent occupancy be given to the forest villagers. This action had two effects : First, forest villagers do not feel the urge for doing anything for the forests. On interviewing, some forest villagers expressed the view that their stay in that place was so uncertain that they won't like to do any work for the forests. Secondly, people away from the forests got the impression that it is possible to occupy the forest land and to earn a livelihood out of the forest produce. As a result, large scale organized encroachment started in a big way.

The ban on tree felling imposed by the Hon'ble Supreme Court has prompted illegal timber extraction in a big way. The timber business is flourishing in the hands of unscrupulous timber traders. Tree felling is going on unabated and the sawing is taking place inside the forests. These timbers are getting its way to the consumers through smugglers. Since no royalty is to be paid for such timbers it is available at a cheaper price. In the process the government is loosing enormous amount of revenue, and the forests are being destructed to such an extent that it would be difficult, if not impossible, to build up good forests in these areas.

4.5.2 ROLE OF IMPLEMENTING AGENCY :

The various Acts had suggested that the Forest Department should perform two duties : (a) Carry out new plantation; (b) Policing of the existing forests. It is alleged that the plantation programs had never been taken up seriously by the Forest Department. It is further alleged that while in papers thousands of sapling plantations are shown and hence money spent, in reality, there is hardly any plantation. The Forest Officials have the ready-made answer to such a situation :- "Saplings were planted, but were destroyed by cattle or by the villagers". This way, not only that the money has been mis-utilized, the forests have been converted to barren lands.

The second aspect of policing requires adequate infrastructure. Unfortunately, the Forest Department does not have the bare minimum required infrastructure. For example while the extremists and timber smugglers are equipped with automatic rifles like AK-47 and AK-56, the forest guards have only a few service rifles. On various trips to forests it was observed by the study team that timber smugglers were carrying logs under the very nose of the Forest Guards. The Guards do not get the uniforms in time, they do not get salaries for months together (One Guard

informed that he did not get salary for continuous eight months). The camps where the Guards are supposed to stay are also in a dilapidated condition. It is alleged that the Guards become demoralized and at times help the smugglers in sending the timber and takes money in return.

4.5.3 OTHER FACTORS :

There are other factors which create obstacles in implementing the forest policies. One such factor is the boundary dispute between Arunachal Pradesh and Assam. The Ranga and Kakoi Reserved Forests in Lakhimpur District do not have the demarcated inter-state boundary. As a result , the Law Enforcing Agencies find it difficult to exercise their power. Besides, many people from Arunachal Pradesh as well as the Government of Arunachal Pradesh are getting the chance to establish various institutions and villages in areas claimed to be inside Assam. The political factor is also responsible to a great extent for the failure of implementation of the policies. It is alleged that Politicians quite often give protection to offenders. Once a Police Official informed that after seizing a truckload of timber along with the offender he had to release the person as well as the consignment on the insistence of a political leader. The study team found that the train Arunachal Express, running between Murkongselek in Arunachal Pradesh and Kamakhya in Assam is laden with fuel-wood and valuable timber. In Batasipur Station it was observed that huge quantity of furniture is loaded everyday for destinations outside Assam. One NGO member informed the team that once the forest officials had stopped loading of timber logs in the Arunachal Express, but had to yield to the pressure of some political leaders. Many respondents had also expressed the view that a section of the politicians is responsible for the destruction of the forests.

4.6 ECONOMIC INSTRUMENTS :

Economic instruments encourage sustainable development by charging a price for the use of an environmental resource. Economic Instruments (EI) offer numerous benefits:

- *EIs are key to environmentally sustainable development* : By integrating environmental concerns directly into the economic incentive structure that producers and consumers face each day, EIs implicitly promote a shift in the

allocation of resources towards those activities which are both environmentally sound and economically attractive.

- *EIs help internalize environmental costs* : EIs can reflect the real costs of environmental degradation and attempt to incorporate them into the prices of goods and services.

- *EIs support the 'Producer and Consumer Pays' Principles* : EIS solicit direct payments from those who cause environmental degradation and those who use natural resources taken from the environment.

- *EIs raise revenues for environmental investments or general government expenditure*: EIs may be designed to earn revenues from environmental degradation charges and the same can be used to co-finance priority environmental investments.

Number of studies on sustainable forest management have concluded that unsustainable consumption and consumption pattern of such products positively may help to preserve forests. Since environmental degradation is a major problem for our country, India has also started using various EIs like taxes, quotas, pricing, subsidies, etc. to discourage unsustainable consumption of forest products.

Data having bearing on various EIs with regard to the sustainable development of forests in Assam were collected from different sources. The data thus collected are analyzed below.

4.6.1 ANALYSIS OF THE FOREST SCENARIO IN ASSAM

The forest scenario in the NE region of our country has been described in details in Chapter 1. Table 4.1 presents the data on the forest coverage of the seven States of the region as recorded in 1951, 1969, 1989, 1991, 1995, and 1997. Of the three rows of data shown against each State, the first row represents the area in sq. km; the second row represents the percent of geographical area of the concerned State covered by forest; and the third represents the forest area of the State as percentage of the total forest area of the NE region. Baring the State of Assam the forest area of the other six States show a sharp increase during the period 1969 – 1989. This

growth seems to be unrealistic. In 1997 the land area covered by forest as percentage of the total area for the whole country stands at around 19%; while the same parameter for the seven States has been recorded to be above 30%. This shows the richness of the NE region regarding forests and forest produce. The data on forest area presented in Table 4.1 are being presented in the form of bar diagram in Fig. 4.1. It is clear that the forest coverage in the State of Assam has declined after 1969.

Table 4.2 shows the data on area of reserved forests, protected forests, and the population of Assam for the period 1981 to 1999. Over the years, the figures of forest cover seem to be more or less constant at around 27% of the total area of he State. However, the ground realities reveal that there has been a sharp decline in the forest cover in the State. This fact has been revealed by the data shown in Table 4.1. As such, the data presented in Table 4.2 can be considered as the area ear-marked as reserved/protected forests. Table 4.2 further reveals that due to increase in population and stagnation in forest cover (rather decrease), the ratio between population and forests has gone down.

The forests of Assam can be divided into three categories. Table 4.3 presents the area (as of 1990) under the three categories of forests --- Ever-green/Semi Ever-green, Deciduous, and Degraded scrub land. Though four districts have larger areas covered by deciduous forests compared to Ever-green or Semi Evergreen forests, the overall State picture shows that Assam has more area covered by Evergreen/Semi Evergreen forests as compared to other types of forests.

The Forest Department undertakes plantation activities in the State. The area planted under the General Forestry Scheme over the period 1987-1999 are presented in Table 4.4. While the data on plantation in the two districts under study seem to fluctuate around a more or less steady level, the All Assam figures show a sharp decline after 1996-97. The trend is clearly visible from the graphs presented in Fig.4.2.

The data on plantation work taken up under Social Forestry during 1991-1999 in the two districts under study are presented in Table 4.5. The data show wide fluctuations over the years. The trend is evident from Fig. 4.3. While the objectives of

these forests should be to provide (a) agricultural timber and fuel-wood, (b) grazing and grass, and (c) recreation, in reality valuable trees have been planted on the roadsides. The people nearby seem to be less concerned about the well-being of such forests.

The impact of shifting cultivation on forests could be realized from the data presented in Table 4.6. In Assam alone around 696 sq. km of forest is cleared annually for the purpose of shifting cultivation and at any point of time, on an average 58000 numbers of families are dependent on this.

Table – 4.6

SHIFTING CULTIVATION IN NE REGION

STATE	Annual area under shifting cultivation Sq. K.m	Fallow period (In Years)	Minimum area under shifting cultivation one time or other(Sq.K.m)	No. of Families practicing shifting cultivation
1.Arunachal Pradesh	700 (18.09)	3 to 10	2100 (14.32)	54,000 (12.18)
2.Assam	696 (17.99)	2 to 10	1392 (9.50)	58, 000 (13.08)
3.Manipur	900(23.26)	4 to 7	3600 (18.08)	70,000 (15.79)
4.Meghalaya	530(13.70)	5 to 7	2650 (18.08)	52,290 (11.79)
5.Mizoram	630 (16.28)	3 to 4	1890(12.89)	50, 000 (11.28)
6.Nagaland	190(4.91)	5 to 8	1913 (13.05)	116046 (26.18)
7.Tripura	223 (5.76)	5 to 9	1115 (7.61)	43000 (9.70)
Total	3869 (100.00)	-	**14660 (100.00)**	44,3336 (100.00)

Figures in the brackets indicates per cent to the total.

(Source :- Task Force on Shifting Cultivation, Ministry of Agriculture, 1983)

4.6.2 ANALYSIS ON FOREST PRODUCE USE PATTERN

The forests of the NE region are very rich in a wide range of forest produce. However, in this study the generation, preservation, and extraction of only timber products have been considered. A wide variety of trees do grow in the forests and hence there is a wide variety of timber products that can be obtained from these forests. It is not possible to consider and study the use and extraction of each type. There are various uses of the timber :- i) furniture preparation, (ii) house construction, (iii) plywood manufacture, (iv) agricultural implements, (v) fuel-wood,

(vi) bridge construction, (vii) railway sleeper, and (viii) match factories, etc. In the two districts where the study was carried out there is no consumption of wood for match factory. The timber consumption data collected from various sources are presented and analyzed in the following sections.

Table 4.7 shows the out-turn of firewood in the two districts under study, vis-à-vis Assam over the period 1983 – 1998. The data show wide variations and more or less a declining trend. Based on these data it is seen that the per capita out-turn of firewood over the period has gone down. There could be two reasons for such a decline. Firstly, illegal extraction has gone up; secondly, because of widespread use of LPG, coal, etc. the need for firewood, specially in the urban and semi-urban areas might have gone down.

The out- turn of timber in the two districts and in the State of Assam are presented in Table 4.8. It is evident from the data that the out-turn of timber from Assam forests has declined over the years. While in the year 1984-85 the out-turn had touched 311815 cubic meter, the out-turn in the year 1996-97 was around 35664 cubic meter, a decline of about 89 percent. The reasons behind such decline are (i) decline in availability of good quality timber producing matured trees, (ii) increase in illegal extraction, (iii) Government control in issuing licence for tree felling, and (iv) Supreme Court's ban on tree felling (after 1997).

The declining trend in out-turn of firewood and timber has the direct impact on the revenue earned by the Government. Table 4.9 and Fig. 4.4 depict the declining trend in revenue generation. However, the trend in expenditures shows a steep rise. It is evident from the graphs that the gap between revenue and expenditures (revenue being always less than expenditures) has been steadily increasing over the years.

The apparent declining trend in the out-turn of timber over the years prompted the study team to make a survey of consumption of timber by the furniture shops in the study area. The data thus collected are being presented in Table 4.10 and in Fig. 4.5 and Fig. 4.6. The surveyed furniture shops manufacture furniture with timber obtained from the legal market and they sell the products in the legal market. The surveyed shops are divided into three categories:- small (annual turn-over less than Rs. 50000), medium (annual turn-over in the range Rs. 50000 to Rs. 100000), and

large(annual turn-over above Rs. 100000) furniture shops. In case of small furniture shop there is a nominal rise in timber consumption from 1995 to 1998, whereas from 1998 to 1999 a marginal decline has been noticed. While there has been a marginal decline in timber consumption for medium sized furniture shops, the decline has been quite significant in case of large-sized shops. The reason behind such differences lie in the fact that the three categories of shops cater the needs of three different categories of customers. The small shops cater the needs of the low-income group of customers who are not concerned about the quality of timber used in the products. Most of them can not afford to by moulded plastic furniture as well. Thus the demand for this category of products is more or less steady. In case of medium sized as well as large sized respondents declining trend has been noticed but declining trend was very much significant in case of large sized shops. The customers for the medium-sized shops are the people of middle-income group and Office establishments. There has been a shift rom wooden furniture to plastic furniture. However, on certain items like furniture to be presented to newly wed girl (a custom in Assam) it has to be made of wood. Thus there has been only a marginal decline in the business of the medium-sized shops. The customers of the large-sized shops are the people from the high-income group and the elite class. The high income group are conscious about the timber quality and won't compromise on it. As good quality timber has become scarce, the demand from this group has also gone down. Besides, there has been a shift from wooden product to plastic product for this group of customers.

Table 4.11 shows average legal market prices of timber that prevailed in the two districts in the study area. It has been noticed that the prices of all varieties of timber have increased over the years. The main reason for such a price hike is the decreasing out-turn of timber during the past decade. Relatively, the prices of the costly and premium categories of timber have been increasing at a high rate. The trend is evident from the graphs presented in Fig. 4.7.

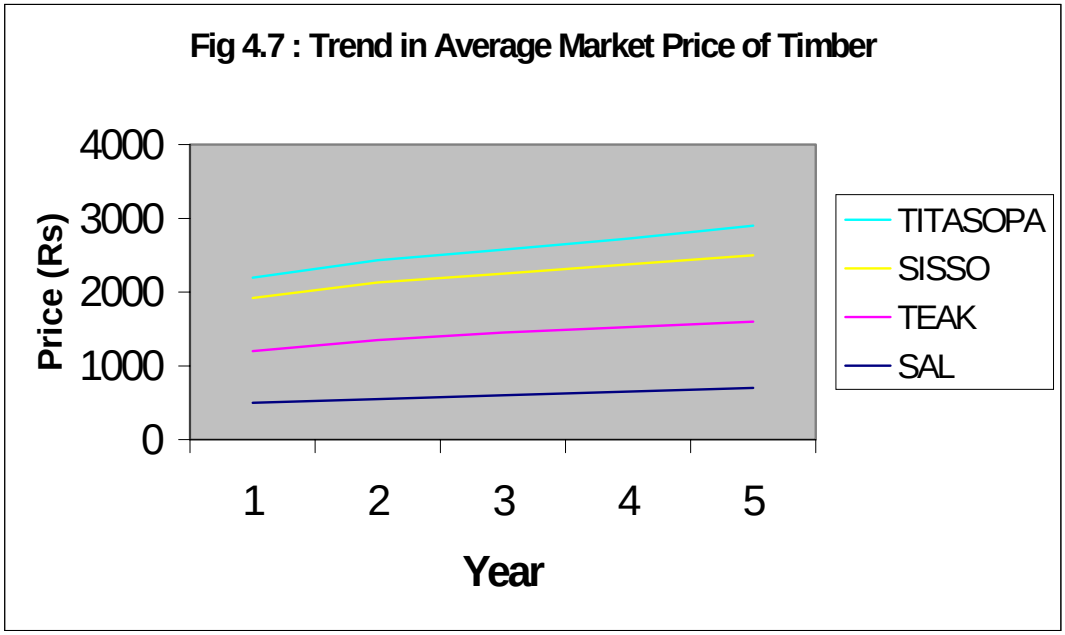
Table : 4.11

Average Market Price (in Rs/cu.ft) of Timber at Sonitpur and Lakhimpur Districts

TIMBER SPECIES	1995	1996	1997	1998	1999
SAL	500	550	600	650	700
TEAK	700	800	850	875	900
SISSO	720	780	800	850	900
TITASOPA	275	300	325	350	400

Note:- The above prices were collected from the legal furniture shops and timber dealers.

Fig. 4.7



There are a few 'illegal' markets for furniture in the two districts under study. The term '***illegal***' has been used in the sense that the furniture sold in these markets are not being manufactured in any registered shop, nor the timber used for these furniture are purchased from legal timber dealers. The furniture are sold in the weekly markets (Haat). The traders (carpenters) do not have any permanent shed in the market, and they make the transactions on the road-side of the market on the days of the '*haat'* only. These furniture are produced in the residences of the carpenters who are generally away from the market but nearer to the forests. The study team visited some of such carpentry 'shops' in the village. The carpentry shops

are housed in the residence of the carpenters. The carpenters informed that they obtain the required timber from the timber 'suppliers' of the locality. These suppliers are generally unemployed local youths who procure/fetch the timber from the forests illegally. Trees are felled and then hand-sawed inside the forests. These timbers are supplied to the 'customers' at their residences or at the desired place of delivery. The timber thus obtained are cheap, but the quality is poor. The price of such timber is almost half the price of the timber available with the legal dealers. This has made it possible to make the furniture available at a much cheaper price.

There are three major markets for illegal furniture in the Sonitpur District where huge quantity of furniture are sold. These markets are located at Dhekiajuli (on NH-52), Balipara, and Itakhola. Even customers from around 200 km distance come to buy furniture from these markets. These three markets are situated within 10 km from a few reserved forests (Orang in Darrang District, Balipara and Charduar in Sonitpur District) which are rich in good quality timbers. These furniture markets have induced large scale tree felling and illegal timber trade in these areas. Table 4.12 presents the estimated monthly average quantity of timber consumed by major illegal furniture markets in the study area. The estimate has been made on the basis of furniture sold on the market days in a month in the markets mentioned. The consumption trend shows that over the two-year period 1997 – 1999 the growth in consumption at Dhekiajuli has been 133%, for Itakhola it is 171%, and for Balipara it is 140%. It is an indicator of the rate of growth of illegal forest extraction in the State.

Table - 4.13

Estimated Monthly Average illegal Timber Consumed at Selected Markets

(cubic feet)

YEAR	1997	1998	1999
Dhekiajuli	985.25	1158.41	1314.63
Itakhola	96.47	132.28	165.41
Balipara	83.68	97.32	117.54

Note :- Estimate based on furniture sold in a month.

Table 4.13 reveals illegal extraction of firewood through major exit points of various reserved forests over a year (January 2000 to December 2000). It is interesting to note that the extraction level is very high through the exit points nearer to the towns and cities; compared to the volume of extraction through exit points at remote places.

Some persons (around 20) dealing with such forest produce (wood and dry bamboo) were interviewed to know about the modus operandi. Each of them stated almost the same method. In some cases the illegal traders (daily commuter) enter the forests and fell trees suitable for firewood. They would shear that much of the tree that they can carry in a bicycle or head-load (around 20 to 40 kg). A person would go to the same tree that he had felled until it is exhausted. In another method the persons residing on the river bank would go to a forest at upstream of the same river and would fell big trees which would be transported downstream through the river. In still another method the persons residing in the banks of the hilly rivers would collect the logs carried by the flood waters during summer and would stack these logs for selling as firewood later. While inquired about higher demand for fuel wood in the urban and semi urban areas the reasons put forward were (a) firewood availability is very less in urban and semi-urban places, (b) urban and semi urban dwellers can afford to pay for firewood, (c) concentration of customers is more in the urban and semi-urban areas.

The data regarding the number of forest-based industries operating in Assam in 1992 and in 1997 are presented in Table 4.14. It is evident from the data that the number of forest-based industries has gone down during that period. Many saw mills have been closed down. Plywood mills are the worst sufferers and more than 50% of such mills have closed down over the years. Some of the plywood factories are functioning with imported timbers. After the Supreme Court's ban on tree felling, the number of operating saw mills have come down further. The operating mills are working with logs obtained through auction of seized lots by Forest Department. Even in absence of the ban on tree felling, the industry would have suffered a lot. While there are good forests in Arunachal Pradesh, Assam does not have sufficient good forests to support thr requirements of the forest-based industries. It is feared that the paper mills are going to be the next victim. The rate at which the bamboo is being extracted without any scheme to replenish, the stock of bamboo in Assam and Meghalaya are going to be diminished to a level that won't be able to supply the raw materials to the paper industry.

Table 4.14

NUMBER OF FOREST-BASED INDUSTRIES IN ASSAM

Industries	1992	1997	Change(%)	
Plywood Mills	52	24	(-28)	(-53%)
Saw Mills	552	458	(-94)	(-17%)
Match Factories	1	1		
Match Splint Unit	3	3		
Paper Mills	2	2		
Timber Treatment Plant	1	1		
Veneer Mills		30		
Manufacture of wood & Wood product, furniture And fixture	583	423	(-160)	(-7.44%.)

Source : Assam Forest at a Glance , Department of Forest , Govt. Of Assam .

4.6.3 ECONOMIC INSTRUMEMTS IN USE :

Though not in appropriate forms, certain economic instruments are in use in the Forest Department. The instruments are mainly aimed at reducing the consumption of forest produce. It, however, might indirectly influence the consumption patterns of the forest products. The study team feels that these instruments are not being implemented properly.

4.6.3.1 Pricing :

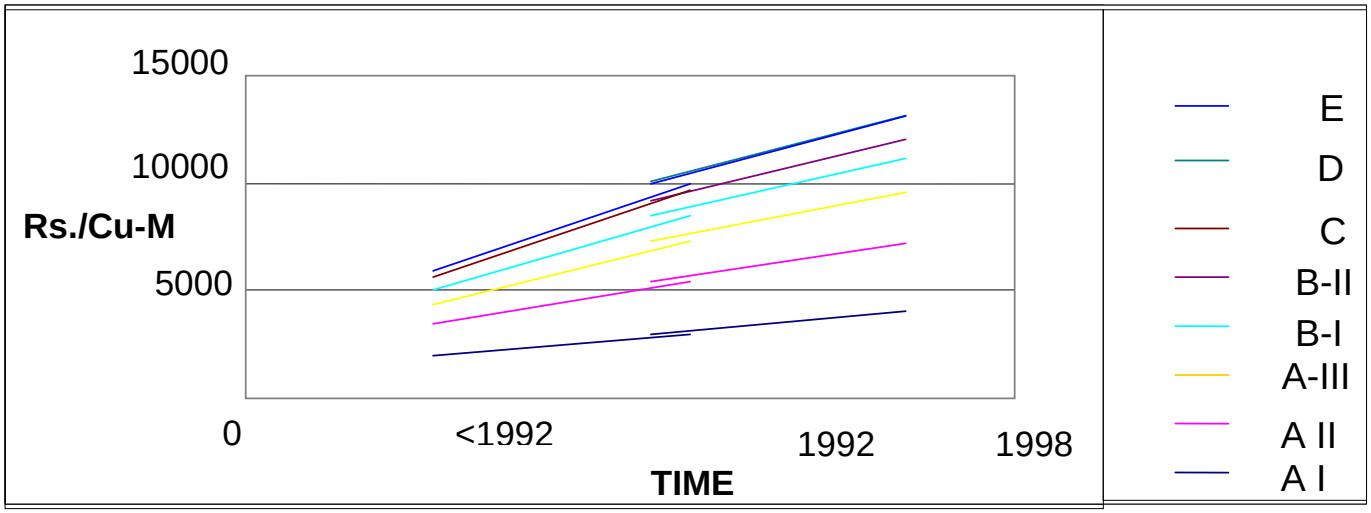
There are clear-cut and well defined procedure of pricing of forest produce. The different prices fixed by the Forest Department on five categories of trees are presented in Table 4.15. The age of forest produce at which it is to be extracted are mentioned in the Working Plans prepared for the specific items.

TABLE 4.15: GOVERNMENT PRICES OF TIMBER (Rs.)

	PRICES	LOWER	GIRTH	PRICES	UPPER	GIRTH
Categories	**Before 1992**	**1992**	**1998**	**Before 1992**	**1992**	**1998**
A-I	1925	3000	4004	3150	5040	6552
A-II	1575	2464	3203	2100	3280	4264
A-III	875	1820	2366	1400	2910	3783
B-I	630	1232	1602	1050	2050	2665
B-II	350	690	897	525	1035	1345
C	245	431	562	350	616	801
D	175	210	273	210	252	328
E	140	140	182	175	210	273

In the last decade the prices were revised twice, once in 1992, and then again in 1998.

Fig. 4.8 : Government Prices of Timber of Different Categories



Increase in prices follow a linear trend as evident from the graphs presented in Fig. 4.8.

Similarly, the Government has also fixed prices for firewood and other minor forest products. The prices of these products are also being revised from time to time. The prevailing prices for firewood at different time over the last decade are presented in Table 4.16 and the prices for minor products are presented in Table 4.17. It is seen

that while the increase in prices of firewood is around 25%, the increase in prices for minor forest products is around 60%, and in case of “Bholuka” bamboo the increase is around 500%. This economic instrument is aimed at discouraging the users to use such forest products.

4.6.3.2 Seizure of Forest Produce:

Forest Regulations empower the Forest Officials to seize any forest produce extracted without permit or licence. The Acts also have indicated the punishment to be given to such offenders. However, the Acts also has a clause indicating that Forest Officials who seize legally- extracted forest produce just to harass the contractors/individuals are liable to punishment to the effect of jail term and monetary fines.

4.6.3.3 Auctioning of Seized Lots:

There is provision for auctioning of forest produce seized from illegal timber dealers or from any other source. The values of the seized lots are estimated on the basis of the quantity of the items, and the standard price approved by the Department. If the value of the lot is below Rs. 1000, the DFO is authorized to sell it through notified auction. For goods worth above Rs. 1000, items are to be disposed of in auction through sealed tenders. The DFO is authorised to settle tenders upto an amount of Rs. 25000, the Conservator of Forest is authorized to settle cases for amount in the range Rs. 25,001 to Rs. 1,00,000; and any amount above Rs. 1,00,000 has to be settled by the Chief Conservator of Forests.

4.6.3.4 Seizure of Products Made of Forest Produce:

Forest Officials are empowered to question the origin of forest produce which are being used for making furniture, construction of bridge, construction of houses, etc. If the users can not produce documents (Transit Permit TP) pertaining to the source from which the products (timber etc.) have been obtained, the Forest Officials can seize the finished/semi-finished products. For example, the huge quantity of furniture sold at Dhekiajuli market on each Sunday could be inspected and the illegal traders can be arrested.

4.7 CRITERIA AND INDICATORS OF SUSTAINABLE FOREST MANAGEMENT - AN ANALYSIS

As a part of this study, it was planned to study the effectiveness of the criteria and indicators that were developed and designed at Bhopal Workshop (IIFM 21-23 Jan 1999). Accordingly the required available data have been collected and presented in Table 4.18 It is observed that all the reserved forests are natural forests which are classified into semi-evergreen, dry-sal, teak and tropical forests. The major portion of the forests is considered to be semi-evergreen. It is also noticed that the forest area covered under fragile eco-system is also considered to be relatively more which is affecting the effective area of forest. Another important observation was that dense forest had gone down to a very minimum extent. Such type of forests could be seen only in two ranges like Chariduar and Balipara. The forests were also poor in non-wood forest products (NWFP) and only cane and bamboo were available. Forests area diverted for non-forestry purpose has been increasing very fast in all the reserved forests. It is understood that community forests are not there in the study area.

The Government policies and legal framework seem to be inadequate. Ineffective implementation mechanism without spending requisite amount on research and development and not involving NGOs in the process of preservation of forest resources has led to failure of the schemes. Some data, as collected from Govt. records, appear to be unrealistic. Out-turn of forests have come down drastically over the years. The annual expenditure of the Forest Dept. of Govt. of Assam has always been more than double the revenue earned. While the revenue earned over the years show a steady decline, the expenditure show a steep rise. Number of forest based industries in Assam has come down during the last decade. Steady and continuous demand for fuel wood have encouraged illegal traders to destroy forest. New plantation has suffered due to paucity of fund. The ban imposed on tree-falling has a direct impact on Govt. revenue but has encouraged illegal tree-falling.

4.8 CONCLUSION

Over the last two centuries the government had formulated several policies through Acts and Regulations with a view to preserving the forest resources in order to

generate revenue for the State. However, these Acts have ignored the important component of the forest ownership of the people residing near the forests. In the process they have been alienated and cooperation from these people in implementing the Acts have been nil. Rather, they have become aggressive and have indulged in the destruction of the forests. The implementing agencies have been doing more of policing than development of the forests. At the same time these agencies do not have adequate infrastructure to implement the policies. The personnel of these agencies are being deprived of the minimum required facilities too. As a result the policies are not being implemented properly. Though various economic instruments are available for implementation, the same are not being utilized effectively.

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TABLE 4.17

ESTIMATED ILLEGAL FUEL WOOD EXTRACTION PATTERN OF SONITPUR & LAKHIMPUR DISTRICT (IN SELECTED EXIT PONITS)

FROM JAN 2000 TO DEC 200O (QTTY. IN TONS)

CENTRE	DISTRICT	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT.	OCT	NOV	DEC	monthly avg.
1.Tezpur	Sonitpur	150	145	130	120	105	95	95	120	130	140	135	145	125.83
2.Balipara	Sonitpur	30	35	32	28	26	25	20	20	25	28	26	32	27.25
3.Chariduar	Sonitpur	45	40	38	35	30	30	30	35	40	42	45	45	37.92
4.Bhalukpur	Sonitpur	60	61	58	55	50	45	45	50	55	55	60	60	54.50
5.Amaribari	Sonitpur	30	28	25	25	20	25	20	25	30	25	28	30	25.92
6.Rangapara	Sonitpur	90	85	80	82	85	85	85	85	80	85	90	90	85.17
7.Missamari	Sonitpur	60	55	50	45	48	45	45	45	50	55	60	60	51.50
8.Dhekiajuli	Sonitpur	90	85	80	80	82	75	75	80	85	80	90	90	82.67
9.Singri	Sonitpur	60	58	55	55	50	50	50	55	55	58	60	60	55.50
10.Jamuguri	Sonitpur	45	42	40	41	40	38	37	35	35	40	43	45	40.08
11.Sotea	Sonitpur	30	25	28	25	20	20	23	25	30	30	32	30	26.50
12.Bis.Chariali	Sonitpur	120	125	115	120	118	115	110	115	118	120	125	120	118.42
13.Borgang	Sonitpur	30	28	25	23	20	20	23	25	28	28	30	32	26.00
14.Bedali	Sonitpur	30	25	23	20	20	21	20	25	25	25	30	30	24.50
15.Missamari	Sonitpur	60	60	58	55	50	45	40	55	60	65	60	60	55.67
16.Gohpur	Sonitpur	90	90	85	85	80	80	80	85	87	90	90	90	86.00
17.Dholpur	Sonitpur	30	25	23	21	20	20	20	23	25	25	30	30	24.33
18.Hawajan	Sonitpur	30	28	25	23	23	22	20	20	25	25	30	30	25.08
19.Narayanpur	N.Lakhum	60	58	55	50	55	55	58	58	60	62	65	65	58.42
20.Bihpuria	N.Lakhum	60	58	58	55	50	40	45	55	65	60	60	60	55.5
21.Naiboicha	N.Lakhum	30	25	23	22	23	25	25	25	28	30	28	25	25.75
22. Laluk	N.Lakhum	30	25	28	25	23	23	23	25	28	25	28	30	26.08
23. Harmutty	N.Lakhum	30	28	25	24	23	25	28	28	28	30	31	32	27.67
24.N.Lakhimpur	N.Lakhum	120	125	115	118	115	100	100	110	115	125	120	125	115.67
25.Diju	N.Lakhum	60	55	58	55	50	55	55	58	58	65	65	70	58.67
26.Dhakuakhana	N.Lakhum	30	28	25	28	25	25	25	30	32	35	35	35	29.42

TABLE 4.18

CRITERIA AND INDICATORS FOR SUSTAINBLE FOREST MANAGEMENT - AN ANALYSIS

CRITERION 5

FOREST RESOURCE PRODUCTIVITY	Panpur	Chenglijan	Kadam	Ranga	Pabha	Kakoi	Dulung
1. Growing stock of wood and NWFPS	NO	amari,titasopa	no good fore	sisoo,uraium	nogood fores	teak,azar,nahar	siya,nahar,azar,teak titasopa,r
2. Natural regeneration status	POOR	POOR	average	average	average	average	POOR	average	average
3. Incrementof wood & nonwood products	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing
4. Area of afforestation & new plantations	* 1	* 1	* 1	* 1	* 1	* 1	* 1
5. Level of material & technological inputs	not adequate	not adequate	not adequate	not adequate	not adequate	not adequate	not adequate
6, Extent of Protection measures	not proper	not proper	not proper	not proper	not proper	not proper	not proper
7. Level of tangible benefits		firewood timber	firewood timber	firewood timber		firewood timber	firewood timber

CRITERION 6

FOREST RESOURCE UTILISATION		timber fire	timber fire	timber fire	timber fire	timber fire	timber fire
1 Aggregate and percapita wood and non- wood consunption	*	500ton/ann	500ton/ann	1250ton/ann		1000 tan/ann	1000tan/ann
2. Import and export of wood and non-wood forest products	* 2	* 2	* 2	* 2	* 2	* 2	* 2
3. Recorded and unrecorded removals of wood and and NWFPS	* 3	* 3	* 3	* 3	* 3	* 3	* 3
4. Direct employment in forest industries	* 4	* 4	* 4	* 4	* 4	* 4	* 4
5. Contribution of forests to the income of forest depandent people	* 5	* 5	* 5	* 5	* 5	* 5	* 5

CRITERION 7

POLICY, LEGAL & INSTITUTIONAL FRAME WORK	* 6	* 6	* 6	* 6	* 6	* 6	* 6

1. Extent of community NGO and private sector participation	POOR	POOR	POOR	POOR	POOR	POOR	POOR
2. Investment in research & development	not adquat	not adquat	not adquat	not adquat	not adquat	not adquat	not adquat
3. Monitoring and evaluating mechanism	notproper	notproper	notproper	notproper	notproper	notproper	notproper

* 1 -- Area of Afforestation is given in another table in range wise .
* 2 -- No import of wood into this region export of wood from this region to various parts of India
* 3 -- Recovered (I.e Legal extraction) and unrecovered (I.e illegal extraction) removals of wood is given in in another table.
* 4 -- More than 1 lakh people directly involed in timber , furniture another releted business directly.
* 5 -- Forest provide fuel, folder , timber, & minor forest produce to the forest depenent people.
* 6 -- Policy discuss in separate chapter

TABLE 4.18(Contd.)

CRITERIA AND INDICATORS FOR SUSTAINBLE FOREST MANAGEMENT - AN ANALYSIS

CRITERION 5

FOREST RESOURCE PRODUCTIVITY	**Charduar**	**Balipara**	**Chenglimara**	**Singri**	**Bhomaraguri**	**Na-duar**	**Biswanath**	**Behali**	**Gohpur**
1. Growing stock of wood and NWFPS	Bansoom	bansom,sal	no good	teak,drysal	teak	titasopa,nahar	titasopa,nahar	titasopa,nahar	
2. Natural regeneration status	POOR	POOR	POOR	average	POOR	POOR	POOR	POOR	NIL
3. Incrementof wood & nonwood products	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing
4. Area of afforestation & new plantations	* 1	* 1	* 1	* 1	* 1	* 1	* 1	* 1	* 1
5. Level of material & technological inputs	not adquat	not adquat	not adquat	not adquat	not adquat	not adquat	not adquat	not adquat	not adquat
6, Extent of Protection measures	notproper	notproper	notproper	notproper	notproper	notproper	notproper	notproper	notproper
7. Level of tangible benefits	firewood timber	firewood timber	firewood timber	firewood timber	firewood timber	firewood timber	firewood timber	firewood timber	firewood timber
CRITERION 6									
FOREST RESOURCE UTILISATION	timber	timber	timber	timber	timber	timber	timber	timber	timber
1 Aggregate and percapita wood and non- wood consunption	2000 tan/ann	1500tan/ann	nil	500ton/ann	250 ton/ann	2000 tan/ann	1000tan/ann	1500ton/ann	nil

2. Import and export of wood and non-wood forest products	* 2	* 2	* 2	* 2	* 2	* 2	* 2	* 2	* 2
3. Recorded and unrecorded removals of wood and and NWFPS	* 3	* 3	* 3	* 3	* 3	* 3	* 3	* 3	* 3
4. Direct employment in forest industries	* 4	* 4	* 4	* 4	* 4	* 4	* 4	* 4	* 4
5. Contribution of forests to the income of forest depandent people	* 5	* 5	* 5	* 5	* 5	* 5	* 5	* 5	* 5
CRITERION 7									
POLICY, LEGAL & INSTITUTIONAL FRAME WORK	* 6	* 6	* 6	* 6	* 6	* 6	* 6	* 6	* 6
1. Extent of community NGO and private sector participation	POOR	POOR	POOR	POOR	POOR	POOR	POOR	POOR	POOR
2. Investment in research & development	not adquat	not adquat	not adquat	not adquat	not adquat	not adquat	not adquat	not adquat	not adquat
3. Monitoring and evaluating mechanism	notproper	notproper	notproper	notproper	notproper	notproper	notproper	notproper	notproper

* 1 -- Area of Afforestation is given in another table in range wise .
* 2 -- No import of wood into this region export of wood from this region to various parts of India
* 3 -- Recovered (I.e Legal extraction) and unrecovered (I.e illegal extraction) removals of wood is given in in another table.
* 4 -- More than 1 lakh people directly involed in timber , furniture another releted business directly.
* 5 -- Forest provide fuel, folder , timber, & minor forest produce to the forest depenent people.

* 6 -- Policy discuss in separate chapter

CHAPTER – 5 :PEOPLE'S PERCEPTIONS FORESTS AND EXTRACTION PATTERNS

5.1 GENERAL PERCEPTIONS OF PEOPLE ABOUT FORESTS

In the beginning of this study, a preliminary survey was conducted amongst randomly selected persons from the public to know their ideas about the reasons for the fast depletion of forests ; And also the measures to be adopted for proper management of the forests. The comments on these issues were collected from 120 persons from various walks of life. Five most important reasons for fast depletion of forests as put forward by the respondents are as follows :

a) Poor people extract the forest products to earn their livelihood (75%)

b) Illegal migrants from across the border have destroyed forests (70%)

c) Ill-equipped forest personnel can not protect forests (54%)

d) Flood-affected people have encroached forest land (42%)

e) Contractors extract forest products illegally (22%)

(The figures within bracket indicate the percent of respondents giving that comment.)

The same group of people were asked about measures to be adopted for sustenance of forests.

The eleven most important suggestions put forward by the respondents are:

a) Forests be handed over to local people for management (74%)

b) Encroachers be evicted (70%)

c) Damage of forests due to flood should be controlled (62%)

d) Harmony between harvesting and plantations (58%)

e) Forest dependent people be provided with alternative means of livelihood (52%)

f) Control illegal extraction (45%)

g) Modify Government policies (44%)

h) Government should be strict in protecting forests (40%)

i) Equip forest guards to fight poachers, encroachers, timber smugglers (35%)

j) Educate people to obey forest regulations (30%)

k) Stop corruption in the Forest Department (20%)

In course of the study three surveys were conducted among (a) Village People residing near the forests, (b) NGOs involved in environmental work, and (c) Employees of the Forest Department, Government of Assam. Three separate structured questionnaires (presented in Annexes) used in this exercise. There were certain common questions in all the three questionnaires regarding the following issues :

1. Reasons for fast depletion of forest resources

2. Forces/entities behind forest destruction

3. Comments on Joint Forest Management (JFM)

4. Suggestions foe effective management of forests

The findings on these issues as obtained from the three categories of respondents are presented in the Tables 5.1 to 5.4.

Table 5.1 presents the views of the respondents regarding the reasons for fast depletion of forest resources. The three groups have pointed out some common points, but the emphasis has been different. More than 45% of the villagers feel that the main reason for depletion of forest is encroachment of forest land arising out of population increase. The forest personnel feel that lured by the value of

the forest resources, the poor people extract forest products heavily; and that leads to the fast depletion of forest resources. All the NGO personnel interviewed , feel that it is the mismanagement on the part of the Forest Department that has led to such a situation. Majority of them feel that illegal extraction of forest products by poor people, and lack of awareness of common people about preservation of forest have been the major reason attributed for fast depletion of forest resources.

TABLE- 5.1

REASONS FOR FAST DEPLETION OF FOREST RESOURCES

Reasons	Common People	N.G.O Personnel	Forest Personnel
Sample Size	600	27	49
1. Mismanagement by Forest Department	23.61	100	24.49
2. Illegal Extraction by Poor People	18.45	92.59	100
3. Encroachment by Tribal People	46.00	55.56	0.00
4. Lack of awareness of common people on forest	---	77.78	---
5. Population explosion	45.00	---	51.02
6. Easy availability of valuable trees	15.45	---	77.55

(Figures indicate per cent only)

The respondents were asked to mention whom they hold responsible for the fast degradation of the forests. Table 5.2 presents the views of the respondents in this regard. It is seen from the table that the common people are almost unanimous in their views. More than two-third of them have held the Forest Department Officials, Contractors, Encroachers, and unemployed persons for the destruction of the forests. A high percentage of the NGO personnel has held the encroachers, forest villagers, and the unemployed persons responsible for the depletion of he forests. On the other hand while 46% of the forest personnel hold the encroachers responsible for the destruction of the forests, a very low percentage of this group of respondents support the views of the other two groups.

TABLE - 5.2
FORCES/ENTITIES RESPONSIBLE FOR FOREST DEPLETION

Entities	Common People	N.G.O Personnel	Forest Personnel
Sample Size	600	27	49
1.Forest Deptt. top officials	10	92.59	42.86
2.Forest Deptt. field level officials	10	74.04	24.49
3.Contractors	22	85.19	51.02
4.Encroachers	46	74.07	91.84
5.Forest villagers	10	55.56	83.67
6.Unemployed persons	10	74.07	71.43
7.Political Parties	18	-----	59.18

(Figures indicate per cent only)

Though the Joint Forest Management (JFM) scheme has been successful and has gained popularity in many States of the country, the same has not been implemented in Assam. Attempt was made in the survey to know about the mindset of the respondents regarding JFM. Table 5.3 presents the responses on this issue. While 71.43% of forest personnel, and 48.15% of NGO personnel are aware about the JFM scheme, none of the 600 respondents of the Common villager category aware about the scheme. It appears that two things have made it difficult to implement the scheme --- (1) Adequate fund for the scheme is not available with Government of Assam, and (2) Forest personnel are not clear about the scheme (63.27% of the forest officials feel the need for training on JFM). At the same time the people in the community seem to be less interested (not interested ?) in the JFM scheme.

TABLE- 5.3

RESPONSES ON FOREST MANAGEMENT & JOINT FOREST MANAGEMENT SCHEME

Reasons	Common People	N.G.O Personnel	Forest Personnel
Sample Size	600	27	49
1. Aware about JFM	---	48.15	71.43
2. Support implementation of JFM	--	--	65.31
3. Difficult to motivate people for participating in JFM	--	---	61.22
4. Non Availability of fund to start JFM	--	---	5120
5 Training on JFM required for forest officials	--	---	63.27

Figures indicate per cent only

The questionnaires also contained questions seeking suggestions from the respondents for forest protection and management. Respondents of all the three categories have put forward number of suggestions in this regard. The suggestions have been presented in edited form in Table 5.4. All the three groups of respondents have given emphasis on three points :- (1) Check corruption in the Forest Department, (2) People should be educated on the effect of deforestation, and (3) eviction of encroachers. NGO personnel are particularly vocal about corruption, nepotism, etc allegedly prevailing in the Forest Department A section of common people and some NGO personnel are unanimous in three points :- (1) Plantation of trees, (2) Deploying army/police personnel to guard the forests, and (3) engage unemployed youths to protect forests. Two common points raised by the common people and the forest personnel are :- (1) check population growth, and (2) introduce alternative means of livelihood. The common people have been more affected by flood and hence suggested for flood control. At the same time 45% of the respondents of this category had suggested that illegal extraction of forest produce should be stopped. 81% of the NGO personnel feel that the responsibility of protecting and managing forests should be given to the NGOs. Most of the forest personnel (more than 85%) strongly feel that (1) Infrastructure of the Department should be

improved, and (2) Financial condition of the Department be enhanced so that payment etc. could be made regularly. All the suggestions are highly feasible.

TABLE -5.4
SUGGESTIONS FOR FOREST PROTECTION AND MANAGEMENT

Reasons	Common People	N.G.O Personnel	Forest Personnel
Sample Size	600	27	49
1. Check corruption, nepotism, red-tapism in the forest department	45.92	74.07	24.49
2. People should be educated on the effect of deforestation	54.08	44.44	51.02
3. Eviction of encroachers	70.00	92.59	87.76
4. Emphasis on plantation of trees	13.00	66.67	---
5. Appoint army/police to protect forest	40.00	15.56	**---**
6. Unemployed should be engaged in forest protection	18.00	44.44	---
7. Check population growth	10.00	---	81.63
8. Alternative income avenues for forest dependent people	52.00	---	59.18
9 . Control floods	62.00	---	---
10. Control illegal extraction	45.00	---	---
11. Forest should be given to local people for management	74.00	---	---
12. Involve NGOs in protection and development of forest	---	81.48	---
13. Financial condition be upgraded	---	---	91.83
14. Infrastructure be upgraded	---	---	85.71

Figures indicate per cent only

5.2 ANALYSIS OF VILLAGER-RESPONDENTS' PERCEPTION :

A survey of 600 households near the forests was conducted through a questionnaire (Appendix – I). The Socio-economic profile of the respondents are presented in Table 5.5. All the respondents are adults. A simple majority of them belongs to the middle-age group and the remaining are aged people. The same distribution pattern is observed in all the three forest divisions. As a whole it is understood that a majority of the respondents have better understanding of the

life out of their age. Regarding sex wise distribution of respondents, 67.33 per cent of the respondents are male and the remaining are female respondents.

TABLE – 5.5
SOCIO-ECONOMIC PROFILE OF RESPONDENTS

RESPONSE	% OF RESPONDENTS --DIVISION WISE			
	LAKHIMPUR	SONITPUR (EAST)	SONITPUR (WEST)	TOTAL
a) Age:				
30--40	18	22	29	23
41--50	39	34	31	34.67
51--60	25	20	34	26.33
60 and above	18	24	6	16
b) Sex:				
Male	63	72	67	67.33
Female	37	28	33	32.66
c) Social Status:				
SC	14	35	3	17.33
ST	54	27	55	45.33
Ex-tea garden labour	4	29	37	23.33
Others	28	9	5	14
d) Number of dependents				
1--3	24	24	25	24.33
4--6	56	49	65	56.67
7 & above	20	27	10	19
e) Occupation				
Cultivation	54	62	44	53.33
Labour	30	21	16	22.33
Service	5	10	17	10.33
Business	8	7	7	7.67
Others	3		16	6.33
f) Income				
Less than 1500	38	49	46	44.33
1501 to 3000	56	38	41	45
3000 to 5000	4	13	8	8.33
5000 & above	2		5	2.34
g) Distance from residence to forests				
0.0-- 0	25	33	29	29
0--3.5	33	67	57	52.33
3.5 -- 7	42		14	18.67

NOTE: FIGURES REVEL VERTICAL PERCENTAGE.

As regards social status of the respondents, nearly half (45.33%) of them belonged to tribal community followed by ex-tea garden labourer (23.33%), scheduled castes 17.33 per cent, and remaining 14 % belonged to upper castes. As a whole it is understood that a greater majority of them belonged to under-

privileged segments of the society. Pertaining to number of dependents of the respondents, a majority of the respondents were having more than four dependents. Relating to occupation of the respondent three-fourth of the respondent had been continuing with agriculture-related activities. A greater majority of the respondents pull on with a meager annual income below Rs3000.00. As regards physical proximity of the respondents to reserved forest a simple majority of them were staying within 3.50 Kms distance. More than one fourth of them were staying within the forest area and 18.67 percent were only staying between 3.50 and 7 Kms distance. In all the above variable analysis, division wise distribution reflects more or less similar trends. It may be concluded that the majority of the respondents were elderly, male people living below poverty line, having more number of dependents, depending on agricultural activities, and staying a bit away from the forest.

Details regarding the origin of the respondents are presented in Table 5.6. Regarding nature of respondent settlement in their respective forest encroachment and the revenue villages, 63.33% had been staying permanently for a long time. It is also significant to note that more than one third of them were migrants. Among the migrant respondents, a simple majority migrated within the State and around thirty per cent of them came from other states. It is also important to note that 15.45per cent of them had migrated from neighboring countries. The reasons that are responsible for their migration are economic (26.36%), flood (38.18%), Political (20.91%). In response to a question regarding the reasons for selecting a particular site for migration, the migrants mentioned few reasons such as easy extraction of resources(54.55%), fertile land (30.00%), and other reasons like social and political reasons (15.45%). On the whole it is learnt that even though majority of them are permanent resident of the villages near the forests, economic, political and flood factors, besides rich forest and the land resources had attracted significant number of respondents from outside the state and country.

TABLE – 5.6

DETAILS OF ORIGIN OF RESPONDENTS

RESPONSE	% OF RESPONDENTS --DIVISION WISE			
	LAKHIMPUR	SONITPUR (EAST)	SONITPUR (WEST)	TOTAL
a) Nature of Settlement				
Permanent	63	56	71	63.33
Migrated	37	44	29	36.67
b) Sources of Migration				
Within the state	54.05	65.91	34.48	53.64
Outside of state	29.73	20.45	48.28	30.91
Outside of country	16.22	13.64	17.24	15.45
c) Reasons for Migration				
Economic	21.62	27.27	31.03	26.36
Flood	35.14	38.64	41.38	38.18
Political	16.22	20.45	27.58	20.91
Others	27.03	13.64	0	14.55
d) Reasons for selecting the place for settlement				
Easy extraction of resources	59.46	54.55	48.28	54.55
Fertile land	29.73	31.82	27.59	30
Others	10.81	13.64	24.14	15.45

NOTE : FIGURES UNDER EACH HEAD REVEAL VERTICAL PERCENTAGE

In Table 5.7 dependency of the respondents with forest resources have been discussed. It is understood that nearly two third of the respondents do not depend on forest products, whereas the remaining (36.67%) had been extracting forest products for their livelihood. Out of the forest dependent people, 67.27% extract firewood, and the remaining 32.73% collect timber and minor forest products. It is also noticed that they were extracting mostly from reserved forest (92.73%) and government land (7.27%). From the above discussion it may be concluded that the very concept of reserved forest is not there, and that people have been extracting forest products from the RFs freely.

TABLE - 5.7

DEPENDENCY OF RESPONDENTS ON FORESTS

RESPONSE	% OF RESPONDENTS --DIVISION WISE			
	LAKHIMPUR	SONITPUR (EAST)	SONITPUR (WEST)	TOTAL
a) Dependence on Forest Product				
Yes	32	43	35	36.67
No	68	57	65	63.33
b) Dependence for Nature of Forest products				
Firewood	65.63	72.09	62.86	67.27
Timber non-sal	34.37	27.91	37.14	32.73
c) Sources of Extraction Products				
Govt. Land	6.25	6.97	8.57	7.27
Reserved Forest	93.75	93.03	91.43	92.73

NOTE: FIGURES REVEAL VERTICAL PERCENTAGE

An attempt was made to know about the awareness of the people about the forests. The findings are presented in Table 5.8. It appears that majority (63.34%) of the respondents are not very much sure about the forest resources available in the nearby forests. While 77.34% of the respondents know that the forest resources are declining, the rest feel that the resources are on the increase. Around 67% of the respondents have even identified some causes of the declining trend of the forests. It is a good sign that majority of the people are aware about the declining trend of the forest resources. If properly utilized, this awareness could motivate the people to take part in protection and growth of forests. The respondents have expressed that it is to be the combined effort of the government and the public to protect the forests from further deterioration. People's participation in the government schemes can only make the schemes successful .

TABLE - 5.8

KNOWLEDGE ABOUT RESOURCES IN THE RESERVED FORESTS

RESPONSE	% OF RESPONDANTS --DIVISION WISE			
	LAKHIMPUR	SONITPUR (EAST)	SONITPUR (WEST)	TOTAL
a) **Type of available Products**				
No response	68	57	65	63.34
fire wood /non-sal	25	29	25	26.33
Timber non -sal	7	14	10	10.33
b) Trend of growth of Forest products				
Declining	85	74	74	77.67
Increasing	15	26	26	22.33
c) Reasons for Declining				
Govt. official & Forest policy	24.7	24.32	21.62	23.61
Political Parties encroachment	21.18	25.68	28.38	24.89
Illegal extraction	20	16.22	18.92	18.45
Do not know	34.12	33.78	31.08	33.05
d) How to prevent depleting of resources				
Govt. effort	47.05	47.3	43.24	45.92
Peoples' effort	52.95	52.7	56.76	54.08

(NOTE: FIGURES UNDER EACH HEAD REVEAL VERTICAL PERCENTAGE)

Respondents were interviewed to learn about their concern regarding encroachments. In fact , some of the respondents were encroachers themselves. The findings have been presented in Table 5.9. It has been revealed that a greater majority of them were aware that encroachment of reserved forest area had been increasing. Only 22.00 percent said that there was no encroachment. In fact this group of respondents may be the encroacher at some point of time. It is also very interesting to note that a majority (57.33%) of them opined that their family incomes were not affected because of encroachment of forest areas, but 42.67 percent express that their incomes were affected. The later group could be the people dependent on forests for their livelihood. Another important finding was that of most them (75.67%) feel that encroachment has not created any social problem, whereas 24.33 percent feel that some social problems have resulted out of encroachment by outsiders. Regarding eviction of encroachers 27.67 percent expressed that there was no

government initiative; whereas 37.33% stated that government was initiating some measures to evict encroachers; the rest 35.00 percent expressed that they do not have any knowledge of such govt. action for eviction. It is also understood that in most of the cases, public were not reacting to eviction of encroachers whereas 43.33 percent of the respondents support eviction of encroachers from forest area. From the above discussion it is learnt that a majority of the respondents were aware about encroachment of forest areas and also are conscious about the effects of encroachment. Even though many of them feel that there has been no social problem with encroachers, they were very much sensitive about their economic benefits that may be taken away by encroachers . It is also noticed that govt. initiative was negligible to evict encroachers and that they were also extending co-operation to encroachers for permanent settlement.

TABLE - 5.9
IMPACT OF ENCROACHMENT

RESPONSE	% OF RESPONDANTS --DIVISION WISE			
	LAKHIMPUR	**SONITPUR (EAST)**	**SONITPUR (WEST)**	**TOTAL**
a) Know about illegal encroachment near your village				
Yes	71	82	79	77.33
No	29	18	21	22.67
b) Affecting your family earning				
Yes	36	42	49	42.67
No	64	57	51	57.33
c) Has created social problem				
Yes	28	24	21	24.33
No	72	76	79	75.67
d) Govt. Initiative For eviction				
Do not know	29	35	41	35
Govt. has taken action	34	41	37	37.33
No Govt. action	37	24	22	27.67
e) Public reaction towards eviction of Encroachers.				
No reaction	58	59	53	56.67
Support eviction	42	41	47	43.33

NOTE: FIGURES UNDER EACH HEAD REVEAL VERTICAL PERCENTAGE

Table 5.10 provides information regarding some extraction related aspects. While 70.55% of the respondents informed that they go for cutting the branches of trees to be used as firewood, the rest go for cutting the whole tree. Besides, 46.36% of them were felling matured trees, and 26.36% were cutting immature trees also, while 27.27% had not given any response regarding what type of trees were being cut by them. 59.10% of the respondents were using heavy weapons & remaining (40.90%) were using light weapons for cutting the trees. It implies that majority of the extractors go for cutting large trees. It is also noticed that around 78% of the respondents use to go alone to the forest for the purpose of extracting forest produce. It is also understood that around 46.82% of the respondents cover more than 7km to fetch the forest produce, and 28.18% of them cover a distance between 3 to 7 km for the purpose. It clearly shows that it is not the nearness to the forests that prompt people to extract forest produce, but it is the need (for own consumption or for earning livelihood) for forest produce that drive the people to such acts. The modes of ransport used are bullock cart and bicycle, though some people (staying close to the forest) carry it on their heads. Bicycles are used extensively to carry the forest produce. The study team noticed it while surveying some forests. Besides, in many Beat Offices hundreds of bicycles were seen which are being kept in stacks. These bicycles were seized by the Forest Officials from persons engaged in illegal extraction of forest produce. It is not that the persons involved do not find any resistance at all. Public, Forest Officials, Police do intercept from time to time. However, it is alleged that in most of the cases it is a matter of bribing the concerned people to carry on the illegal work. Regarding Strategies used for illegal extraction 37.33 percent express that they were indulging in illegal extraction by bribing forest personnel. Some 23 percent shared that illegal extraction was carried out during night time. 18.33% of the respondents informed that they use weapons to scare the forest officials or whoever may put resistance in illegal forest extraction. 64% of the respondents had involvement in illegal extraction of forest produce. Majority of the respondents (61.11%) earn a meager amount of Rs. 5000 or less annually from the sale of the forest produce they extract. A good sign is that majority (68.67%) of the respondents feel that ‘something’ is being lost by illegal extraction of forest produce. This could be a

motivating factor for the common people to take part in tree plantation and in preservation of forests.

TABLE - 5.10

EXTRACTION RELATED ASPECTS

RESPONSE	% OF RESPONDANTS -DIVISION WISE			
	LAKHIMPUR	SONITPUR (EAST)	SONITPUR (WEST)	TOTAL
a) Nature of felling				
Whole Tree	23.45	29.25	35.65	29.45
Only Branch	76.55	70.75	64.35	70.55
b) Type of tree felling				
No Response	18.75	25.58	37.14	27.27
Immature	25	27.91	25.71	26.36
Mature	56.25	46.51	37.14	46.36
c) Weapons used				
Heavy	62.5	48.84	68.57	59.1
Light	37.5	51.16	31.43	40.9
d) Extraction in group/alone				
Individual	84.38	74.42	77.14	78.18
In Group	15.62	25.58	22.86	21.82
e) Distance to go for extraction				
0 to 3	21.88	27.91	25.71	25.45
4 to 7	37.5	18.6	31.43	28.18
More than 7	40.63	53.49	42.86	46.82
f) Mode of transportation				
Bullock cart	6.25	9.3	8.57	8.18
Cycle	50	48.84	51.43	50
Person	40.63	41.86	4	41.82
g) Whether faced in extraction problem				
Yes	37.5	25.58	37.14	32.73
No	62.5	74.42	62.66	67.27
h) Problem from				
Public	16.67	18.18	23.08	19.44
Forest Official	50	45.45	46.15	47.22
Police Personnel	33.33	36.36	30.77	33.33
i) Strategy used for illegal extraction				
Bribing forest personnel	38	42	32	37.33
Felling at Night	32	22	15	23
With Weapons	5	9	41	18.33
Others	25	27	12	21.33
j) Ever involved in illegal extraction				
No	62	66	64	64
Yes	38	34	36	6
k) Annual income from illegal extraction (in Rupees)				
Less than 5000	57.9	58.82	66.67	61.11
5000 - 10000	31.58	31.58	22.22	26.85
More than 10000	10.52	10.52	11.11	12.04
l) Peoples' feeling about illegal extraction				
Losing something	0	54	0	18
No comment	2	20	18	13.33
Yes	98	26	82	68.67

(NOTE: FIGURES REVEAL VERTICAL PERCENTAGE)

Details regarding selling of forest products by the respondent who are involved in the process of extraction and selling have been discussed in the Table 5.11. Nearly half of the respondents were selling their fuel wood in the nearby village market, a few of them were selling to either middlemen or contractors. Even though a simple majority were able to set reasonable price for their products a significant number were forced to sell their product at low price. Even though many of them were not facing much problems some of them were facing problems like not getting adequate amount of revenue for their efforts to meet their livelihood requirement. From the above discussion it may be concluded that the products were sold in nearby village markets and to the contractors at average price.

TABLE - 5.11

DETAILS REGARDING SELLING OF FOREST PRODUCTS

RESPONSE	**% OF RESPONDANTS --DIVISION WISE**			
	LAKHIMPUR	**SONITPUR (EAST)**	**SONITPUR (WEST)**	**TOTAL**
a) Whom sold (Target Customer)				
Village Market	46.88	44.19	48.57	46.36
Middlemen	15.63	16.28	20	17.27
Contractors	21.88	20.93	25.71	22.73
Others	15.63	18.6	5.71	13.64
b) Prices of the product				
Low	53.13	41.86	45.71	46.36
Average	46.88	58.14	54.29	53.64
c) Any problem in selling				
Yes	28.13	16.28	31.421	24.55
No	71.87	83.72	68.58	75.45
d) Adequacy of earning for livelihood out of selling				
Yes	43.75	48.84	51.43	48.18
No	56.25	51.16	48.57	51.82

(NOTE: FIGURES REVEAL VERTICAL PERCENTAGE)

Table 5.12 depicts the details regarding association of common people with tree plantation program. Only 45% of them had taken part in plantation work, and out of them 41% had done so occasionally, and only 4% had taken part in regular plantation program. 34.67% of the respondents have expressed that they were not taking part in any plantation program because they were not advised to do so by any agency. Majority of the respondents are aware about the on-going social forestry program, and

TABLE - 5.12

ASSOCIATION WITH PLANTATION

RESPONSE	% OF RESPONDANTS -DIVISION WISE			
	LAKHIMPUR	SONITPUR (EAST)	SONITPUR (WEST)	TOTAL
a) Your initiative for forestation				
Yes	37	32	65	44.66
No	36	68	35	55.34
b) Frequency of plantation				
No response	63	69	34	55
Occasionally	34	24	65	41
Regularly	3	8	1	4
c) Reasons for non plantation				
No response	36	32	65	44.33
Lack of advice	33	50	21	34.67
Material scarcity	31	18	14	21
d) Awareness about social forestry plantation in your area				
No	53	54	31	46
Yes	47	46	69	54
e) If aware, your participation in social forestry				
NO	65	79	59	67.67
Yes	35	21	41	32.33
f) Usefulness about social forestry				
No response	12	14	11	12.33
Yes	62	63	69	64.67
No	26	23	20	23
g) Knowledge of NGOs initiative for plantation in your area				
Yes	15	26	51	30.67
No	85	74	49	69.33

(NOTE: FIGURES REVEAL VERTICAL PERCENTAGE)

Respondents were asked about their knowledge about common property resource and their willingness to join such schemes. The responses have been presented in Table 5.13. It is observed that as many as 36% of the respondents from Sonitpur East Forest Division are not aware about CPR, whereas only small percent (2 to 3) percent of the respondents from the other two divisions under consideration are not aware about it.

TABLE - 5.13

AWARENESS ABOUT COMMON PROPERTY RESOURCE

RESPONSE	% OF RESPONDANTS -DIVISION WISE			
	LAKHIMPUR	SONITPUR (EAST)	SONITPUR (WEST)	TOTAL
Not aware about CPR	2	36	3	13.67
Yes, I want to Join	No response	45	95	79.33
No, I do not want to join	98	19	2	7

(NOTE: FIGURES SHOWN REVEAL VERTICAL PERCENTAGES)

5.3 NGO-RESPONDENTS' VIEWPOINTS :

Views of 27 NGO personnel regarding various issues of forests were collected through a questionnaire (Appendix - II). The profiles of the NGOs are presented in Tables 5.14 to 5.16

TABLE - 5.14

BREAK-UP OF NGOS' CONTACTED

Divisions	% of NGOs' Respondents
1. Sonitpur (East)	29.63
2. Sonitpur (West)	25.93
3. Lakhimpur	44.44
Total	**100.00**

TABLE - 5.15

EXPERIENCE OF NGOS'

Divisions/ Experience	Less than 5 years	More than 5 years	Total
1. Sonitpur (East)	62.50	3 7.50	100
2. Sonitpur (West)	57.14	42.86	100
3. Lakhimpur	83.33	16.67	100
Total	70.37	29.63	100

(Note : Figures indicate percentage to the total)

The NGOs contacted are involved with various activities like education, environment, and different types of social work. The distribution is presented in Table 5.16. Out of the 27 NGOs, as many as 10 are involved with environmental matters, mainly forests

TABLE - 5.16

MAJOR ACTIVITIES OF THE NGO'S

Division/ Activities	Education	Environment	Social work	Total
1. Sonitpur (East)	25.00	37.50	37.50	100
2. Sonitpur (West)	28.57	42.86	28.57	100
3. Lakhimpur	50.00	33.33	16.66	100
Total	39.04	37.04	27.93	100

(Note : Figures indicate horizontal percentages to the total.)

Most of the findings obtained through the questionnaire have been presented, along with the findings of the other two groups of respondents, in the Tables 5.1 to 5.4. The NGOs had mentioned about some activities that they had taken

up for protecting the forests. The activities mentioned are presented in Table 5.17. The major activity of the NGOs had been to educate people about the danger of deforestation and to create awareness about the need for forest preservation. Thus maximum activities had been to organize meetings among the common people. The other major activity has been to take up plantation work at public places like institutions etc. This should be an eye-opener for Government agencies and other NGOs involved in environmental matters.

TABLE- 5.17

ACTIVITIES ORGANIZED BY NGO'S TO PROTECT FOREST

Steps	% of Respondents.
Organizing meetings	85.19
Publishing articles	18.52
Plantations of trees in schools & others common place	55.56
Co- operating with Govt. in eviction & other process	44.44

(Note : Each respondent has given more than one response.)

5.4 FOREST PERSONNEL -RESPONDENTS' OPINION :

A questionnaire (Appendix-III) was administered among 49 forest officers and field workers. The profiles of the respondents are presented in tabular form in Table 5.18 and Table 5.19. Most of the findings obtained through the questionnaire have been presented, along with the findings of the other two groups of respondents, in the Tables 5.1 to 5.4.

Regarding the problems faced by the employees, all the respondents were almost unanimous in their opinions. The problems mentioned by the respondents are presented in Table 5.20. The problems listed are (i) Lack of facilities (95.92%), (ii) Problem from extremists (93.88%), (iii) Financial Problem and encroachers (91.84%), (iv) Shortage of manpower (85.71%), (v). Political interference, and problem from unemployed youths (59.18%).

TABLE - 5.18

DIVISION- WISE DISTRIBUTION OF EMPLOYEES:

Division / Category	Sonitpur (East)	Sonitpur (west)	Lakhimpur	Total
Officers	41.18	44.44	28.57	38.78
Non-officers	58.82	55.56	71.43	61.22
Total	100	100	100	100

(Note : Figures indicate vertical percentages to the total .)

TABLE - 5.19

SERVICE EXPERIENCE OF THE RESPONDENTS

Years of experience/ category	Less than 10 years	10 to 20 years	More than 20 years	Total
Officers	21.05	52.63	26.32	100
Non-officers	20.00	40.00	40.00	100
Total	20.41	44.90	34.69	100

(Note : Figures indicate horizontal percentages of total .)

TABLE - 5.20

PROBLEMS FACED BY FOREST OFFICERS / EMPLOYEES IN PROTECTING FOREST

Problems	% of Respondents.
Financial problems	91.84
Extremist problems	93.88
Shortage of man power	85.71
Facilities like communication, uniforms, arms are unavailable	95.92
Political pressure transfer	59.18
Encroachment	91.84
Unemployment youths	59.18

(Note : Each respondent has mentioned more than one view .)

The fall-outs of forest depletion as realized by the forest personnel are presented in Table 5.21. A high percent of respondents consider that the change in the behavior of wild animals (81.63%) and economic loss to the society (71.43%) are the fall outs of deforestation. The other two effects mentioned are : flood and erosion (59.18%), and ecological imbalance (55.10%)

TABLE - 5.21

FALL OUTS OF DEFORESTATION

Comments	% of Respondents
Change in weather	36.73
Flood and erosion	59.18
Change in wild animal behavior	81.63
Ecological imbalance	55.10
Economic loss	71.43

(Note : Each respondent has mentioned more than one view.)

5.5 CONCLUSION :

Three categories of people involved directly or indirectly with forests were interviewed through separate questionnaire to collect their opinions and understanding about various aspects of forests. The responses from the surveys have been able to shed light on the problem of haphazard extraction of forest products. It is heartening to note hat the respondents were aware about the various facets of forest operations and problems. In most of the issues on which the surveys were conducted there seem to be consensus among the respondents of the three categories. For example, a high percentage of respondents from each category have pointed out that the contractors, encroachers, unemployed youths are the main entities responsible for fast depletion of forests. Thus, the problems have been identified and it should help the study team in formulating policies for sustainable extraction of forest products.

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CHAPTER 6 : ECONOMIC VALUATION OF FOREST ECOSYSTEM

6.1 FOREST ECOSYSTEM:

Forest are complex eco-systems which fulfil an incredible array of both tangible as well as intangible functions that benefit people. Yet, even today, many decision makers continue to measure forest in terms of the volume of timber extracted only. And once the useful timber is extracted, the forests are converted into agricultural fields and for human settlement. Such attitudes coupled with the fundamental socio-economic forces have led to the rapid rate of loss and degradation of forest areas. The need of the day is therefore:

i) To understand the forces that the forests are exposed to,

ii) To assess the economic values for tangible as well as intangible product/services/benefits that the forests provide to the people and

iii) To develop strategies to counter these forces with actual valuation insights.

The benefits that the forests provide to the people can be classified into five categories namely :

i) Direct extractive benefits.

ii) Direct, Non-extractive benefits.

iii) Indirect benefits

iv) Optional benefits

iv) Passive uses.

6.1.1 DIRECT EXTRACTIVE BENEFITS:

These are the personal uses of materials originating from the forests which can be listed as follows:

a) Timber
b) Medicinal & Aromatic Plants
c) Bamboo
d) Forest Wastes for Dry Flowers
e) Cane
f) Cocoon
g) Reeds
h) Honey
i) Grass
j) Lac
k) Orchids and other natural resources like minerals, primarily sand and gravel.

6.1.2 DIRECT NON-EXTRACTIVE BENEFITS:

The **direct but little or non-extractive benefits** are primarily the T**ourism Industry** and study for **Scientific Knowledge** associated with the forests. In this context, it is relevant to state that an analysis of over 16000 tourists into the state in 1997 reveal 92% of the foreign tourists and 65% of the domestic tourist made Kaziranga and Manas as their ultimate destination. The other centres of tourist attractions were Orang, Jatinga and Bhalukpung. Hence the tourism Industry in Assam is due to the forests and their rich and unique inventory. The very fact that none of the above destinations have the desired facilities, (the Tourist function (TF) value being less than 1.0% other than that for Kaziranga which being 15.7% is also poor considering its location and the demography) the tourist traffic reflect the high level of popularity of these destinations. As such, the forests of Assam are paradise for botanists, zoologists and nature lovers : And form a part of global bio-diversity **hot spot**. The 13 National parks and Wild-life sanctuaries are the habitat for over 180 spices of mammals, more than 800 spices birds and 195 species of reptiles including 119 species of snakes and 21 species of turtles amongst which 31 species of mammals, 14 species of amphibians and reptiles have been identified as rare and endangered.

The valuation of forests for such non-extractive benefits and non-market commodity or benefits like nature tourism and visits for gathering scientific knowledge can be carried out by adopting techniques like Travel Cost Method (TCM) based on the actual expenditures incurred.

6.1.3 THE INDIRECT BENEFITS:

The indirect benefits which the forests provide to the people are numerous, the importance of which are increasing day by day. The depleting sources of fresh water threatening many nations in the near future has led to serious global awareness for preservation and development of the wetlands which are again directly related to the forests. Even without going into the complex interdependency of eco-subsystems and their co-relations, the indirect but tangible benefits which the forest provide to the people can be listed as :

a) Forests enhance water holding capacity of the soil
b) Forests enhance ground water recharging capacity
c) Forests enhance capacity to retain soil nutrients
d) Forests enhance qualities to conserve soil
e) Forests enhance fertility to the top soil of the fringe areas
f) Forests reduce hazards from floods, storm & wind
g) Forests enhance capacity to purify the air.

In an experiment conducted to " Study Certain Effects of De-forestations : Effect on Edaphic Factors in selected areas in Goalpara district " by M. Ahmed and Prof. N.K. Das of Gauhati University, 72 samples of soil were collected at various depths of 0-15, 15-30, 30-60, 60-90 cm and were analyzed for various effects for the summer as well as winter seasons results of which are summarized as under :

1. That the soil from forested area have fine clay loam texture, and the water holding capacity is considerably higher than that of soil from deforested areas.
2. That the soil pH value is generally higher for deforested areas than in the forested areas.
3. That the phosphate P_2O_5 content (kg/ Acre) in the soil is generally observed to be lower in deforested land than in the forested land. The depth variation is however similar.
4. Similarly, the value of Potassium, K_2O content (kg / Acre) is higher for forested areas than for the deforested areas.

5. The carbon content is also higher for soil at the surface from forested areas than at the soil from deforested areas.
6. The metals, namely Copper (Cu), Zinc (Zn) and Iron (Fe) content of the soil at surface for forested areas are found to be higher than in case of the soil from deforested areas.
7. The Nitrogen as well as carbon contents of the soil in forested areas is higher than that of the soil in deforested area.

The results of the experiments reveal that the soil parameter had been significantly affected due to deforestation processes and it can, therefore be, conclusively stated that the fertility and the plant yield in the forest areas are markedly higher than in the deforested areas. It is also observed that the productivity in the deforested areas is high in the initial few years because of the residual fertility due to forest but there after, the loss of soil fertility is rapid and the land becomes useless for any agricultural use. The bare, exposed soil is then subjected to run-off process in which fine clay particles are eroded more selectively leaving the soil nutrient poor and barren.

The assessment of the loss of benefits due to deforestation can only be evaluated through observations over number of years that too without any additional inputs to the soil like manure or fertilizers. Alternatively, such valuation can also be carried out through Benefit Transfer instead of the prolonged and expensive custom research provided Environment Valuation Reference Inventory (EVRI) becomes available for use. In view of the lack of such data base in the country, limitation on the scope of the study and the constraints on the time, such environmental valuations become beyond the scope of this study. Although some data may be obtained from developed nations like Canada and the U.S.A., but due to the grossly different socio-economic status of the population of India in general and Assam in particular, such reference have little significance in valuation of such indirect benefits or losses. It will be therefore necessary to conduct custom research adopting techniques like Contingent Valuation Method (CVM) where valuation can be interpreted through the respondents' willingness to pay (WTP) or accept (WTA) for the proposed commodity or benefit.

6.1.4 PASSIVE & OPTIONAL BENEFITS :

One major reason for degradation of forests and their conservation to alternative use is the lack of understanding of public values of forest and their valuation techniques The indirect and passive benefits that the forest provide to the people may ultimately constitute a major part of the total economic benefits to the people. There public or non-market value of forest have also been classified either as **passive or option value** or as **existence, option and bequest value.**

While **Existence value** which the valuer attributes in order to prevent it from being extinct or damaged is dependent on a number of population attributes which includes education, economic status, employment opportunities, population density etc. Such values are also relative to the gross environmental status of the region or nation. For example, a small forest which may be totally insignificant in Assam would be highly valued in Rajasthan. Therefore such valuation will need an analysis of the respondents' background as an individuals as well as a members of the society. The **Bequest Value** is the value which the valuers attribute to protect and preserve the quality environment for the future generations to enjoy as they enjoy today.

The case of identification and preservation of rare and endangered species of flora and fauna and even the preservation of cultural heritage is the outcome of realization of such values. Bequest value again is dependent in the valuers educational, economic and social ground. Both existence or bequest values can be considered together as Passive Value. It is quite evident that the such valuation are deeply influenced by the respondents values and value orientations as an individuals as well as a number of the society.

6.1.5 OPTION VALUE :

The **Option Value** which the valuer is willing to pay in order to preserve, so that the opportunity remains for him to avail the benefits at a later date. But actually he may never do so. Comparing it to more tangible terms a valuer may not enjoy the forest for hunting but if the forest continues to exist he may do so sometime in future.

6.2 VALUE ASSESSMENT :

Values of the different activities mentioned above could be calculated in various ways. In the absence of available authentic data certain subjective assessments criteria have been considered along-with certain objective assessment criteria.

6.2.1 FOR DIRECT, EXTRACTIVE BENEFITS:

In the following sections an attempt has been made to assess the values of the forest products like timber, bamboo, cane, thatch grass, hill grass, reeds, medicinal and aromatic plants, and other non-wood forest products.

6.2.1.1. Timber Extraction :

A. Recorded timber production (govt) - **13,68,000 cft**

B. Recorded extraction of Fire wood (govt) - **42, 510 ton**

C. Illegal extraction of fire wood based on primary survey in Sonitpur, Lakhimpur districts and extrapolated for the state.

Illegal extraction in Sonitpur & Lakhimpur district is **6170 Mton**

(Primary survey)

The per capita consumption of illegally extracted fire wood for the two districts **(61,70,000 / 21,75,804)kg = 2.85kg**

Hence the estimated consumption of illegally extracted fire wood for Assam is **74,146 Mt**.

Total consumption of firewood in the state is **1, 16, 650 Mt**.

D. Illegal Extraction of Timber **:**

The data and information for illegal extraction of timber cannot be authenticated as neither the forest department nor the police records are available. The market of illegally extracted timber are primarily the furniture manufacturing units and individuals for construction of houses . Even primary survey is extremely difficult as most activities are carried out during night and early hours of the day. The methodology adopted for assessment is based on the analysis of the impact of " ban on felling of trees by the supreme court in 1995-96 ".

The ban on felling of trees was vehemently opposed by the timber traders but surprisingly there was no response from the workers or the forest operators engaged for extraction of timber.Also there was no changes of state statistics on the unemployment. No news paper report or article has been seen stating the plight of the timber workers after the ban ; And it is most unlikely that these workers had found alternative employment. This can only mean that the workers had not actually lost their employment opportunities and continued their activities, although reduction in volume was possible. Considering the fact that illegal extraction was prevalent even before the ban, the volume of illegal extraction can be taken as the average (10 years before ban) difference of net revenue earned before the ban and after the ban as seen in table 4.9. The reasoning can further be substantiated by the fact that there had been no apparent change of life style of the forest workers both private as well as government employees inspite of the loss of revenue on account of legal felling. The assessed volume thus is **27185 CuM** which at current lowest market price of Rs. 14,250 per CuM (Rs. 400 per Cft.) is valued at **Rs. 38.7 crores** annually.

The total value of timber extracted from the forest (at market price)

i)	Legally extracted timber	-	Rs. 54,72,00,000.00
ii)	Illegally extracted timber	-	Rs. 38,70,00,000.00
iii)	Legally extracted firewood	-	Rs 8,50,00,000.00
iv)	Illegally extracted firewood		Rs 14,83,00,000.00
			Rs. 1,16,75,00,000.00

6.2.1.2. BAMBOO :

The total production of green bamboo for the state is estimated at 75,34,700 Mt

(A study conducted by Agriculture Finance Corpn. on behalf of Hindustan Paper Corpn. Ltd. in 1998)

Considering the market price to be at par with the purchase rates of HPC (direct purchase scheme for individual grower @ 1100/- per Mton of green bamboo at coup head) the net annual value of bamboo extracted is **Rs**. **828 crores**. HPC alone procures bamboo to the extent of Rs 95 crores for their 300 TPA paper mills

at Jagiroad & Panchgram. Besides the above, the Ashok paper mill (when in operation) procured bamboo to an extent of Rs. 15.0 Crores.

Bamboo, however, is grown also within the village residential areas as well as in non-forest areas.The estimate for valuation of the forest , the analysis of the source of supply to HPC paper mill is considered as the basis which accounts to 30% being forest extraction. Accordingly the estimated forest value on account of bamboo is **Rs. 248.40 crores**.

6.2.1.3. Cane :

The estimated production of cane of various grades is estimated at 8000 m tons

(as estimated by trifed, guwahati). Although the price of cane is based on the girth, length and species, the average cost for assessment is taken at the lowest market price of rs. 2500 per kg and accordingly the value of cane extracted per annum is estimated at **rs. 2.00 crores**.

6.2.1.4. Thatch Grass :

Considering the number of temporary hutments of the state numbering to 2.40 million (NBO), the requirement of thatch grass (based on average size of a household to be 30 Sqm) is 1.60 million bundles (of size 3"- 4" dia) per year (considering replacement every 3 years). Accordingly, the estimated value of the thatch grass is Rs. 32.0 crores/annum. However, as the thatch grass also grows in the riverine (*char*) areas not included in the forests, the value considered for assessment is taken at 50% (based on the area covered). The value assessed thus is **16.0 crores** per Annum.

6.2.1.5. Hill Grass (*Phool Jharu*)

Hill Grass is a major non-wood forest product of the region, It is estimated

(TRIFED, Guwahati) that about 9000 Mton. of Hill Grass go out of the state every year. Taking into account the consumption within the state, the estimated annual production is about 13,000 Mton and at the current market price of Rs. 15000.00 per Mton. at coup head the value is estimated at **Rs. 19.50 Crores**.

6.2.1.6. Reeds: (*Sheetal Pati / Patidoi, Ekra, Nal, Khagori)*

Sheetal pati or Patidoi, Ekra, Nal, Khagori different varieties of reeds generally grow in the swampy forest areas and are extracted for various uses such as building materials, for making mats, decorative and utility goods, household articles etc. Although no records or assessment has been made for extraction of these forest produces but based on the number of people engaged (primarily in Goalpara, Karimganj, Jorhat, Dibrugarh districts) the conservative estimate of **Rs. 1.5 Crores** can be considered as the value of annual extraction.

6.2.1.7 Medicinal & Aromatic Plants :

A large number of species of medicinal plants have already been identified which are widely available in the forests of Assam. Yet more are to be identified. The extraction of such plants and their parts such as flowers, leaves, barks, seeds, rhizomes, roots and stems are increasing every day. However no data are recorded for the volume or value of extraction. Often the products are under valued. The forest personnel being ignorant, cannot even identify the product, let alone their usage and value. The trade is totally unorganised and compilation of data cannot be made without primary survey. However a survey conducted amongst a few traders namely TRIFED, M/s Kamakhya Agarwal, M/s D. Baisya (whose annual trade amount to over Rs. 2.3 Crore, 10.0 Crore and 1.0 Crore respectively) reveal that the total estimated trading value will exceed over Rs. 100.0 Crores. Considering the growing awareness for Ayurvedic or herbal medicines all over the world, the value is likely to increase manifold. However, for the present purpose the value of extraction on account of medicinal and aromatic plants is taken at

Rs. 50.0 crores.

6.2.1.8 Other Non- wood Forest Products :

The non-wood forest products other than those stated above that are extracted regularly from the forests are Honey, wax, Orchids, Lac, sand, gravel etc which generated a government income of Rs, 8.5 Crores for the year 1998-99 as royalty . Considering the royalty value being 8 – 10 % of the market value, the market value of the products are estimated at **Rs. 85.0 Crores**.

6.2.2. SUMMARY OF THE ASSESSMENT OF FOREST VALUE

A. DIRECT, EXTRACTIVE BENEFITS :

(Value- Rs in Crores)

I)	Timber & Wood products :-			116.75
ii)	NWFP :			
a)	Bamboo	-	248.40	
b)	Grass (jharu)	-	19.50	
c)	Cane	-	2.00	
d)	Thatch	-	16.00	
e)	Sheetal pati	-	1.50	
f)	Medicinal plants	-	50.00	
g)	Other non-wood forest products	-	85.00	
			422.40	422.40

Total - Rs 539.15 Crores

B. DIRECT, NON–EXTRACTIVE BENEFITS

Tourists Visiting Assam

Year	Domestic Tourist	Foreign Tourist
1997	14, 238	723
1998	13,478	631
1999	14,336	596
2000 (p)	15,112	698

(Source : Regional Tourist Office, Govt. of India, Guwahati)

Considering that 92 % of the foreign tourists and 65% of domestic tourists in 1997 visited Assam with Kaziranga and Manas forests as their ultimate destination, number of tourists to The two major forest are

i) Foreign Tourist - 665

ii) Domestic Tourist - 9255

The average actual expenditure incurred by a tourist (as assessed by Tour Operators)

i) Foreign Tourist - 2000 US $ or Rs. 96,000.00

ii) Domestic Tourist - 9255 Rs. 6,000.00

The total actual gross expenditures incurred is estimated = **Rs. 11.93 Crores**

The expenditures incurred by local tourists from the neighbourhood areas, picnic goers etc. not utilising the available facilities are not included in the above assessment.

C. SUMMARY VALUATION OF DIRECT BENEFITS :

i) Direct Extractive Benefits - Rs. 539.15 Crores

ii) Direct Non-extractive Benefits Rs. 11.93 Crores

Toal - Rs 551.08 Crores

6.2.3. ECONOMICS OF CULTIVATION OF SALI PADDY CROP (Per Ha)

Sl. No.	Item	Unit	Cost (Rs)
A.	**Production Cost :**		
1.	Cost of preparation of land including bullock labour.... etc	30 Mandays	1800.00
2.	Cost of seed	40kg ha	480.00
3.	Cost of transplanting in the main field including upprooting in the nursery bed.	20 mandays	1200.00
4.	Cost of inter-culture	15 mandays	900.00
5.	Cost of fertilizer	Urea - 90kg	460.00
		SSP - 135kg	1150.00
		MOP - 30kg	230.00

6.	Cost of plant protection including labour cost		900.00
7.	Cost of irrigation		1125.00
8.	Cost of harvesting	20 mandays	1200.00
9.	Cost of transportation to the home	LS	300.00
10.	Cost of threshing including bullocks, labour	10 mandays	600.00
		Sub total :	***9345.00***

B. Cost of Marketing

1.	Cost of transportation to the market @ Rs. 10/at		450.00
2.	Market tax and other preparation cost for marketing		900.00
		Sub Total :	***1350.00***

Total Cost (A+B) = 10,695.00

C. Return :

Returns for 30 qtls of paddy @ Rs. 450.00 /qlt **Rs. 13,500.00**

Net profit per ha ***Rs, 2,805.00***

Say Rs. 2,800.00

6.2.4. ECONOMICS OF CULTIVATION OF MUSTARD (1 ha) :

Sl. No.	Item	Unit	Cost (Rs.)
A.	**Production Cost**		
1.	Cost of preparation of land including bullock labour	45 man-days	2700.00
2.	Cost of seed	10kg	200.00
3.	Cost of fertilizer	Urea = 90kg	450.00
		SSP = 225kg	1350.00
		MOP = 30kg	240.00
4.	Cost of plant protection	(LS)	500.00
5.	Cost of harvesting	15 man-days	900.00
6.	Cost carrying including	15 man-days	900.00
	threshing, bagging and preparation	15 bags	225.00
7.	Cost of marketing including transportation	LS	200.00

market tax etc.

_____

Sub - Total Cost 7665.00

B. **Return** :

10 qtl. @ Rs. 1000/qtl Rs. **10,000.00**

C. Net profit/ha (A – B) **Rs 2,335.00**

6.2.5. ECONOMICS OF PLANTATION OF SOFT WOOD (Per Hectare) :

A. EXPENDITURES (Per Hectare) :

First Year Cost :

I)	Cost of land preparation	-	7,500.00
ii)	Cost of planting material (400 Nos) (5' x 5')	-	8,000.00
iii)	Cost of labour for planting	-	1,000.00
iv)	Cost of manure & fertiliser (Lump sum)	-	3,500.00
v)	labour & Maintenance cost		
	I) 2nd Year	-	2,000.00
	I) 3rd Year	-	2,000.00
	I) 4thYear	-	2,000.00
	I) 5th Year	-	2,000.00
	I) 6th Year	-	2,000.00
	I) 7th Year	-	2,000.00
	I) 8thYear	-	2,000.00
	I) 9th Year	-	2,000.00
	I) 10thYear	-	2,000.00
	Total Expenditure	**Rs.**	**38,000.00**

B. Gross Return @ Rs. 840.00 x 320 plants per Ha = **Rs. 2,68,000.00**
C Net Return (B – A) = Rs. 2,30,000.00

Considering bank interest and the rate of inflation aggregating 50% annually the current rate of annual return is calculated **at Rs.5685.00 per ha**

6.3 CONCLUSION :

Although in view of the lack of database, constraints and limitations of the study, the actual valuation is beyond the scope of the study. Never the less it can be summarized from various literature study on the similar studies that the **passive** and **option values** are directly dependent on the respondents' background from which correlation between man and the environment (***Purush and Prakiti, as explained in Indian philosophy)*** can be quantified.

CHAPTER - 7: FINDINGS AND OBSERVATIONS

7.1 STUDY AREA AND DATA SOURCES:

This study on sustainable extraction level of forest products has been carried out in two districts, namely, Sonitpur and Lakhimpur Districts of Assam. These two districts consist of three forest divisions such as Sonitpur(East), Sonitpur(West), and Lakhimpur. Altogether there are ten forest range offices, which are governing seventeen reserved forests. The study has been aimed at recognizing the dynamics of forest resource extraction pattern and methods used by various parties concerned, identifying the reasons that are prompting extraction, and measuring the effectiveness of forestation programmes. Besides, socio-cultural based policy and administrative reforms will be proposed based on developed models and established relationship among various dependent and independent variables. For this purpose, it was planned to collect both primary and secondary data. Primary data were collected from forest villagers, forest department personnel, NGO workers, social scientists and academicians, legal and illegal furniture markets and timber dealers as well as from exit points for fuel wood. Secondary data were collected from various Central and State Government departments, research and training institutes. Appropriate statistical techniques were used in tabulation and analysis of data.

7.2 STATUS OF RESERVED FORESTS :

It is planned to study the effectiveness of the criteria and indicators that were developed and designed at Bhopal Workshop (IIFM 21-23 Jan 1999). Accordingly the required available data have been collected and presented in the Tables. It is observed that all the reserved forests are natural forests which are classified into semi-evergreen, dry-sal, teak and tropical forests. The major portion of the forests is considered to be semi-evergreen. It is also noticed that the forest area covered under fragile eco-system is also relatively more which is affecting the effective area of forest. Another important observation was that dense forest had gone down to a very minimum extent. Such type of forest could be seen only in two ranges, namely, Chariduar and Balipara. The forests are also poor in non-wood forest products (NWFP) and only cane and bamboo are available. Forests area converted for non-

forestry purpose has been increasing very fast in all reserved forests. It is understood that community forests were not there in the study area.

The eco-system maintenance was considered to be poor due to ineffective natural regeneration and succession, non-existence of secondary forest and heavy grazing. Bio-diversity conservation was understood to be very weak due to non-existence of Flora and Fauna. Besides medicinal and aromatic plants were not available. As regards forest resources productivity, the data reveal that the situation is not very conducive for sustaining its resource productivity due to poor management of forests. Even regarding forest resource utilization, the available data reveal that resources are exploited unscrupulously without considering ecological needs due to more illegal extraction, encroachment, corruption etc.

7. 3 FINDINGS FROM THE SURVEY:

A survey was conducted among Forest Villagers, Forest Employees, NGO Workers, Academicians, Social Workers, etc. The data so obtained are analyzed below:

7.3.1 *FOREST VILLAGER-RESPONDENTS' PERCEPTION :*

The findings from the Villager-respondents can be summarized as follows:

- Rich forest and land resources had attracted significant number of respondents from outside the state and country to settle in the present location.
- Forest resources started declining due to encroachment, illegal extraction and weak govt. policies.
- Most of the respondents cut matured trees partially.
- Problems/resistance that were faced from forest officials, police personnel, were relatively negligible.
- Forestation process has not been successful due to lack of people's initiative, lack of motivation by concerned authority and social institutions for the purpose.

- The respondents feel that govt. initiative was negligible in evicting the encroachers.
- Illegal extraction activities are carried out by bribing officials, threatening the officials, and cutting trees during night (theft).
- The respondents are having implicit spirit of motivation to join in such public oriented schemes like Common Property Resources (CPR) management. This is so because of the following important reasons:
    a. Poor people are dependent exclusively on forest product for livelihood;
    b. b. Contractors' high involvement in extraction with the help of poor people;
    c. Encroachers' involvement,
    d. Inability of common people to protect forest due to lack of security,

The suggestions given by this group of respondents are as follows:

a) Majority of them suggested that flood should be controlled,

b) Population growth rate should be reduced;

c) Encroachers should be evicted from the forest areas;

d) Government should provide tailor–made alternative sources of income to meet the basic needs of the people to divert them from deforestation process;

e) Forestation program through joint forest management should be implemented and peoples' participation should be encouraged for sustainable forest management;

f) Govt. policy should be updated to bring harmony between ecological requirements and the peoples' basic needs fulfillment and others.

7.3.2 *NGO-RESPONDENTS' VIEWPOINT*

The responses of the NGO Members are summarized below:

- Illegal extraction of forest produce is being carried out mostly by poor people.
- Politicians and Contractors are responsible for the fast depletion of forests.
- Involvement of NGOs in Forest management and in dealing with the corrupt practices of a section of Officers would ensure preservation of forests
- Top officials of forest department, contractors, encroachers, field-level officers of forest Dept., unemployed persons and forest villagers are responsible for the fast depletion of the forest resources.
- Majority of the NGO respondents have organized public meetings to make the people aware about the need for forest protection, plantation work in public places. etc.

The suggestions put forward by the NGOs for saving the forests include :

(a) NGOs be funded to take up forest development and protection work,

(b) Strictness on the part of the Govt. in all aspects

(c) Encourage common people to take up plantation work

(d) Generate alternative employment avenues

(e) Start agro-based economic activities in the villages near the forests.

7.3.3 *FOREST PERSONNEL-RESPONDENTS' OPINION*

The views of the Forest personnel interviewed are as follows:

- Need for fuel by common people, and easy accessibility to the forests are the reasons for fast depletion of forests.
- Majority of the respondents felt that people are lured by the value of the forest wealth.

- Many of respondents opined that the encroachers are responsible for the fast depletion of forests. Besides, nearby villagers, unemployed persons, political parties, contractors and sections of high officials are also responsible for the present situation. Regarding the problems faced by the employees, all the respondents were almost unanimous in their opinions. The problems listed are: lack of facilities, problem from extremists, financial problem, shortage of manpower, political interference, and problem from unemployed youths. Many of them expressed that forest villagers were not extending any productive help for forest conservation even though they had been getting all the benefits for the last thirty years.

The main suggestions as offered by the respondents for protection of forest correspond to the problem faced by the workers. The main suggestions are: (a)Provide fund, (b) provide infrastructure facilities, (c) take action against encroachers, (d) obtain cooperation of people, and (e) provide alternative livelihood to forest dependent people. A high percent of respondents considered that deforestation has caused changes in the behavior of wild animals besides causing economic loss to the society. The other two important effects have been: (i) flood and erosion, and (ii) ecological imbalance Most of the respondents are aware about the Joint Forest Management (JFM). While majority of them advocate the implementation of JFM, they are afraid that the common people may not take active part in it.

7.3.4 *SOCIAL SCIENTISTS' AND ACADEMICIANS' VIEWPOINTS*:

The respondents feel that heavy deforestation of reserved forest area has been increasing day by day due to encroachment for acquiring land for cultivation and construction of dwelling units. They opined that if the present rate of deforestation continues, within ten to fifteen years the whole forest would be converted to non-forestry paddy field. It has been understood that multi-ethnic and religious groups characterize people of this region. Many of such ethnic groups have close affinity with forest by way of settling their habitation in forests for a long time and that has prompted them to rely on extraction of forest products for their livelihood. Because of this strong belief towards their traditional occupation i.e. use of forest resources for their livelihood, the initiative for implementation of non-traditional occupation

could not be successful. This is because of not understanding and incorporating their socio cultural sentiments in designing and implementing of innovative and sustainable economic development programmes. Even though Hon'ble Supreme Court's ban on tree felling has some positive impact in controlling export of timber from North-east to other parts of the country, it has led to unemployment problem due to closure of forest based industries. People who have lost their jobs from such industries, now-a-days they have involved themselves in illegal extraction of forest products for their survival. Besides, smuggling activities have also gone up. Moreover, people have shifted their dependence on forest from extraction of minor products to major products like timber. Moreover, illegal migration, population growth, practice of shifting cultivation, extension of cultivated land has also increased the pace of deforestation.

Land hungry farmers and middlemen are capitalizing the innocent forest villagers' socio-cultural and economic needs in cutting the trees and occupying the forest area. Forestation schemes have not been successful because of lack of commitment and political will by Government and concerned forest department. The changes that are taking place among tribal communities like ideological differences between old and young generations due to increasing needs and wants through better exposure has also great impact on deforestation process.

7.3.5 *MISCELLANEOUS* :

The team had interviewed some firewood sellers who carry around 50 to 60 kg of firewood on bicycle to the market in Tezpur town. They revealed the fact that during high flood, the Brahmaputra river and the Jia-Bhoroli river carry large number of logs and trees. These people collect such forest products, sometimes round the clock, during the flood season, and pile up the logs/trees in their compounds. They are basically agricultural workers or daily wage earners. When they do not get jobs as agricultural workers, or when they need extra money over the daily wage, they split the logs and sell the firewood in the market.

It is apparent that the Government has been loosing huge amount revenue that could be otherwise earned from these river-borne forest products. Some collection points on the river bank could be set up and casual labour could be engaged to

collect the produce. Such collections could be auctioned on the spot which would fetch revenue for the Department.

The team had come across villagers (mostly Bangladeshi immigrants who have settled near the forests) who extract huge quantity of minor forest products such as reed, straw, various types of grass (not cattle fodder), etc. from the fringe areas of the forests and sell these products in the market. The study team observed such transactions on several days. They had also accompanied the traders from their residences to the market. But on no occasion it was noticed that such illegal traders are intercepted either by the Police or by Forest Officials. It only reveals that the Law Enforcement agencies are not active in checking illegal extraction of the forest products.

7.4 OBSERVATIONS

The following observations have been made while carrying out the study.

7.4.1 *GENERAL OBSERVATIONS ABOUT FORESTS*

Assam has more area covered by Evergreen/Semi Evergreen forests as compared to other types of forests. It is clear that the forest coverage in the State of Assam has declined after 1969. Due to increase in population and decline in forest cover the ratio of population to forests has gone down at a very fast rate. The rate of encroachment has been on the rise. It is alleged that illegal Bangladeshi migrants have occupied the fringe areas of the reserved forests. They also clear the forests for acquiring cultivable land for cash crops.

It is observed that the per capita out-turn of firewood (as recorded in the Forest Department) over the period has gone down. There could be three reasons for such a decline. Firstly, illegal extraction has gone up; secondly, there has been a decline in the fuel-wood reserve that could be licensed for extraction; and thirdly, because of widespread use of LPG, coal, etc. the need for firewood, specially in the urban and semi-urban areas, might have gone down. It is interesting to note that the extraction level is very high through the exit points nearer to the towns and cities; compared to the volume of extraction through exit points at remote places.

The out-turn of timber (official) from Assam forests has declined over the years. The reasons behind such decline are (i) decline in availability of good quality timber producing matured trees, (ii) increase in illegal extraction, (iii) Government control in issuing licence for tree felling, and (iv) Supreme Court's ban on tree felling (after 1997). As a consequence to decline in out-turn of timber, the revenue has gone down. However, over the years, the revenue of the Forest Department has always been less than the expenditures.

7.4.2 *FOREST POLICY IMPLEMENTATION :*

Number of Forest Regulations and Acts have been framed since the British period. However, these Acts seem to ignore the ethnic people who were users as well as protectors of the forests. They have been alienated by the Acts, and as a result their sense of belongingness to the forests has gone down. The Forest Acts have been focusing mainly on 'policing' the forests without trying for involvement of the common people around the forests. However, in recent past there has been a shift in the paradigm and schemes like Joint Forest Management (JFM) have been introduced.

It has been observed that in implementing the Acts and Regulations, the potential of forest department personnel could not be utilized properly for sustainable forest management professionally due to lack of required equipment and infrastructure like weapons, vehicles, road communication etc. The forest personnel have also been deprived of many basic amenities like uniform, housing, traveling expenses, festival bonus etc., which have demoralised them in discharging their responsibilities. This situation has also compelled them to indulge in illegal extraction and smuggling business. It has also been observed that most of the forest villages are not equipped with even minimum infrastructure facilities like electricity, roads, health centers, potable water, primary schools etc.

7.4.2.1 Implementation of Joint Forest Management :

Joint forest Management which is popular in many States of India got poor response from the people of Lakhimpur Forest Division. JFM committees have been formed by respective Range Officers, and their proposals have been submitted to the higher authority. But due to paucity of fund, Officers are unable to start the work. According to the forest officials of the district, the people as well do not show any

interest for joining JFM. The forest department is not well-equipped. The officers are yet to be trained in the various aspects of Joint Forest Management. The communities are suspicious about the ownership of the property. Since there are many communities living side by side, each one suspects the other to be enemy, and suspects that the forest property owned by one community might be destroyed/harvested by another community. The communities feel that raising a common property would only lead o quarrels and unpleasantness among the communities. People are more interested to work for building up of personal property rather than community property. The farmers (encroachers) give more weightage to cultivable land than on forests.

7.4.3 *BORDER DISPUTE:*

The land area of each Reserved Forests (RFs) is demarcated by Govt. Notification from time to time. The ground demarcation of sector from Dikrong river to Subansiri river in Lakhimpur District and right from Subansiri to Laliriver of the boundary in Dhemaji district was carried out by the Survey of India during the field seasons 1972-74. As such boundary pillars were also fixed during 1972-75 field seasons, but people from Arunachal Pradesh(AP) as well as administration of AP have encroached over part of reserved forests in the Assam-Arunachal Pradesh border. While the common people have cleared large area of forest land for cultivation, the AP administration has established water supply schemes, electrical installations, offices, quarters, school, fair price shop, churches etc. Jhum cultivation has been going on in the R.Fs of Lakhimpur district by destroying green forest every year. It has also been reported by many Govt. Officials that illegal cultivation of opium which is used for preparation of illegal drugs is still going on in the adjoining border forests of Assam and A.P, where smugglers often guard their land with lethal weapons. In this division, there is boundary dispute with A.P. which has ultimately affected forest management. There are number of saw mills operating in the border of Assam and A.P. These saw mills are fed by logs acquired by illegal tree felling in Assam. After the ban on timber extraction, illegal hand sawing of timber is going on in full swing in the deep forests.

7.4.4 *FLOOD DAMAGE* :

Every year flood also damages the reserved forests of Lakhimpur district. Rivers of Lakhimpur district originate from the hills of A.P which are snow-fed. In summer season due to melting of snow and heavy rainfall in the hill areas, the Brahamaputra, Subansiri, Ranga rivers cause flood to the plain areas. The reserved forests by the river side have been affected by severe erosion.

7.4.5 *EXTRACTION OF FOREST PRODUCTS – TRENDS :*

In case of wood based furniture and timber shops in the two districts, it is observed that there is an overall downward trend in the consumption of timber in all the three categories (small, medium and large) of licensed shops. The decline in consumption is more prominent after the imposition of the ban on tree felling by the Hon'ble Supreme Court. Another reason for decline in consumption is the large scale use of substitutes. It has been understood that the sale of fuel wood is more in the town compared to the sub urban and rural areas. It is so because of the fact that population in the town is more, people have higher buying capacity and there is less scope for obtaining free bio-mass fuel. On the other hand rural people use agricultural waste, twigs and dried tree branches that could be obtained freely. In case of illegal furniture markets the trend is opposite to the legal furniture shops. In case of three major markets, the consumption of timber has been increasing at a high rate due to low prices of the furniture products. It is because timber is extracted without paying any tax to the Government. The prices of the timber products are different in the legal and illegal markets. While the prices have been increasing in the legal market the prices are decreasing in the illegal markets.

If this trend of extraction continues for another seven to ten years, the remaining forest resources will get exhausted completely. There is no scheme or project in sight for replenishment of the forest resources. It appears as if there is a competition among the communities vis-à-vis individuals to grab as much forest resources in as much short time as possible.

It has been observed that the number of forest-based industries in the State has gone down. At the same time the volume of legally extracted forest products has also gone down due to non-availability of good quality mature trees. However, the

actual volume of extraction of forest products has gone up because the illegal extractors are felling all kinds of trees. The hand-sawing activities are going on deep inside the forests; and thus the saw mills in the towns have faced closure.

7.4.6 *ECONOMIC INSTRUMENTS:*

Though not in proper forms (having lot of loop-holes) there are few economic instruments in use in the Forest Department of Assam. The Government has pricing policy which is revised from time to time to incorporate the changes in price. The Government has fixed the prices of the forest produces dividing them into various classes such as Timber, Firewood, Minor forest products etc. Examination of the prices of three classes of products show that there has been an upward revision of the prices of these forest products. The timber seized from unauthorized people are disposed of by following the standard procedure. However, the study team observed that huge quantity of seized timber logs are lying in front of several offices of the Forest Department for long time. Some of these logs having very high value in the market are rotting there. On inquiry, some Officials informed the team that the bureaucratic procedure to dispose of the logs have led to such a situation. The Forest Department is loosing huge amount of revenue in this way. To discourage people from illegal extraction of forest produce, there is provision for punishment to offenders of the Regulations. Some Forest Officials informed the study team that quite often they face interference from Politicians in implementing the Forest regulations. The concept of Forest Village is another economic instrument which has been a total failure. Rather the Forest Villages have caused harm to the forests. It has been observed that illegally extracted timber is being used in huge quantity to produce furniture being sold in the weekly markets. Though there is provision in the Acts and Regulations to ask for the Transit Permit to ascertain the origin of the timber, the Forest Officials are turning deaf ears to this matter. It is alleged that the Officials are acting in this manner under the pressure from the Politicians who protect the offenders. The illegal furniture market is a business of several lakhs of Rupees. The ban on tree felling has a mixed effect. Timber extraction activities in the organized sector have not stopped totally. But the forest extraction activities in the illegal way have increased many fold. Compared to the dimension of such activities the resources of the Forest Department are inadequate to check such

illegal acts. Another reason for improper implementation of the economic instruments is large-scale corruption among some of the Forest Officials. The personnel of one NGO in Behali in Sonitpur District informed the team that they had established proof of illicit involvement of Forest Officials in timber smuggling; but the offenders go Scot free under the protective umbrella of some Politicians.

7.4.7 *ECONOMIC VALUATION*

The valuation of the forest needs to be assessed with a changed perspective taking into account the environmental aspects and other non-market benefits associated with the forests as discussed in chapter 6 . In view of the limitation of time . scope of work and the available database only the direct benefits have been assessed as described in Annexure II . Accordingly it has been found that value of NWFP extracted is higher than wood or timber products . The **Direct extractive** value is assessed at Rs. 539.15 Crores per annum and the **Direct non-extractive** value (assessed from the expenditures of tourists visiting the National Parks in Assam) at Rs. 11.93 crores totalling to Rs. 551.08 crores . Hence the average direct return from the forest at current price is Rs. 3193.00 per ha (however this value must not be considered for any evaluation due to its wide variation from forest to forest) . As in case of plantation of specific plant such as *Kadam* (soft wood used as match splint) the annual return is estimated at Rs. 5685.00 per ha. Considering the present lack of irrigation facilities in the state and the forests being located mostly away from the rivers at the junction of the hills and plains , only one crop can be expected in a year as is the normal practice today . Accordingly the estimated annual return from cultivation of rice or mustard cannot be expected to exceed Rs. 2800.00 per ha . It is therefore conclusive to state that even without the consideration of **Indirect , Passive** and **Option** benefits of the forests , preservation as well as forestation is economically more viable and beneficial for the people .

Nevertheless, with the growth of population, conversion of forest for growing more food will continue, as necessity will override the economic viability and productivity . It therefore becomes more important to implement schemes which will be alternatives to the activities demanding deforestation .

7.5 CONCLUSION :

The findings of the study are very much frustrating. It appears that a huge number of people are involved in the process of illegal timber trade and hence in illegal extraction of forest products. This number will be much more compared to the number of Forest personnel the Department have for the purpose of protecting the forests. There is equally a large number, if not more, of patrons of such illegal activities. Flood affected people, migrants from inside and outside the country, unemployed youths, and some forest employees are said to be involved in illegal use of forest resources. During the study it was revealed that people of all categories have started realizing the danger that might crop up due to large-scale deforestation. A section of common people is seem to be interested to take active part in schemes like Joint Forest Management.

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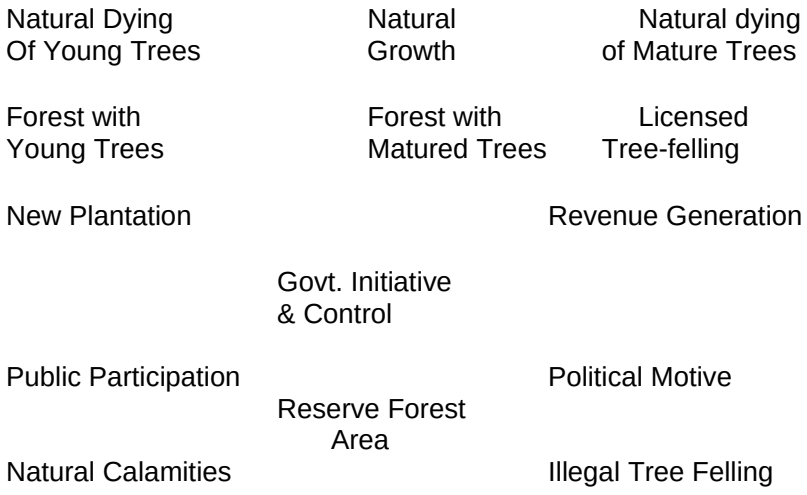
CHAPTER – 8 : MODELING AND POLICY FORMULATION

8.1 MODEL BUILDING :

It is possible to develop varied types of model to represent any system. The model to be developed, and then to be used, however, should be based on the objectives of the study. The variables to be incorporated in the model are to be properly identified and the relationships among the variables be established. Exclusion of important variables in the model may lead to wrong results and to misleading system behavior. It is more so in socio-economic system like the one under study. Various models were tried and the following three have been considered to be appropriate for the system under consideration.

8.2 MODEL 1 : SYSTEM DYNAMICS MODEL FOR THE FOREST GROWTH:

The dynamics of any system is determined by the causal mechanism prevailing among the system variables. Such mechanism constitute certain feedback loops and the interaction of the loops govern the system behavior. As such it is essential to identify the system variables and then to establish the causal relationships among them. After a through and careful study of the forest scenario in Assam an aggregate causal loop diagram has been developed as being presented in fig 8.1 A close look at the causal loop diagram presented in fig 8.1 reveals that there are six major loops in the system. All these loops are positive in nature, which means that there would be constant growth or decay till the system attains a limit. The loops are analyzed in the following sections.



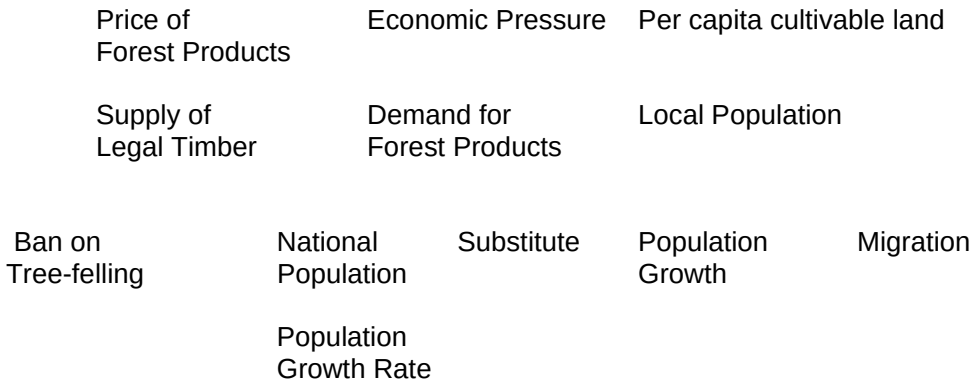


Fig. 8.1 : Causal Mechanism of Forest Dynamics

8.2.1 LOOP 1 : NATURAL GROWTH LOOP

It is a positive feedback loop and is shown in Fig. 8.2

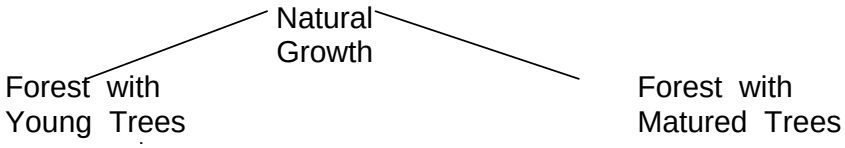


Fig. 8.2 : Natural Growth Loop

It is a positive feed back loop. The young trees, after certain delay, enhance the forest with matured trees. The matured trees give rise to saplings which contribute to the young trees. After considering natural dying of certain proportion of both young and matured trees, the loop depicts an ever-increasing forest provided there is no extraction. However, there is a limit to such growth.

LOOP 2 : PLANTATION – FOREST-GROWTH LOOP

It is a positive feedback loop and is shown in Fig. 8.3

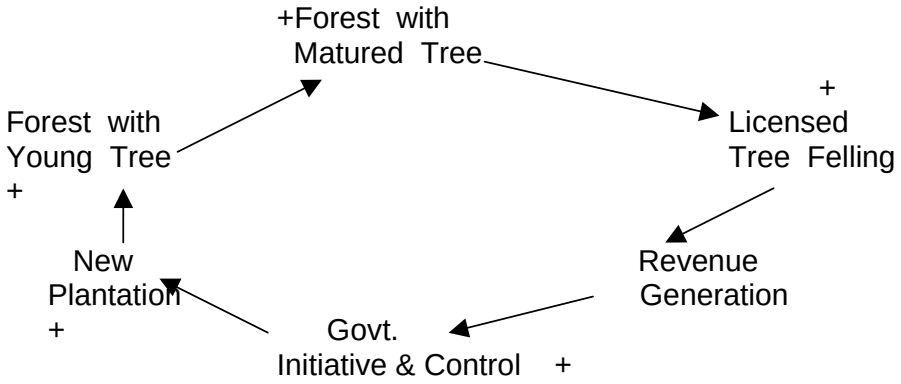


Fig. 8.3 : Plantation Forest-Growth Loop

If large quantity of matured trees is available, the Government can earn more revenue through licensing of tree felling. Raised amount of revenue would make it possible on the part of the Govt. to take up new plantation work resulting in the increase of forest with young trees. These young trees eventually increases the forest with mature trees and hence more revenue. This loop also indicates an ever–increasing growth of the forest. It is assumed that a certain proportion of the revenue earned from forest would be utilized in new plantation.

LOOP 3 : ILLEGAL EXTRACTION LOOP

This loop as presented in Fig. 8.4 shows the impact of illegal extraction on forest reserves.

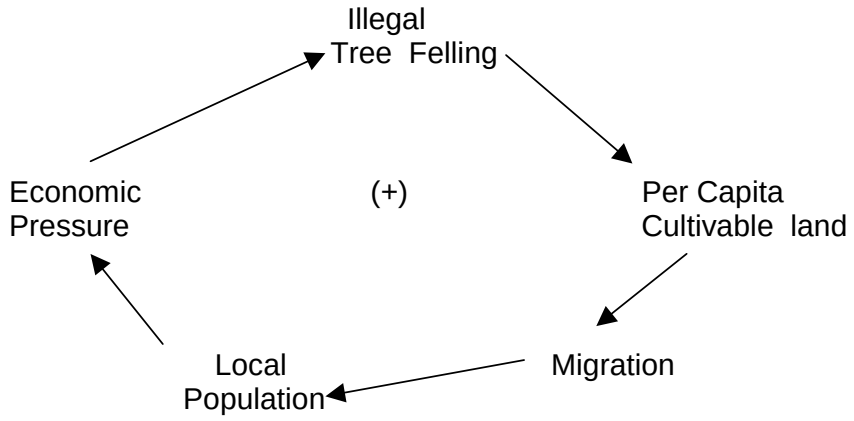


Fig 8.4 : Illegal Extraction Loop

It is again a positive feedback loop leading to decline of the forest resources. Migration of people from other states or from across the border increases the local population and exerts an economic pressure. Because of such pressure the people resort to illegal tree felling for selling the timber, most of the migrants go for clearing forests to acquire cultivable land. As more cultivable land become available fresh migrants get encouraged to migrate to the region. Most parts of the forests in Assam are getting destroyed because of such activities.

LOOP 4 : GOVERNMENT ACTION LOOP

This loop incorporates the Govt. role in the forest management system. The loop has been presented in Fig. 8.5

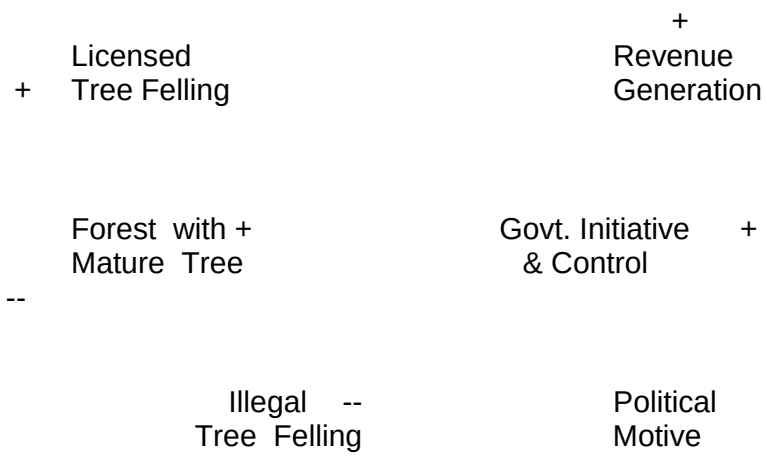


Fig. 8.5 : Government Action Loop

This loop is again a positive feedback loop and plays a critical role in maintaining forest. Higher revenue generation should be able to motivate the Govt. to exercise firm control over forest management. Higher revenue also helps the Govt. to maintain the work force and also to buy equipment for forest security. However, decline in revenue generation would lead to continuous decline in the forest resource. Less revenue generation would result in a weak security arrangement that would lead to higher rate of illegal tree felling with the consequence of less quantity of matured tree for licensed tree felling. This would, in turn, generate less revenue and will deteriorate the situation further. Even in the situation of high revenue generation, Govt. initiative and control may have negative impact on the system if the exogenous factor. Govt. Motive has a

negative, inefficient, and narrow outlook. Thus Govt. initiative and control has the most critical role which might turn the scenario to be of growing or declining nature.

LOOP 5: PUBLIC PARTICIPATION LOOP

It is a positive feedback loop with the factor Govt. Initiative and control plying the critical role. The loop has been presented in Fig. 8.6

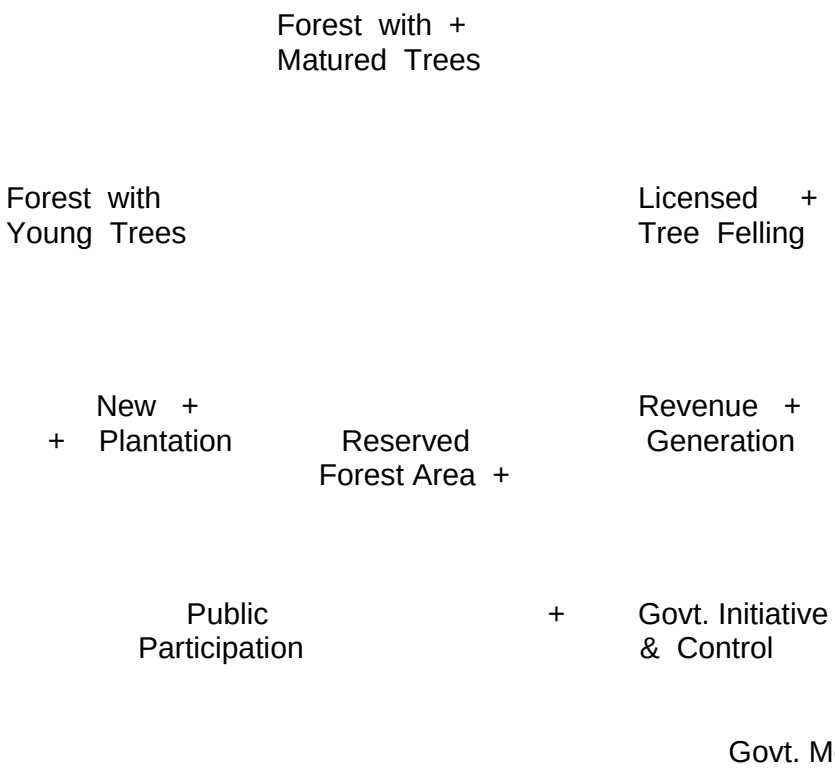


Fig. 8.6 : Public Participation Loop

Government plans and program could be framed in a manner to motivate the common people to take active part in forest management. Active participation of people in plantation work and management of forest would have a positive growth of the forests.

LOOP 6: NATURAL CALAMITY LOOP

Many natural calamities are the results of insensible destruction of ecology and balance in nature by the human being. The loop presented in Fig. 8.7 depicts the effects of natural calamity on forests.

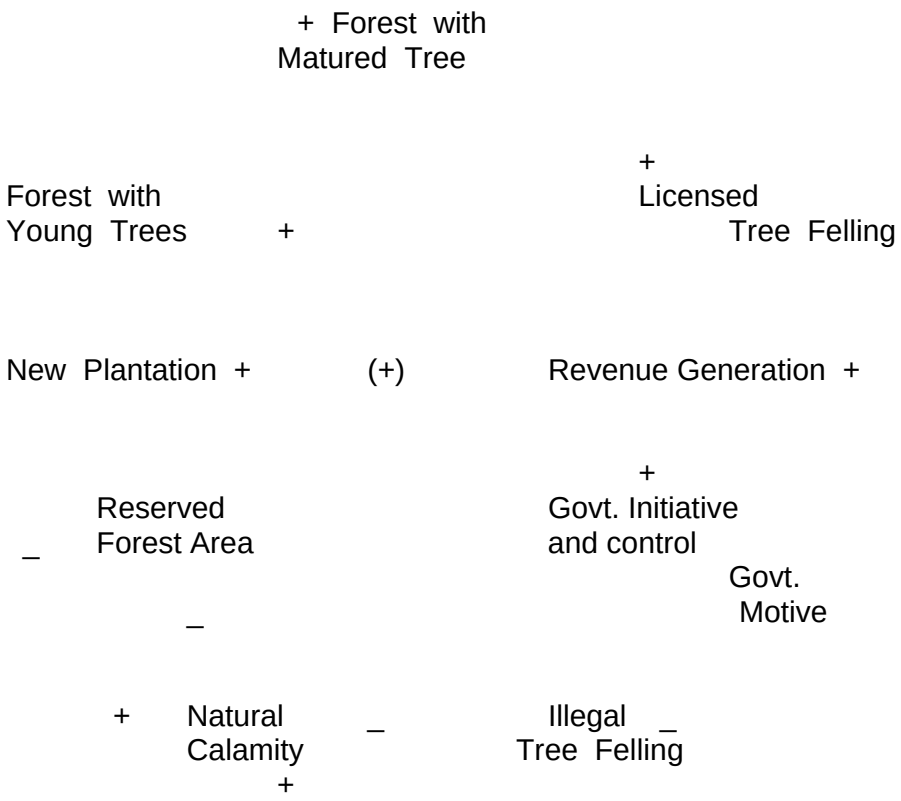


Fig: 8.7 : The Natural Calamity Loop

It is also a positive feedback loop. If the Govt. controls the illegal tree felling there would be less natural calamities like flood, erosion, etc. Flood and erosion destroy forest area and thus reduces the area available for new plantation. It eventually affects the revenue earnings of the Government leading to less effort to control illegal tree felling. It is important to note that all the loops discussed above are positive feedback loops. The basic nature of such loop is that it reinforces its growth or decline. In case of Assam Forest it is in the decline. Thus, the forest scenario has been deteriorating continuously.

The causal loop diagram presented in Fig. 8.1 could be converted to a flow Diagram using the System Dynamics icons. With proper values of constants, parameters, and initial level values the system can be simulated to portray the

forest scenario over the years. The model thus obtained could be utilized for testing policies for sustainable extraction level of forest products in Assam. However, the causal loop diagrams have also shed some light to come to policy decisions as suggested in a later section.

8.4 MODEL2: HUMAN BEHAVIOR AND ENVIRONMENTAL MANAGEMENT MODEL

Some of the important revolutionary and evolutionary events that happened in history having direct association with nature of human behavior are :- Ethnic harmony and conflicts, wars and freedom movements, accepting and rejecting imperialism and disintegration of nations, forest conservation and degradation, etc. Number of research studies on behavioral sciences reveal that positive and negative mind-sets of the people are very dynamic which have multi-dimensional perspective. It has also been observed that nature of change in human being at all stages of his life is subjected to dynamics that take place in socio-cultural, economic, political, legal and management milieu.

As mentioned above, the human behavior, particularly group behaviour has direct impact on the events of revolutionary and evolutionary changes. The findings of this study also reveal that present day environmental degradation is the result of dynamics of human behavior. That is why, interface between environmental degradation and dynamics of human behavior has to be understood before designing any policy. Having understood its importance and relationship based on the data collected from discussions with various segments of the people concerned, a behavioral oriented model has been designed and presented in Figure 8.8. It focuses on the relationship among the variables of behavioral aspects to design holistic and pragmatic intervention strategies, approaches, to create and sustain eco-friendly system.

8.5 COMPREHENSIVE POLICIES FOR SUSTAINABLE FOREST MANAGEMENT

The comprehensive policies are to be based on the findings and observations of the study. The analysis of the primary data were presented and the common opinions of the three categories of respondents interviewed were presented in Table 5.1 to Table 5.4. The reasons for fast depletion of forest resources were found to be(i)

Mismanagement by forest department,(ii) Illegal extraction by poor people,(iii) Encroachment by tribal people,(iv) Lack of awareness of common people on forest,(v) Population Explosion, and(vi) Easy availability of valuable trees.

The respondents have raised their accusing finger towards(i) Forest Department employees,(ii) Contractors,(iii) Encroachers,(iv) Forest Villagers,(v) Unemployed persons, and(vii) Political Parties for the destruction of forests.

The measures suggested for preservation of forests include(I) Check corruption,(ii) Evict encroachers,(iii) Educate people,(iv) Fresh plantation,(v) Employment generation,(vi) Control flood,(vii) Population control,(viii) Appointment of Police/Army,(ix) Committed participation of Forest Employees and NGO personnel,(x) Improvement of infrastructure of Forest Department, etc.

The above findings would be utilized as guidelines in developing a set of comprehensive policies for sustainable extraction level of forest products. The policies thus developed, however, must be able to meet the following requirements :

(i) feasible from socio-cultural-economic points of view,

(ii) having short-term, medium-term, and long-term perspectives,

(iii) encouraging to the common people, Government agencies, and Grass-root agencies for taking part in decision-making and implementation process.

Keeping in view the above aspects and after taking into account the viewpoints of the stake-holders, the following comprehensive policies have been suggested.

8.5.1 CHANGING ECONOMIC ACTIVITIES

In order to implement the forest policies strictly that would debar the villagers from extracting the forest products, it would be required to provide alternative ways to these people to earn their livelihood. The people/youth engaged in illegal extraction of forest products would accept the alternatives, if, and only if these alternatives can fetch higher or at least equal earnings to them. An attempt was made to estimate the average earning of an individual in the trade of illegal forest business.

The survey conducted in 600 households revealed that 36%(216 persons) of the respondents were involved in illegal extraction of timber/fuel-wood. Of these 216 respondents, 131 earn less than Rs. 5000/- per annum, 59 earn between Rs. 5000 and Rs. 10000/- per annum, and 26 earn above Rs. 10000.00 per annum from illegation extraction of forest products. It clearly shows that there are three categories of illegal extractors of forest products :(a) Villagers who collect branches of trees, twigs, reeds, etc. and sell these in the open market;(b) Village youths involved in illegal timber business by way of working for big merchants; and(c) Village youths dealing with timber at a low scale. All these people take up such activities as supplementary to other economic activities they are engaged in. For the sake of simplicity in calculating average earnings from forest activities, it is assumed that the people of category(a) earn Rs. 3500/- per annum, people of category(b) earn Rs. 8000/- per annum, while people of category(c) earn Rs. 14000/- per annum. The weighted average earning per person per annum may be calculated as :

Weighted Average Earning = Rs.(131x3500.00+ 59x8000.00+26x1400.00)/216

= Rs. 6113.00(Say Rs. 6000.00 per annum)

Now, if the Village people involved in illegal extraction of forest products could be provided with certain economic activities which can earn around Rs. 500.00 per month, it is expected that they might switch over to such activities. A few such alternatives are suggested below :

8.5.1.1 Sericulture and Weaving :

Assamese women in general, and Assamese tribal women in particular, are capable of weaving various types of cloths. Apart from cotton cloths, they can weave silk cloths with the locally produced silk. There are three types of local silk(1) Endi,(2) Paat, and(3) Muga, of which Muga silk is the most expensive. All these three types of silk are obtained from three different types of cocoons. The rural people in Assam are conversant with rearing of these worms to produce the silk. The Muga silk feed on the leaves of a certain type of tall tree. Thus Muga worm rearing would automatically bring in certain type of forest too. The people should be encouraged to take up sericulture and weaving as alternative sources of earning. However, the

marketing of the finished products has to be done by NGOs or some other agencies. Thus

- Encourage villagers to take up sericulture and weaving
- Arrange for subsidies and loans wherever required
- Arrange for marketing of the products
- Arrange for training and workshops
- Cooperative societies may be formed

8.5.1.2 Poultry Farming, Goat Rearing, and Pig Farming

The sericulture and weaving activities may not be welcome by the Bangladeshi migrants. They may be encouraged to take up poultry farming and goat rearing. Goat rearing in rural Assam has been an economic activity since time immemorial. The tribal people generally used to rear pigs as well. Thus

- Encourage villagers to take up poultry farming, goat rearing, and pig farming
- Arrange marketing of the products
- Provide veterinary facilities in the rural areas
- Provide training to the farmers
- Arrange for providing high breed pigs, chics, and goats

8.5.1.3 Alternative Cash Crops

It was observed that many villagers resort to forest extraction when they do not have work in the agricultural fields. Crop rotation may be designed in such a manner that the fields are used throughout the year and the farmers are busy all throughout. Besides, farmers may be encouraged to grow crops like citronella oil plant, flower, oil seeds, etc. Thus

- Educate the people about alternative crops
- Provide irrigation facilities

- Arrange for marketing of the products
- Monitoring by experts and professionals

8.5.1.4 Joint Forest Management

It has been found that Joint Forest Management(JFM) has not been successful in Assam. It is said that paucity of fund to implement the scheme, unwillingness of the common people to take part in JFM, lack of thorough knowledge about JFM to the forest personnel are the main causes of failure of this scheme. Another factor, which has perhaps been overlooked, is the compatibility of the scheme with the social, cultural, and background of the State of Assam. JFM scheme that has been successful in West Bengal or in Madhya Pradesh may not be appropriate in Assam. Thus the first step is to restructure the JFM scheme to suit the requirements of the State.

- Involve people with JFM through the community prayer houses like Naamghar, mosque, church, other social institutions existing in the tribal areas, etc. The property right be given to the Naamghar/mosque. Compounds of the community prayer houses be converted to forests.
- Competition be held with regard to achievements among communities/villages
- Train and educate the people
- Train the forest personnel

For all the measures to be implemented, a joint mission of the Government Departments, NGOs, Village communities would be necessary. The Forest Department is to coordinate the activities. The NGOs may take up demonstration/pilot schemes in the rural areas.

8.5.1.5 REQUIREMENT OF FUNDS FOR IMPLEMENTATION OF ALTERNATIVE S TO ILLEGAL EXTRACTION OF TIMBER.

Considering the overall scenario, the people who are involved in illegal extraction of timber and wood can be classified into three groups :

1. Contractor and Trader group

2. Intermediate group -(transporters, saw mill owners, furniture shop owners)

3. Execution or operators' group.

While the people belonging to the first two groups are relatively well -off and are residents of urban or semi-urban areas, the people from the third group need to depend on the forest for their daily earnings and are generally residents of villages within or near the forest areas. While it may be possible to control and monitor the first two groups through strict vigilance within the existing administrative frame work and without any additional infrastructure or investment other than for regular operations under non- plan or revenue account, the prevention or isolation of the third group demand that alternative sustainable means for earning will need to be motivated.

It will also be necessary to formulate a strategy for curbing encroachment for shelter and for agriculture. Merely declaring encroachment to be illegal cannot prevent the damage to the forests. It is important to understand the growing need for shelter and food. Accordingly two approaches have been suggested :

a) For people who seek forest as the means for their daily earning(although through illegal means of extraction) but do not occupy the forest land for either shelter or for growing food, and

b) For encroachers(generally in groups).

The alternative means of livelihood targeted for the people belonging to the category A needs to be on individual schemes so as adequate motivation can be generated for enhanced prosperity : And considering the dangers involved in illegal activities, it may not be very difficult to motivate the people to adopt the alternatives. The suggestion made earlier such as poultry farming, piggery, goat rearing, weaving and other similar existing schemes under NABARD, NHB , CAPART etc. can be adopted with renewed efforts. It will however be necessary to coordinate the functions of various organizations and schemes to optimize the efficacy as well as

productivity. The role of NGOs become important for implementation. An amount of about 15 % of the project / scheme budget must be set aside to meet the expenditures by the NGOs for their supervision, motivation, training etc. The survey of the three forest divisions of Sonitpur(east), Sonitpur(west) and Lakhimpur reveal that 3875 persons(2575 in Sonitpur(east & west) and 1300 in Lakhimpur division) will need to be motivated and with an average invest of Rs.23,720.00 per scheme, the total investment envisaged amounts to Rs. 10.12 crores. (Annexure IV). Such projects can be implemented with similar implementation methodologies adopted under NWDPRA schemes for which the Department of Social Forestry can act as the nodal agency.

The strategy to curb the collective encroachment for shelter and production of food needs to adopt an approach for regeneration of forests, more specifically agro-forests. Such agro-forests(i.e. plantation with inter-space agriculture) can only be successful if the agriculture is aimed for personal benefits and the forest so planted aims for the public benefits only. The upkeep of such forests form a part of the lease money payable for the lease of the land under cultivation. Such lease agreements must also be made credit worthy to avail the finance from the banks and the financial institutions. The estimated number of encroachers in Sonitpur district(comprising Sonitpur(east) and Sonitpur(west) divisions) is 20,900 and in Lakhimpur district is 2,200. Considering the number of encroachers, their socio-economic status and their general natures it may be more appropriate to consider collective investments. Such activities can be considered under the joint forest management schemes and considering various types of agro-forestry covering an area of about 23000 Ha in the two districts at an average requirement of Rs. 63,000.00 the total financial requirement is estimated at Rs. 138.0 Crores.

8.5.2 SYSTEMS APPROACH:

There has to be a consorted effort on the part of the common people, social organizations, and the government agencies. High level of commitment on the part of the forest employees, dedication to social service from members of social organizations, and active whole-hearted participation of the common people are to be blended to generate common awareness about the need for preservation of forests. It calls for reforms of the social organizations, administration, and the

government. It is suggested that the organizational structure of the Forest Department be changed to include people from all walks of the society. The most important of all is, however, a strong will of the Government to preserve forests. Since the Government has been playing multiple roles as promoters, regulators and facilitator in this regard, as mentioned in the System Model, the Government mindset has to be changed in the positive spirit for this purpose.

The following Short, Medium, and Long Term measures to be introduced at various levels are suggested for sustainable growth of forest

8.5.2.1 Short-Term Measures:

A. Government Department:

- Instantly required infrastructure including weapons, manpower, training facilities, be provided to the forest personnel to stop illegal tree felling and smuggling of timber.
- Strict control over the forest personnel to make them work with commitment and dedication for the noble cause.
- Train up forest employees, educate common people, and involve NGOs for successful implementation of the JFM scheme.
- Ready-made markets for marketing of minor and major products have to be created
- Improve co-ordination and co-operation among all concerned departments to tackle the problems with integrated efforts

B. Social Organizations

- NGOs, Forest Guards, and Police personnel should put up joint effort to protect forests.
- Create public awareness for forest preservation.

- Transparency has to be maintained in respect utilization of fund received for forest preservation activities.

- Take up plantation work in line with JFM.

8.5.2.2. Medium-Term Measures :

A. Government Department :

- Existing agencies for marketing of minor forest products should be streamlined to encourage people to concentrate more on extraction of such produc

- Popularize community, farm, and private forests in Government as well as private lands.

- Administrative structure of present forest organization system be rationalized so as to inject the spirit of holistic concern for the sustainable extraction among the employees and officers concerned.

- Plantation of fast growing as well as medicinal and aromatic plants besides religious based plants, be popularized.

- Control mechanisms have to be strengthened to arrest corruption at all levels.

- Utilize NGOs in forest management

- Restructure the administrative set-up by injecting the implicit spirit of motivation through job redesign, job enrichment, and job enlargement.

- Work culture has to be developed by creating desirable organizational culture and climate.

B. Social Organizations :

- Encouraged more number of people having urge to serve the society, to join in existing NGOs. Inspire young and retired people to start NGOs to serve the purpose.

- Extend all necessary information and help to survive and prosper the fellow NGOs for fulfilling the cause for which they are established.

- Empowerment along with accountability in resource utilisation have to go hand in hand for efficient utilisation of resources.

- Ecological revolution should be activated at appropriate place and time from grass root level to higher level like Medha Patkar to eradicate and prevent ecological poverty.

8.5.2.3 Perspective Planning:(Long Term)

A. Government Department :

- Government should review and reengineer its forest policies and programs
- Relationship among various partners for the purpose has to be strengthened
- Any structural changes that are initiated at any time, should be linked with all the important sub-systems of the main system.
- Continuous efforts to maintain cultural heritage through various means, has to be strengthened.
- Bring about behavioural changes in the Department through training and by injecting ethos and values.

B. Social Organizations :

- Establish sustainable relationship among all sections of the society, government and public through gaining confidence and trust from them.
- Diversify organizational activities through injecting high level of moral and cultural values.
- Involvement in Value addition activities of forest
- Changing the mind-sets of the forest-dependent people.

- Joint Forest Management activities

8.5.3 ECONOMIC INSTRUMENTS :

After going through the existing economic instruments(EI), and on analyzing their shortcomings, it is felt that additional EIs should be suggested and implemented. A few such instruments are mentioned below.

8.5.3.1. Tax on Timber/Wood Products :

It has been observed that there is no dearth of timber for procurement. Though after the ban on tree felling, there should not have been a single piece of timber in the depot, timber of any size and quantity are available in the market. On inquiry, the Depot owners replied that the timber they had stocked are coming from the logs seized and eventually auctioned by the Forest Department. An investigation revealed that such timbers are also extracted illegally in connivance with some forest personnel, and are shown as auctioned lot from seized consignments. As such it is proposed that a heavy tax be imposed on finished products made of wood/timber, so that buyers are discouraged to buy the same because of high amount to be paid. In such a system, the illegal furniture markets won't flourish as it is growing now. It would also generate handsome revenue for the Forest Department. However, the law enforcing personnel(tax collectors) must be honest and committed to the noble cause of preserving the forest. Alternatively the task can be given to Lessee.

8.5.3.2. Sustainable Consumption and Consumption Pattern

Two basic aspects of economic instruments are(i) reduction in consumption, and(ii) change in consumption pattern. The EIs discussed in the foregoing two sections are meant for reduction of the consumption of timber products. Another EI in this direction could be the introduction of quota system with respect to the volume of forest products procured in the furniture market. Besides, certain complicated formalities could be introduced to discourage(to act as non-tariff barrier) people from buying wood-based products.

Under such a situation people would look for substitutes to fulfil their requirement of furniture or so. It could be arranged in the market to demonstrate the non-wood

furniture. In fact the furniture traders or the carpenters could be encouraged to take up the business of alternative furniture.

8.5.3.3. Rationalization of Illegal Furniture Market Practices

The number of illegal furniture shops(temporary, road-side) in the weekly 'haats' is increasing at a fast rate. To curb it and to rationalize the market practices, they could be given trade permits. In doing so, the applicants should be asked to furnish information on(a) source of timber to be used,(b) volume of timber to be used per week,(c) location of the carpentry shop,(d) Licence Number of the carpentry shop,(e) Number of workers engaged,(f) Type of tools and equipment used, etc. Those who can provide authentic information could be issued trade permit against a fee. The traders without permit may be fined or arrested by the law enforcing authorities. This would reduce the number of illegal traders to a great extent.

8.5.3.4. Subsidies to Wood Substitution Activities

Government can formulate policies to provide subsidies to certain activities that help in saving wood. For example:

(ii) In localities where illegal furniture markets operate, subsidy could be given to dealers of moulded plastic furniture by way of exemption/reduction of sales tax, reduction of municipality tax, etc.

(iii) Cottage industries that would utilize agricultural wastes and cattle dung to produce 'fuel-cakes' may be given subsidies.

(iv) Subsidies be also given on improved 'chullah' that would consume less fuel.

(v) Subsidies may be given on doors and window frames made of non-wood materials.

(vi) Subsidies be given on bio-gas plants.

8.5.4 VALUE ADDITION TO FORESTS :

Whatever forest is left in Assam, and for that matter in the country as a whole, most of it is degraded or bad forest. Some forests have even been converted to barren land. Thus there is ample scope for resilience or value addition to these forests.

8.5.4.1 Value Addition Schemes By Govt.

The first and foremost task before the Government now is to protect the remaining forest and forest land from further encroachment or destruction. It requires an all out effort on the part of the Government to revitalize and equip the Forest Department for such an endeavor. Next step is to draw plans for enrichment of the forests by way of planting valuable trees, emphasizing on bio-diversity, and protecting the fauna. Fresh working plan for each forest be prepared carefully and implement the same with dedication and commitment. Study of each forest regarding its suitability for varieties is to be carried out scientifically. On the whole, the Government should concentrate on building up of good forests in all the districts.

8.5.4.2 Value Addition Schemes By NGOs

The forests of Assam are rich in medicinal plants. The NGOs of different regions of the State may concentrate in identifying, rearing, and growing of region-specific medicinal plants. They may collaborate with well-equipped Biotechnology laboratories in the region(Tezpur University, Assam Agricultural University, Gauhati University, Regional Research Laboratory, Defence Research Laboratory) for testing the medicinal plants and to venture into entrepreneurship in this field. In fact the laboratories of the region are already organizing camps and workshops in this field. The other potential area of value addition is the growing and rearing of orchids which are available in abundance, specially in the forests bordering Assam and Arunachal Pradesh. The NGOs may take up commercial activities centered around the orchids. The Forest Department may allow the NGOs to use strips of forests for such activities.

As the forests grow, birds of various types will nest in the forests. The forests would then attract bird watchers and thus the tourism activities may grow. This would lead to more economic activities which the NGOs can very well take up. Thus the forests

would be able to generate more resources for the Forest Department as well as for many entrepreneures.

8.5.4.3 Resilience of The Forests

It would be a Herculean task to revive the forests even to a stage in which it was about a decade ago. In some areas there is no scope for revival at all. For example, the Gohpur RF where every inch of the RF has been encroached and occupied, it won't be possible now to evict these people for formation of a forest. Thus the Forest Department should take a pragmatic view regarding resilience of the forests. For this purpose the first step would be to classify the forests into a five categories.

I. Encroached forest area beyond the scope of eviction
II. Encroached forest area where eviction is possible
III. Barren land created due to massive tree felling
IV. Forest with low crown density
V. Thick forests

The Government should immediately concentrate on revival of the third and fourth categories of forests. Massive plantation work in collaboration with local NGOs and the villagers from the Revenue Villages should be started immediately. Along with that plantation of saplings should be carried out in the forests with lower crown density. If experts feel that by giving proper protection to the existing trees, natural regeneration could be achieved, then steps should be taken in this direction for effective natural growth. Proper protection must be provided to the newly planted saplings. If needed, police/army deployment could be thought of.

The next task should be to evict the encroachers from forestland. Areas recovered this way should be guarded by army/police personnel to prevent recurrence of encroachment. Plantation work in these areas should start immediately. NGOs and villagers from the revenue villages should be included in Vigilance Team to watch the newly created forests.

The cost involvement in the above-said tasks would be tremendous. The cost components are(a) land preparation,(b) saplings,(c) manure, if needed,(d) labor, and supervisory cost. In some places, however, protection(fence) to the newly planted

saplings may have to be provided. If the work is taken up in line of JFM the cost will come down drastically. The Forest Department should try for such an arrangement.

8.5.5 RENAISSANCE OF CULTURAL HERITAGE :

Indian cultural philosophy is appreciated all over the world. Our scriptures and epics have enlightened us to earn money and seek satisfaction through following principles of ***dharma*** and ***moksha***. As it is understood from many quarters that as long as cultural heritage was maintained, harmony between nature and man, had sustained. The unequilibrium between nature and man that has resulted recently, is also influenced by a paradigm shift from national culture to western culture. As advocated by many philosophers and scholars, renaissance of cultural heritage is very much needed to overcome all disasters that are increasing day by day.

Philosophy of sustainable forest management can not be achieved without linking the government, NGOs, and administrative reforms with national and local cultural ethos and values. That is why, the following suggestions aimed at medium term and long term developments have been proposed :

- While framing and implementing policies at national, state, and local level, national and local cultural sentiments have to be considered.
- Public participation should be encouraged by taking into account the local cultural aspects.
- The cultural sentiments, temperament, beliefs, closed and independent societies character with collective decision making spirit, should be considered in policy making and implementation.
- Common Property Resources(CPR) Management can be made successful
- Most Assamese people prefer to live relatively in big home-stead and love nature very much. They may be motivated to plant more number of trees in their private holdings and the compound of their houses.
- Religious-based plantation may be encouraged among all sections of the society.

- While encouraging forest dependent people to take up non-traditional occupation, their cultural aspects have to be studied properly.
- Above all, our education system has to be reoriented by injecting more of our national and local values rather than western oriented principles.
- The social and spiritual aspects of the tribal society be given importance while formulating and implementing forest policies.
- People should be motivated to link up forestation program with their rituals:
    1. plantation of trees by newly wed couples
    2. plantation of trees on the birth of each child in the community
    3. annual festival of forest preservation
    4. community-based forest competition should be launched.(New plantations, old forest maintenance, reduction in forest product consumption).

8.6 SCOPE FOR FURTHER STUDY :

As the area of this research reflects multi-dimensional character, an in-depth study has to be carried out further in the following areas so as to understand and solve the problem with integrated approach and outlook. The new areas of research that are proposed to initiate in future are as follows:

- Impact of socio-cultural aspects on Forest depletion
- Relevance of existing forest administrative set-up for handling the emerging challenges in forest conservation and extraction
- Impact of globalization and privatization on forests.
- Womens' Representation and Roles in the community-based forest management.

8.7 CONCLUSION :

From the above analysis and suggestions, it may be concluded that the forest depletion has been taking place at a very fast rate. The reasons that are responsible for the situation are multi-dimensional factors like socio-cultural, economic, political, legal and administrative aspects. The encroachment and illegal extraction are the major means through deforestation has been taking place. It has been understood that forest resource extraction is unsustainable and the rate of unsustainability is increasing at high rate. In case of climatic conditions like rainfall, temperature and humidity, a sea change has been noticed in a negative trend which is not very sustainable for continuing a more cherished nature based human habitation in this region. It has been suggested that a radical and innovative policy reforms which have been proposed in the Study should be implemented with a holistic approach and sincere commitment. However, the success of any policy, whatever strong or scientific, depends on the commitment and will of the Government, and also active participation of the common people.

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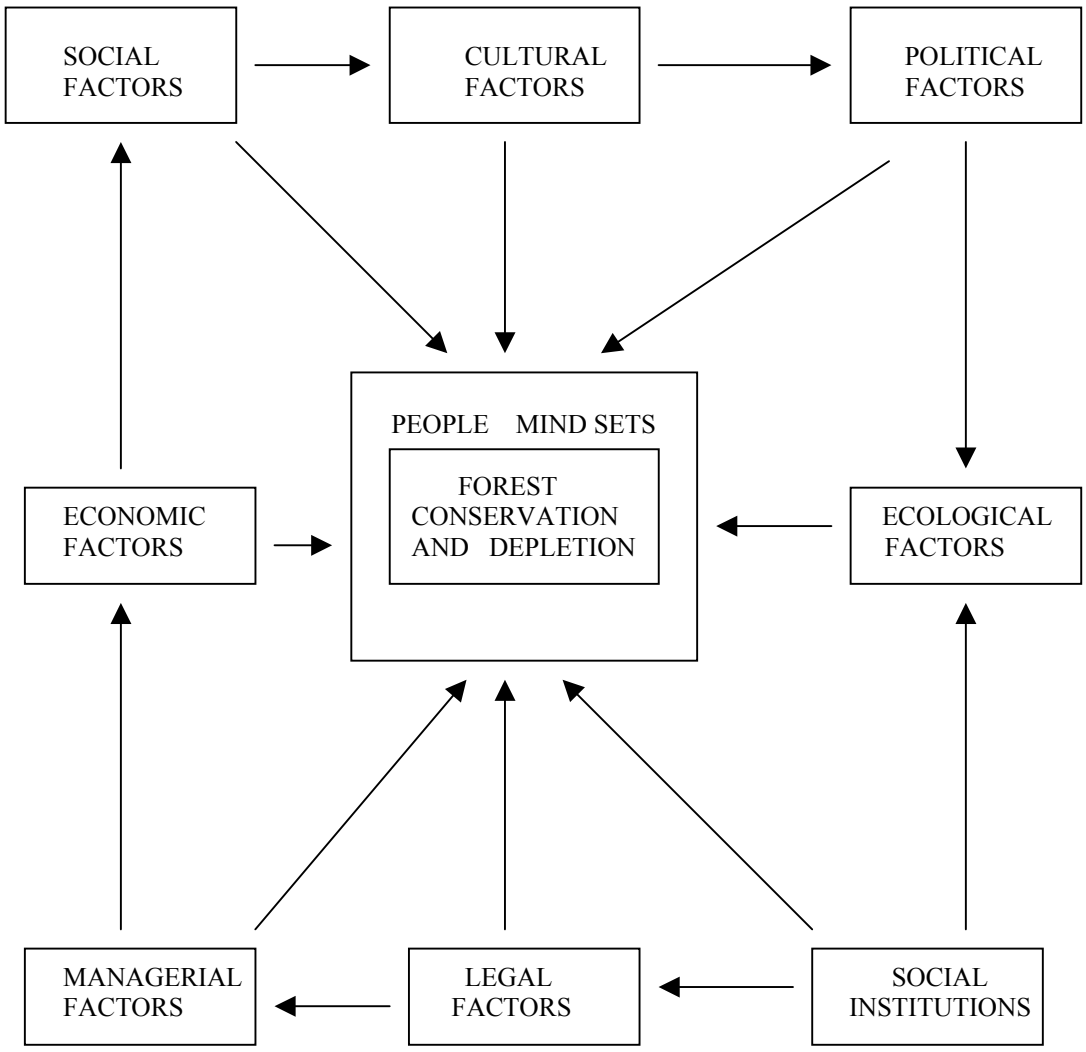
FIG: 8.8

BEHAVIORAL MODEL



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Annexure I : Project Related Photographs

ANNEXURE – II

LIST OF A FEW SELECTED MEDICINAL AND AROMATIC PLANTS OF ASSAM

Common Name	***Botanical Name***	***Price (Rs./Kg)***
Chopsini	*Similex china*	65.00 - 100.00
Cardamom	*Elettaria cardamoms*	50.00 - 70.00
Naga Dalseni wild	*Cinnamomum zeylanicum*	52.00 - 60.00
cardamom (large)	*Elettaria cardamamum*	
Cinnamon	*Cinnamomum yerum*	25.00 - 65.00
Tejpat	*Cinnamomum tamala*	
Stone flower	*wood lichien*	35.00 - 70.00
Majith	*Ruhia cordifolia*	18.00 - 22.00
Lycopodium	*Lycopodium Spp*	
Staranise	*Illicium griffithii*	50.00 - 70.00
Indian Mamira	*Coptis tita*	600.00
Chirayate	*Swertia chirayita*	
Shilajit	-	4000.00 - 5000.00
Anato seed	-	30.00 - 40.00
Lahom	-	8.00 - 12.00
Kata bengena	*Dyoscroea floroba*	
Sarpagadha	*Rauvolfia serpentina*	50.00 - 80.00
Ginseng	*Panax pseudo ginseng*	2000.00 - 1000.00
Perrila seeds	-	60.00 - 70.00
Pipli (Rand & lag)	*Piper nigrum*	-
Boch/Boju	Acorus - Calamus	-
Hop ginger	-	-
Apong	*Achranthes Aspera*	-
Jhapa	*Abotilum Indicum*	-
Chalkunwari	*Aloe Vera*	-
Ashok	*Saraca Indica*	-
Bael tree	A*egle Marmelos*	-
Rain tree	*Albizia iebbek*	-
Devil tree	Alstonia *Scholaris*	-
Indian mallow	*Abutilon Indicum*	-
Red Amaranthus	*Amaranthus*	-
Betelnut	*Areca catechu linn*	-
Maxican poppy	*Argamone maxicana linn*	-
Asparagus	*Asparagus officinalis*	-
Neem	*Azadiracheta Indica*	-
Indian Spinach	*Basella Alba*	-
Mounlai cbony	*Bauhinia variegate*	-
Asparagus	*Asparagus Officinala*	-
Palmira param	*Borassus flabellifes*	-
Spront leaf plant	*Bryophyilum pinnatum lam*	-
Flame of the forest	Butea monos perma	-
Nalkhagari	*Butea Frundosa*	-
India Laburnum	*Cassia fistula*	-
Periwinkie	*Catharanthus roseus*	-
Indian penny wost	*Centella asiatica*.	-
Sonaru	*Cassio fistula linn*	-
Triangular milkwost	*Emphorsia antiquorum*	-
Eucalyptus	*Eucalyptus globulus*	-
Lalpata	*Euphoria pulcherrima*	-
Bimlipatam jute	*Hibiscus cannabinus*	-
Pride of India	*Lag erstroemia specioss*	-
Lantana	*Lantana canara*	-

Tapioca	*Manihot utilissina*	-
Persian lilae	*Melia azedara ch*	-
Wielajiban	*Semitive plant. Minosa pudica*	-
Blackmulberry	*Morus nigra*	-
Curry leaf tree	*Murrya Koenigil*	-
Sacred Lotus	*Nelumblum Speclosum*	-
Pickly pear	*Opuntia dilleni*	-
Emblic myrobalam	*phyllanthus emblica linn*	-
Phyllanthis	*phyllanthus fraternus*	-
Temple tree	*Plumeria actiminate*	-
India beech	*Pongania pinnate*	-
Castos	*Ricinus Communis*	-
Bowstring Hemp	*Sausevieria zeylanica*	-
Seshan	*Ses hania grandiflora*	-
Yellow berried nightshed	*Salanum xanthocarpum*	-
Orjun	*Terminalia arjuna*	-
Teak	*Tectoria grandis linn*	-
Yellow allender	*Thevetia peruviana*	-
Emetic swallow	*Tylophora asthamatica*	-
Ranvolfia Root	*Rauwolfia* serpentina	-
Indian privet	*Vitex negundo*	-
Atkuri Invory tree,	*wrightia tomentosa*	-
Vasaka	*Adhatoda Zeylanica*	-
Calamus	*Acorus Calamus*	-
Chhatim	*Alstonia Scholaris*	-
Brahmi	*Bocopa Monnieri*	-
Kantakari	*Solanum Aviculare*	-
Costus	*Costus Speciosus*	-
Centella	*Centella Asiatica*	-
Cinchona	*Cinchona Species*	-
Coscinium	*Coscinium Fenestratum*	-
Euphorbia	*Euphorbia Hirta*	-
Asafoetida	*Ferula Nerthex*	-
Anantamul	*Hemdesmus Indicus*	-
Tamarind	*Tamarindus Indica*	-

LIST OF ABBREVIATIONS

ARIASP - Assam Rural Infrastructure & Agricultural Services Project
ARTC - Assam Railway and Trading Company
C & I - Criteria and Indicators
CPR - Common Property Resource
CVM - Contigent Valuation Method
DFO - Divisional Forest Officer
EI - Economic Instrument
EVRI - Environment Valuation Research Inventory
HPC - Hindustan Paper Corporation Limited
ICAR - Indian Council of Agriculture Research
JFM - Joint Forest Management
Km - Kilometer
LPG - Liquidified Petroleum Gas
Mton - Metric ton
NABARD - National Bank for Agriculture and Rural Development
NBO - National Building Organisation .
NE - North East
NGO - Non Government Organisation
NWDPRRA - National Watershed Dev. Project for Rainfed Areas
NWFP- Non Wood Forest Products
RF - Reserved Forest
SFM - Sustainable Forest Management
TCM - Travel Cost Method
TRIFED- Tribal Cooperative Marketing Development Federation of India Limited
USA - United States of America
WTA - Willingness to Accept
WTP - Willingness to Pay

• • • •

ANNEXURE III

1. Poultry(Layer) 200 birds.

a)	**Grower shed**	**16 Sqmtr**	
b)	**Layer shed**	**50 Sqmtr**	**Rs. 20,000.00**
c)	**Equipment**	**LS**	**Rs. 2,000.00**
d)	**Day old chick**	**210 nos.**	**Rs. 3,780.00**
e)	**Feed**	**1600 Kg**	**Rs. 12,800.00**
f)	**Vety aid & insurance**	**-**	**Rs. 2100.00**
			Total – Rs 40,680.00

Say Rs. 40,700.00

2. Piggery(Breeding Unit 3 + 1)

a)	**Pig sty**	**14 Sq Mtr.**	**Rs. 6300.00**
b)	**Female weaner**	**3**	**Rs. 6600.00**
c)	**Male weaner(8 month old)**	**1**	**Rs. 3500.00**
d)	**Feed cost for 200 days**		**Rs. 4000.00**
e)	**Vet care & medicines**		**Rs. 1500.00**
f)	**Garbage collection**		**Rs. 1500.00**
			Total Rs. 25,400.00

3. Goat Rearing (5 + 1)

a)	**Shed**	**9 Sq mtr.**	**Rs. 1000.00**
b)	**Doe (1 year old)**	**5**	**Rs. 2500.00**
c)	**Breeding buck**	**1**	**Rs. 800.00**
d)	**Conc. Feed**		**Rs. 400.00**
e)	**Vety. Aid & insurane**	**-**	**Rs. 350.00**
			Total Rs. 5050.00

4. Mulberry Plantation(Rainfed) per Bigha

a)	**Planting Materials**	**Rs. 450.00**
b)	**Manure & Fertilizer**	**Rs. 730.00**
c)	**Plant Protection**	**Rs 175.00**
d)	**Sprayers**	**Rs. 1000.00**
e)	**Fencing**	**Rs. 1200.00**
f)	**Rearing shed**	**Rs. 3000.00**
g)	**Rearing equipment**	**Rs. 2515.00**
h)	**DFL & Disintect**	**Rs. 950.00**
i)	**Labour**	**Rs. 4066.00**
		Total Rs. 14086.00

Say Rs. 14,100.00 per bigha Or Rs. 105750.00 per Ha.

5. Rubber Plantation(Rainfed) per Ha

a)	**Planting Materials**	**Rs. 4410.00**
b)	**Manure & Fertilizer**	**Rs. 6465.00**
c)	**Plant Protection**	**Rs 2000.00**
d)	**Cover crop seed**	**Rs. 100.00**
e)	**Fencing**	**Rs. 8800.00**
f)	**Insurance, tools**	**Rs. 950.00**
g)	**Labour**	**Rs. 23490.00**
		Total Rs. 46215.00

Say Rs. 46,200,00 per Ha.

6. Horticultural Plantation(Assam Lemon) per Ha

a)	**Planting Materials**	**Rs. 8470.00**
b)	**Manure & Fertilizer**	**Rs. 4655.00**
c)	**Plant Protection**	**Rs 1000.00**
d)	**Transportation**	**Rs. 700.00**
e)	**Labour**	**Rs. 4710.00**
	Total	Rs. 19355.00

Say Rs. 19500.00 per Ha.