CHAPTER - 2

ASSESSMENT OF FOREST RESOURCE

2.1. INTRODUCTION

Forest can be viewed as one of the important economic asset for the country's prosperity and a major segment of it is owned by the government. (Westoby, 1978). Forestry of our country provides us with a great variety of valuable products. In fact, the impact of forests and their importance on the economy can hardly be exaggerated. The influence of forest is so penetrating in nature that it hardly requires any special mention. Nevertheless representation of some of the aspects, over which forest exercises its influence in systematic manner, would necessarily help us a lot to understand it's relative degree of importance on our life and activities (Singh & Upadhayay, 2000). It is however essential to note that some of effects of forest are direct, while there are many others which are indirect in nature. Actually, it's relative range of influence stretches from the mere existence of the mankind on the earth down to the employment of a few million people, who are engaged in various kind of activities based on forests.

Forests of Darjeeling and Jalpaiguri district play an important role in the economy of the area (Figure 2.1a and 2.1b) Forests perform both productive and protective functions. The function which can be achieved through the exploitation of forest are called productive or direct functions. The local economy associated with it is called extractive economy. Protective function or indirect functions imply the protection of environment. These functions are now highly significant and according to United Nation's guideline 1/3rd of the total geographical area should be under forest (FAO, 1997). The functions which are performed by the forest of Darjeeling and Jalpaiguri district are summarised below :-

a) Productive functions

- Source of timber
- Source of fuel wood
- Source of food and fodder
- Source of raw materials for forest based industries and
- Source of medicinal plants.

b) **Protective functions**

- Moderation of local climate.
- Control of landslide and soil erosion
- Control of flood
- Reduction of the effects of air pollution.
- Wild life conservation.
- Maintaining catchment area water balance and
- Maintaining sustainable soil fertility.

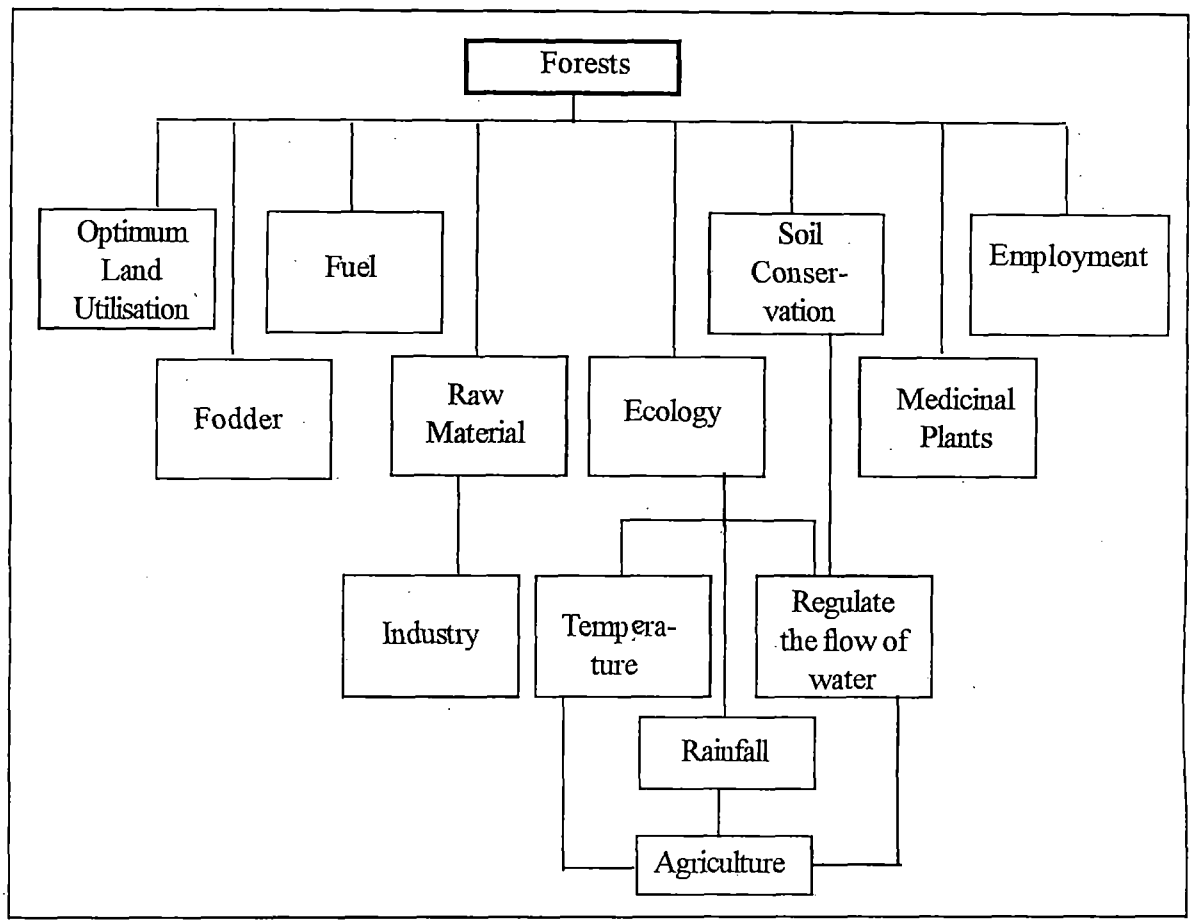

Figure 2.1a - Role of forests in the development of the study area.

The aim of this chapter is to assess the forest resource of the Darjeeling and Jalpaiguri district. It includes distribution of forest, classification of forest, types of species, extent of degradation and growth of stock of forest resource. The investigator, therefore, concentrates his investigation on :

- The study of distribution of forest from the view point of geographical area, legal status and their classification.

- The study of the classification of plant species which includes timber and non-timber plants

- The extent of degradation and its quantitative estimation through sample survey and secondary sources

- Estimation of growing stock of forest resource

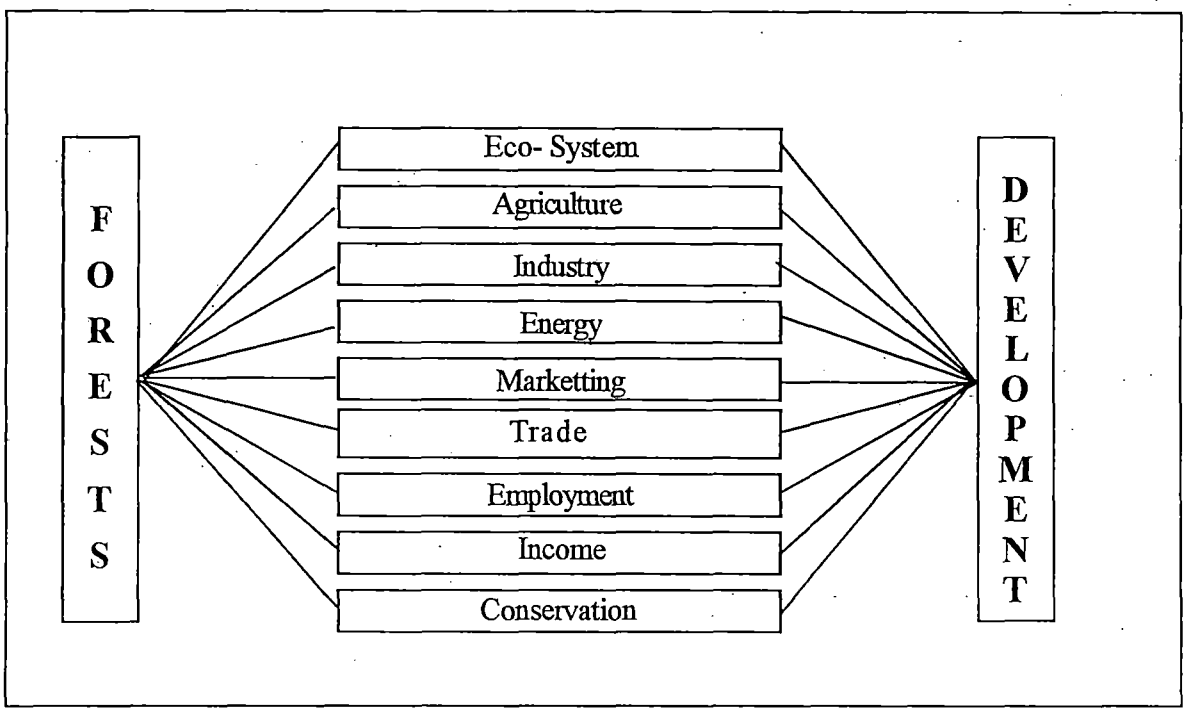

Fig. 2.1b - Linkage of forest with local economy

2.2 DISTRIBUTION OF FORESTS OF THE STUDY AREA

The sub-Himalayan North Bengal (Darjeeling and Jalpaiguri district) maintains a fair amount of forest but their distribution and density are not uniform. 32.39% of the geographical area is covered by forest (Table 2.1a). There is a marginal increase in the forest area of

the districts as per the details is given in table2.1b Darjeeling district can boast up the higher per capita forest land (0.10 ha.) in West Bengal, followed by Jalpaiguri (0.08 ha.), which are even higher than the national average of 0.07 ha. and the state average of 0.02 ha. per capita (Rohatgi, 2000). Many parts of the study area enjoy a warm rainy season which is advantageous for the growth of natural vegetation.

Table 2.1a

Distribution of forests in Darjeeling and Jalpaiguri district

(area in sq. km.)

Name of the District	Geographical area	Forest Area	% of forest area to total area	Dense forest	Open forest
Darjeeling	3149	1455	46.21	1096	359
Jalpaiguri	6227	1582	25.41	1445	137
Total	9376	3037	32.39	2541	496

Source - State Forest Report - 1999. Ministry of Environment and Forest, Govt. of India.

Table 2.1b

Comparative study of forest area.

Name of the District	1991-92 (area in sq.km.)	1999-2000 (area in sq.km.)	% of forest area increased over 1991 - 1992
Darjeeling	204	1455	1.20
Jalpaiguri (excluding COB forest division)	1415	1582	1.12
Total -	2619	3037	1.16

Source - State Forest Report, 1991-92 and 1999-2000, Ministry of Environment and Forest, Govt. of India

The investigator has also prepared a table (No.2.2) on distribution of forest of the study area as per geographical location.

Table 2.2

Distribution of forest according to geographical region

Geographical Region	Division	% of Plantation forest	% of Natural forest
Terai (Middle region of Mechi & Tista river)	Kurseong (Part) Wild life - I (Part) Baikunthapur (Part)	24	76
West Dooars (Middle region of Tista & Torsha river)	Kalimpong (Part) Wild life - II (Part) Baikunthapur (Part) Jalpaiguri (Part) Cooch Behar (Part)	35	65
East Dooars (Middle region of Torsa & Sankosh river)	Cooch Behar (Part) Buxa Tiger Reserve	31	69
Hilly region	Kurseong (Part) Wild life - I (Part) Kalimpong (Part) Darjeeling (Part)	55	45

Source -Forest Department, Darjeeling and Jalpaiguri district

2.2.1. Distribution of forest by legal status

For the convenience of administration, forest have been grouped into three broad categories:

- State forest which is under the direct control of the government and revenue earned goes to the state government.
- The community forest which is under the control of autonomous bodies and the Panchayat etc.
- Private forest - it is under private ownership and usually includes plants which provide fruits and timber for construction as well as fuel wood.

Further, on the basis of the legal status, the forest department has categorised into three broad divisions;

(i) Reserved
(ii) Protected
(iii) Unclassed and others.

Reserve forest is permanently dedicated either to production of timber or other forest produce and in which the right of grazing is seldom allowed. It is owned and operated by the government. In protected forest these rights are allowed subject to a few mild restrictions. Though owned by the government, it may be used by private individuals to meet their needs of wood and grazing. The unclassed forests are those which are under the general control of forest department and are allowed to be used by general public. The area distribution of forest by legal status in the area is given in table2.3 and figure 2.2

Table 2.3

Legal status of forest in the study area.

Legal status	Area (in sq.km)	Area (in %)
Reserve forest	2598	85
Protected forest	259	9
Unclassed & others forest	194	6
Total (including COB Division)	3051	100

Source - West Bengal State Forestry Action Plan (1996 - 2015)

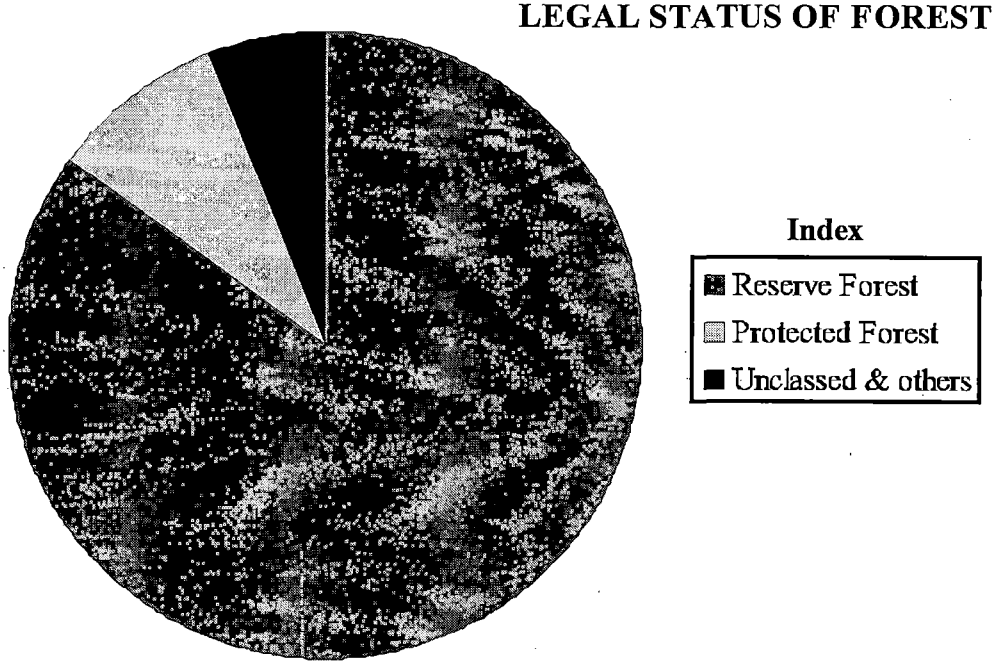

Fig. 2.2

2.2.2. Spatial distribution of forest land

It is important to note that, the forest, which is considered as one of the man's most valuable resources, have depleted through ages, particularly since the time when agriculture was introduced. But the rate and degree of depletion of forest are not same every where (Basu, 1999) In comparison to the forest of the temperate latitudes and sub-tropical latitudes, the forest of the equatorial regions have less been affected until recent times. This is largely because of the fact that the forest of the mid-latitudes and also of the tropical areas have been cleared very rapidly for the sake of expansion of agriculture and also for building roads, cities, and towns, but the tropical forests still retain, to a great extent, their virgin characters. The study area is situated within the monsoon climatic zone, gets heavy seasonal rainfall and plenty of sun light. The soils are also congenial for forest growth.

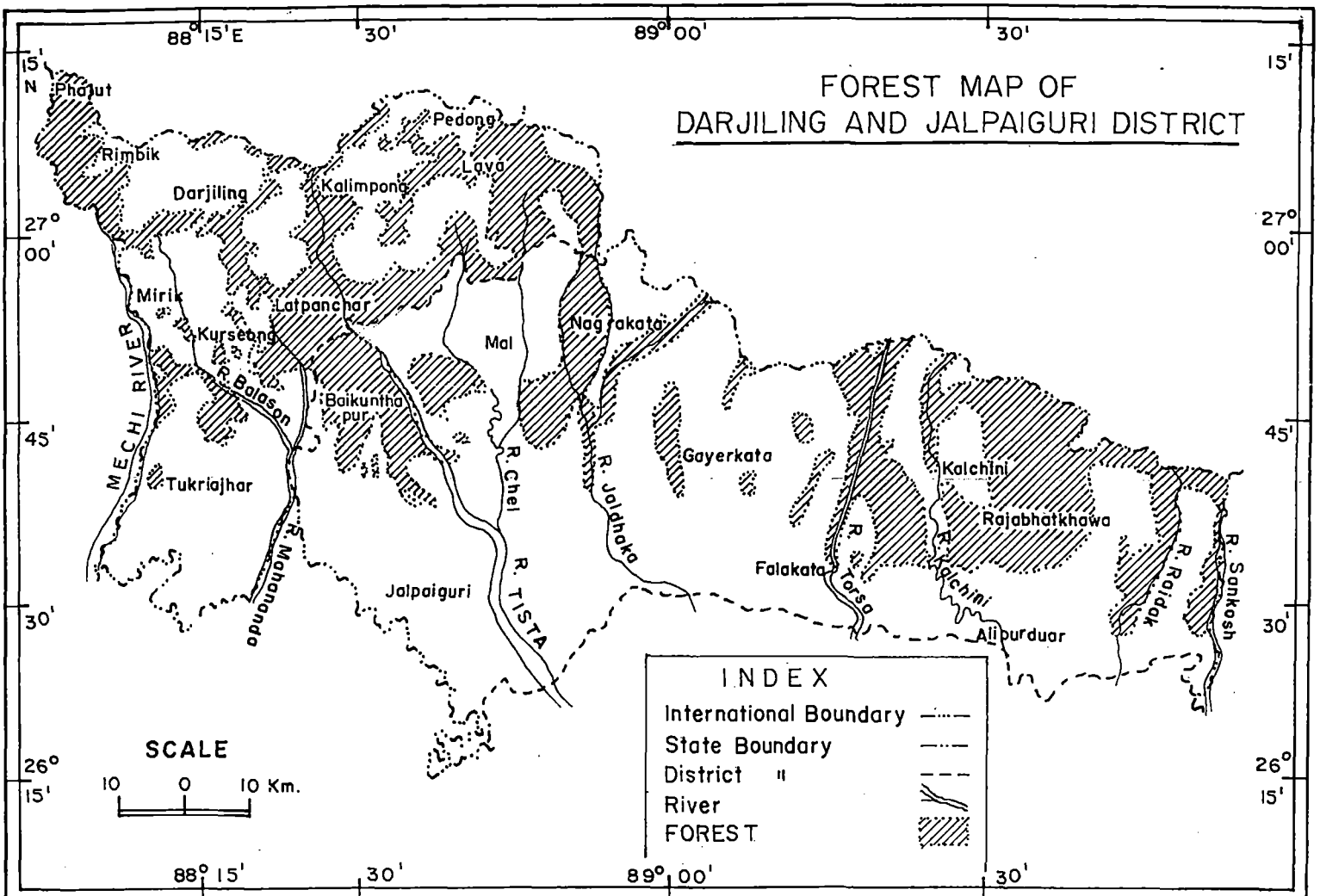
FOREST MAP OF
DARJILING AND JALPAIGURI DISTRICT
88° 15' E
30'
89° 00'
30'
15' N
27° 00'
45'
30'
26° 15'
Phalut
Rimbik
Pedong
Lava
Darjiling
Kalimpong
Mirik
Latpanchar
Kurseong
Mal
Nagrakata
MECHI RIVER
R. Balason
Baikuntha pur
Tukriajhar
R. Chel
R. TISTA
R. Jaldhaka
Gayerkata
Kalchini
Rajabhatkhawa
Falakata
R. Torsa
R. Kalchini
Alipurduar
R. Raidak
R. Sankosh
R. Monanada
Jalpaiguri
INDEX
International Boundary
State Boundary
District
River
FOREST
SCALE
10 0 10 Km.

Fig. 2.3

During the past few years of the last century the forests owned by the government suffered wide spread damaged by illegal cutting and disintegration. So, these forest area lost their compactness. As such the original form and structure of forest have been modified except in the remote and inaccessible areas of Darjeeling and Jalpaiguri district.

Change in land use pattern, growth and migration of population in different periods of history and deforestation have influenced the spatial distribution of forest in Darjeeling and Jalpaiguri district (Figure 2.3). Even the forests which have managed to survive after prolonged exploitation show signs of degeneration. Moreover, gradual progress of agriculture on the forest lands have enhanced the problem and change the residual vegetation to scrubs. Yet these forests of the area provide the major requirement of fuel, fodder, and construction material for thousands of people living in these district.

2.3 CLASSIFICATION OF FOREST IN THE STUDY AREA

There is a positive co-relation existing in the Darjeeling and Jalpaiguri district between the diverse nature of physiography, climate and forest. Numerous factors are responsible for the changing of forest from place to place. Among the various factors responsible for spatial differences of forest, pedological and climatic factors are by far the most important (Chatterjee, 1964). Biotic, edaphic and climatic climax group dominates in forest growth. Several attempts were made to classify the forest of the study area. According to variation of rainfall and temperature the forest area are divided by Champion and Seth into following types (Table 2.4 , Figure2.4 and Photo 2.1 - 2.4)

1. Sal forests of he plains
2. Riverine forest
3. Wet mixed Sal and moist deciduous forest
4. Middle hill forest
5. Lower hill forest
6. Wet temperature montane forest
7. Alpine forest

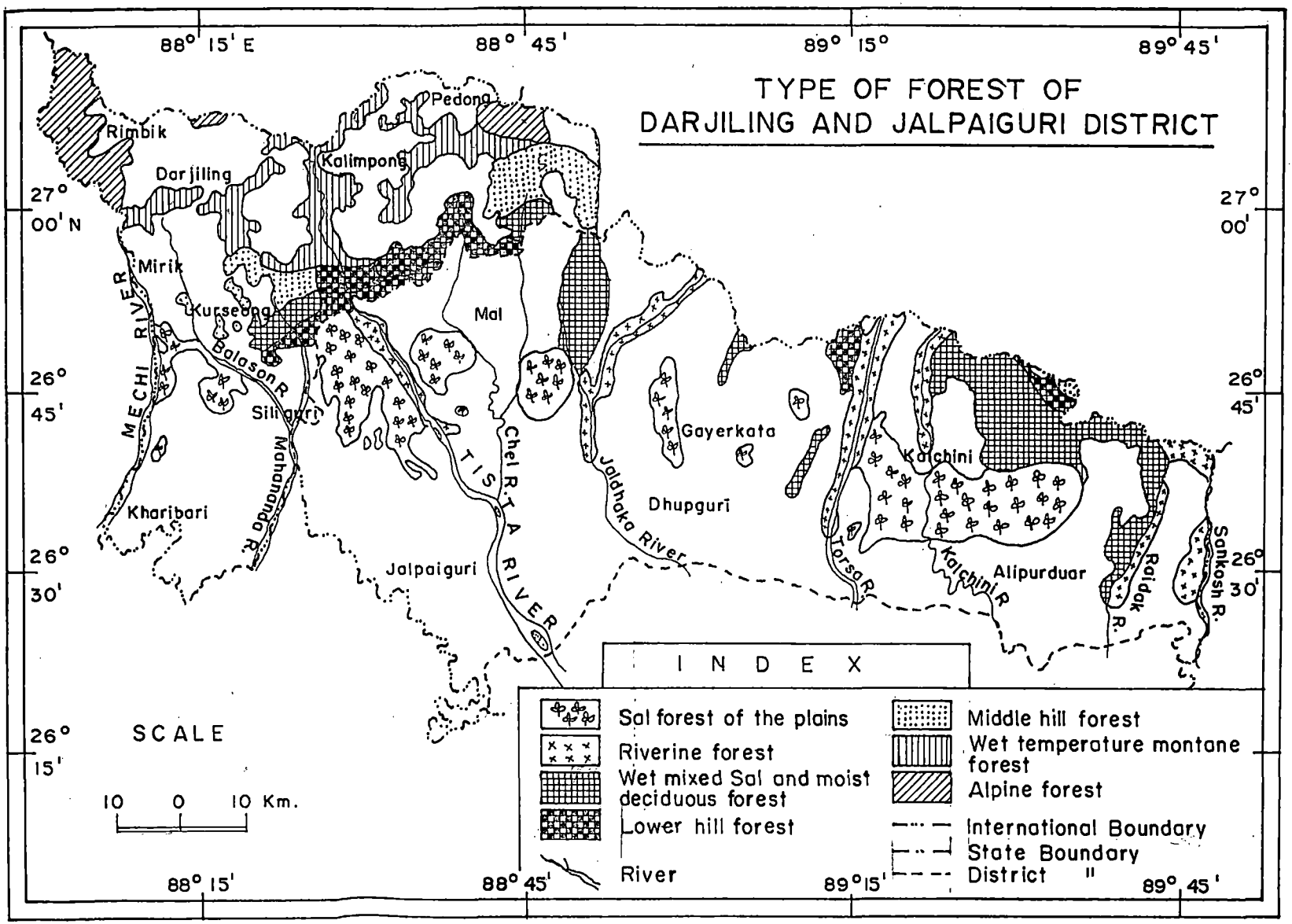
TYPE OF FOREST OF
DARJILING AND JALPAIGURI DISTRICT
88° 15' E
88° 45'
89° 15°
89° 45'
27° 00' N
27° 00'
26° 45'
26° 30'
26° 15'
Rimbik
Pedong
Kalimpong
Darjiling
Mirik
Kurseong
Mal
Siliguri
Balason R.
Mahanada R.
MECHI RIVER
TISTA RIVER
Chel R.
Jaldhaka River
Gayerkata
Dhupguri
Kharibari
Jalpaiguri
Kalchini
Torsa R.
Kalchini R.
Alipurduar
Raidak R.
Sankosh R.
SCALE
10 0 10 Km.
INDEX
Sal forest of the plains
Riverine forest
Wet mixed Sal and moist deciduous forest
Lower hill forest
River
Middle hill forest
Wet temperature montane forest
Alpine forest
International Boundary
State Boundary
District "

Fig. no. 2.4

Photo 2.1 Sal forest at Moraghat Range.

Photo 2.2 Riverine forest at Murti.

Table 2.4

Major forest types of the study area.

Forest types	Division wise occurrence	Place of occurrence
1. Sal forests of the plains	Kurseong, Wild life - I, Baikunthapur, Jalpaiguri Wild life - II, Coochbehar and B.T.R.	**Terai region** - Laltung, Salugarh, Bagdogra, Sukna, **West Duars** - Moraghat, Tandu, Apalchand **East Duars** - Chilapata, Rajabhatkhawa, Damanpur.
2. Riverine forest	Wild life - I, Jalpaiguri Coochbehar and B.T.R	**Terai region** - Sevoke **West Duars**- Diana, Murti, Jaldapara., **East Duars** - Pana, Raydak, Jayanti.
3. Wet mixed Sal and moist deciduous forest	Wild life - I, Kurseong, Jalpaiguri, Wild life - II Coochbehar and B.T.R.	**Terai region** - Sukna, Sevoke, Bagdogra, **West Duars** - Alpalchand, Moraghat, Gorumara, Chapramari **East Duars** - Jayanti, Buxa, Nimati. Chilapata, Rajabhatkhawa
4. Middle hill forest	Kurseong, Wild life-I & II Kalimpong, B.T.R	**Terai region** - Kalijhora, Latpanchar, **West Duars** - Chel, Noyam, Neora valley, **East Duars** -Raymatang, Buxa,
5. Lower hill forest	Kurseong, Wild life-I & II Kalimpong, B.T.R	**Terai region** - Panighata, **West Duars** - Jaldhaka, Samsing, **East Duars**- Buxa, Bhutanghat
6. Wet temperature montane forest	Kalimpong, Wild life-I & II Darjeeling	**Hill region** - Singalila National park (Sandakfu area), Neora valley National park (Alubari Renon area), Lava, Rimbik, Sinchal
7. Alpine forest	Darjeeling, Wild life-I & II	**Hill region** - Singalila National Park, Neora Valley (Jorpakri) Tonglu, Ghoom area

Photo 2.3 Middle hill forest at Bagora Range

Photo 2.4 Lower hill forest at Kurseong Range.

2.4. SPECIES OF THE STUDY AREA

Man's dependence on plants for his existence dates back to the beginning of the human race .In the early days he had only limited needs like food, shelter and clothing. But with the advancement of civilization his requirement also grew . The present day man depends heavily on a very large number of plants to meet his daily requirement . The forest product obtained are converted into useful articles, contributing to his comfortable life .He needs wood as a structural material, as a source of energy, for manufacturing of paper and many other fashioned and finished products . The drugs obtained from plants and plant can cure many of the human suffering starting from the simple headache to the serious heart ailments

The study area is fortunately endowed with a wide variety of climatic and edaphic conditions resulting in a rich and varied flora and fauna (Chowdhury, 1964,Mukherjee, 1965). Most of the plants are wild in nature and only a few are cultivated. Species of the forest of the area are classified into two categories :

- Species in General
- Miscellaneous Species .

Species in general indicates timber-bearing trees. On the other hand miscellaneous species means non-timber plants. General species are used as timber to sawn logs or round wood processed into veneer, plywood, furniture, poles and pulpwood. Non-timber species, in the broadest sense include bamboo, cane, grasses, fibres, and leaves of some trees , mushroom and seeds of some plants. Details are shown on figure 2.5.

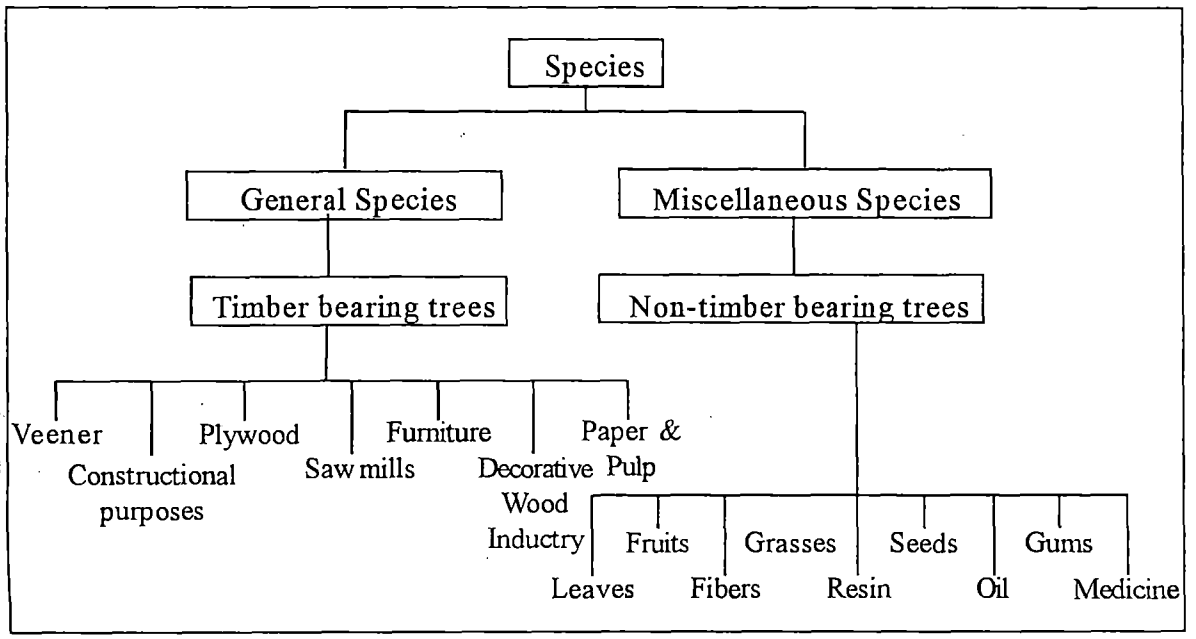

Fig. 2.5 - Different types of species and their uses in the area.

2.4.1. General species :

There are numerous species in the study area. Various factors are responsible for such variation of forest plants (Banerjee, 1964). Altitude , soil and climatic factors have influenced the growth of different species which are found in the area (Figure 2.6) . Some of the important species with their local name and scientific name are listed in Table 2.5.

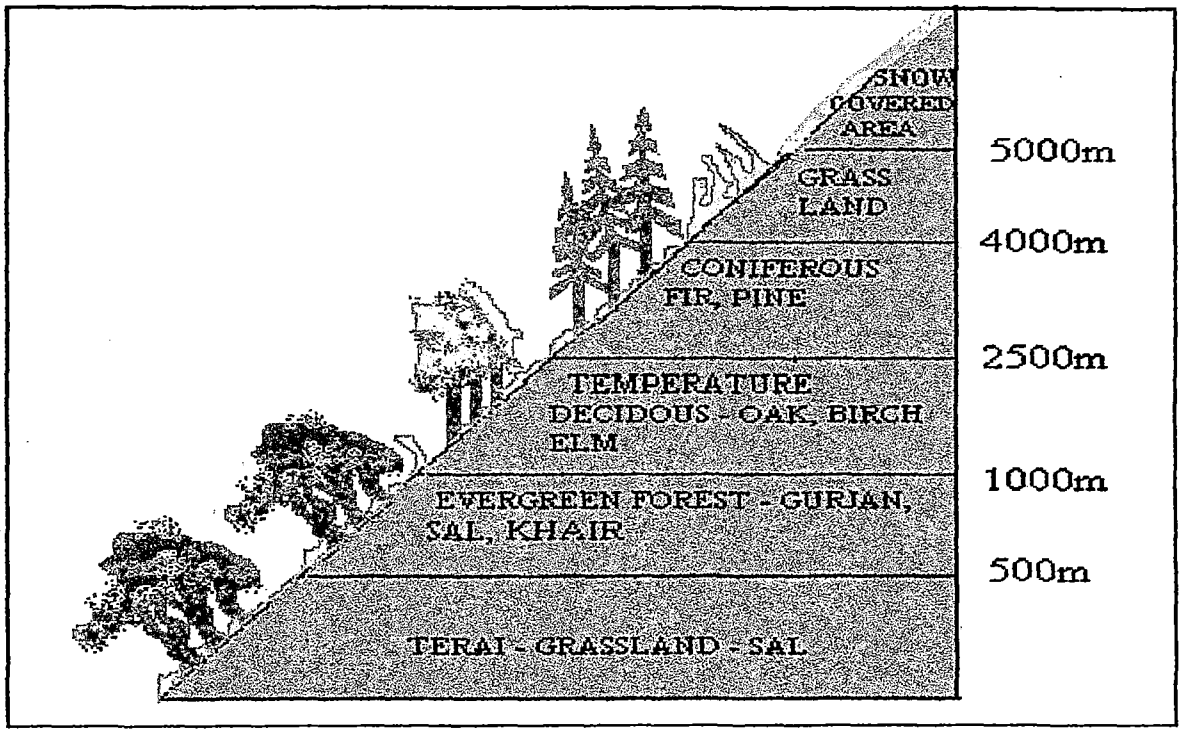

Fig. 2.6 - Variation of tree species with altitude in the study area.

2.4.2. Miscellaneous species :

Miscellaneous species include non- timber bearing trees. The products which are obtained from such trees are called non-timber forest produce (NTFP) or minor forest produce (MFP). Though sal, simul etc. are the timber bearing trees, yet these give a number of non-wood products. So these trees are considered as timber as well non-timber plants. There are various types of miscellaneous species in the area from which a variety of non-timber forest produce are available. A List is made for such species showing their products. (Table 2.6)

Table - 2.5

Some important species of the study area

Sl. No	Scientific name	Local Name
1.	*Acacia auriculiformis*	Akashmani *
2.	*Terminalia arjuna*	Arjun
3.	*Terminalia belarica*	Bahera
4.	*Betula alnoides*	Birch
5.	*Quercus lamcllosa*	Buk
6.	*Michelia champaca*	Champ *
7.	*Alstonia scholaris*	Chhatian *
8.	*Chukrassia tabularies*	Chikrasi
9.	*Schima wallichi*	Chiloni
10.	*Cryptomeria japanica*	Dhupi
11.	*Eucalyptus*	Eucalyptus *
12.	*Gmelia arbores*	Gammar *
13.	*Melia azaderach*	Ghoraneem *
14.	*Ailanthus grandis*	Gokul
15.	*Lagerstroemia flos-reginae*	Jarul *
16.	*Authocephalus cadamba*	Kadam *
17.	*Castanopsis*	Katua
18.	*Machilus*	Kawlas
19.	*Symplocos*	Kharani
20.	*Acacia catechu*	Khair
21.	*Careya arborea*	Kumbhi
22.	*Duabanga India*	Lampati
23.	*Artocarpus fraxinifolius*	Latore
24.	*Machilus odoratissaima*	Lalikawla
25.	*Macaranga pustulata*	Malata
26.	*Arundinaria racemosa*	Maling
27.	*Engelhardtia spicata*	Mauwa
28.	*Tetrameles nudiflora*	Mainakach
29.	*Cassia seamea*	Minjiri *
30.	*Auercus lamellosa*	Oaks
31.	*Terminalia crenuluta*	Pakasaj
32.	*Terminalia myriocorpa*	Panisaj
33.	*Quercus lineata*	Phalat
34.	*Book landia populnea*	Pipli
35.	*R.arboreum, Grande & falconeri*	Rhododendron
36.	*Shorea robusta*	Sal *
37.	*Bombax ceiba*	Simul *
38.	*Albizzia spices*	Sirish *
39.	*Dalbergia sissoo*	Sissoo *
40.	*Betula utilis*	Saur
41.	*Tectona grandis*	Teak *
42.	*Cedrella toona*	Toon

* Species of economic importance.

Table 2.6

Miscellaneous species for non-timber forest produce

Sl No.	Species (Local name)	Products or NTFPs / MFPs
1.	Sal (Timber & non-timber bearing tree)	1. Sal leave for Sal Plate 2. Sal seeds for oil etc.
2.	Bamboos	1. Constructional purposes 2. Making of Paper 3. Principal food for animals etc.
3.	Grasses - Citronella	Citronella oil
4.	Dhupi	Rasins
5.	Chirata	As medicinal plant
6.	Cinchona	As medicinal plant
7.	Mushroom	Edible wild plant food value.
8.	Cane	As Furniture
9.	Turmeric, Black pepper Cardamom, Ginger etc.	As spice and medicine
10.	Simul (timber & non-timber bearing tree)	Simul flower for raw cotton
11.	Gammar (timber & non-timber bearing tree)	Bark of Gammar used in cough, indigestion, seminal weakness etc.
12.	Ulatkambal	As medicinal plant
13.	Ritha	As detergent & hair smoothness
14.	Behara	Fruit of bahera used in stomach & eye ailments.
15.	Khair	As Khata
16.	Brahmi	As medicine
17.	Thankuni	Used in stomach & brain tonic

2.5. EXTENT OF FOREST DEGRADATION IN DARJEELING & JALPAIGURI DISTRICT

Deforestation and degradation of forest land are the main problems of forests in the districts. Different information about deforestation of forest in the area have been circulating in state newspaper since last few years. The people of these region realise the impact of deforestation. As such, there is no records of deforestation in the forest department. Different N.G.Os of the study area are showing their attention on the deforestation. There are many reasons for degradation of forest lands in the area (Figure 2.7). No extensive works have so far been done on the degradation of forest land of these districts. An attempt has been made in the present study to asses the extent of forest degradation in the study area based on information gathered from the N.G.Os as well as from the sample survey done during field work. Degradation caused by soil erosion, landslide, forest fire, flood etc has also been considered. Extent of forest degradation as estimated by the investigator based on the above mentioned is shown in tabuler form (table no 2.7 & photo 2.5).

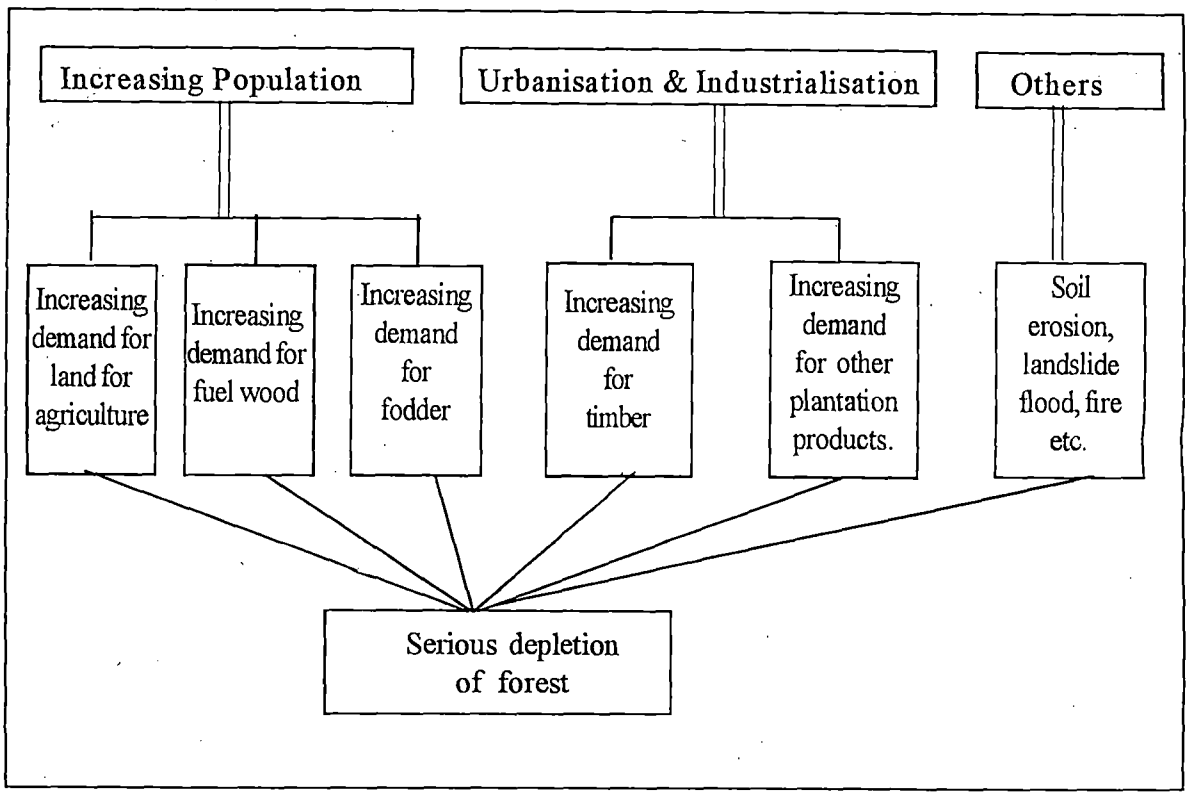

Fig. 2.7 - Causes of degradation of forest land in the study area.

Table 2.7

Extent of forest degradation of the study area

Division	Range	Severely degraded areas (more than 40% of total area)	Partly degreded areas (more than 20% of total area	% of degradation as per total range area.
Darjeeling	Tista Valley	Riyang, Geyel	Pesok	30
	Tokdah	Takdahvest, Pumong, Lopchu	Sim	30-40
Kurseong	Bagdogra	Kalka, Dolka, Kadam Central Malta, Tarabari Tirihana	Bagdogra	40-50
	Panighata	Balasan, Kalabari, Mechi	Bangkolong, Lohagarah	50-60
Kalimpong	Chel	Chunabhati, Noyam, Yanmakum	Lis, Mongpong	20
	Neora	Mal, Sakam	Ambiyok	20-30
Jalpaiguri	Moragat	North Moragat, Gosaihat	-	20-30
	Dalgaon	Dalgaon, Dhumchi Bandapani	Reti	60-70
Baikunthapur	Ambari	Total range area	-	50-40
	Belakoba	Total range area (excluding Batasivita)	Batasivita	60-70
Coochbehar (Part)	Madarihat	Khairbari	Titi	20-25
	Chilpati	Mondabari	Bariya	20-30
B.T.R.	Damanpur	Dima, Gadadhar	Damanpur	40
	Jayanti	Panbari, Cheko	Phaskhawa, Hatipota	20

Source - Sample Survey and N.G.O reports

The investigator also tries to quantify the amount of illegal felling of timber in some forest ranges the through sample survey. An estimate in this regard is given below (Table 2.8).

Table 2.8

Illegal timber collection from different forest ranges (in cu.m.)

Areas	Forest ranges from which timber is collected.	Main business centre	Average annual qty.	Main species collected
Terai	Salugara, Ambari, Dabgram (Baikunthapur), Bagdogra, Naksalbari, Sevoke, Panighata (Kurseong), Sukna (Wild life - 1), Chel (Kalimpong).	Siliguri	24000 To 25000	Sal, Segun Jalrul, Champ etc.
West Duars - 1	Lataguri, Chalsa, Ramsai, (Jalpaiguri), Apalchand, Targhera (Baikunthapur), Noyam, Chel, Neora (Kalimpong), Gorumara (Wild life - 2).	Malbazar & Kranti	13000 To 15000	Sal, Segun Jalrul, Gamari, Champ etc.
West Duars - 2	Moraghat, Nathua Diana (Jalpaiguri).	Gairkata & Banarhat	6000 To 8000	Sal, Segun Gamari, Champ etc.
West Duars - 3	Dalgaon	Birpara	3500 To 5000	Sal, Segun Gamar,Jarul Champ etc.
East Duars - 1	Jaldapara Wild Life Sanctuary (Coochbehar)Chilapata,Titi, Mandari hat, Nilpara, Kodal basti (Coochbehar), Salkumar, Jaldapara	Falakata Madarihat Hasimara Cooch - Behar	15000 To 20000	Sal, Segun Gamari, Champ etc.
East Duars - 2	Buxa Tiger Reserve	Kalchini Hasimara Hamiltonganj Damanpur Alipurduar	35000 To 45000	Sal, Segun Gamari, Champ Jalrul etc.
Total	Average annual illegal felling (excluding Hill area)		93500 to 1,18,000	

Source - Sample Survey and N.G.O reports

2.5.1 Forest fire

Forest fire causes extensive damage to ground flora every year. No major fire damage was occurred in the years 1997-98 and 1998-99 in the Jalpaiguri district. In the year 1996, plantation raised by Chamurchi beat of Banarhat range under model p_3 (Annexure-1) over an area of 10 ha. was completely damaged by fire (Jalpaiguri Forest Division, Annual Report 1997-98).

Fire has caused extensive damage to young as well as old plantations in the hilly regions of Darjeeling. The damage of the older plantations was caused in Rimbick, Tonglu and Ghoom Simana ranges of Darjeeling division. Fire has also caused damaged to the younger plantations especially in Teesta valley and Darjeeling range of this division (Table2.9)

Table 2.9

Forest areas affected by fire in Darjeeling division

Sl. No.	Year of occurrence	Area in Ha.
1.	1992 (April - May)	500.000
2.	1995 - 96	37.500
3.	1997 - 98	38.450
4.	1998 - 99	46.042

Source :- Darjeeling Forest Division - Annual Report - 1998-99

2.5.2. Snow damage

About 14.ha.plantation has damaged by snow/frost during 1998-99 at Tongly Range. (Annual Report 1998-99, Forest Department, Darjeeling Division).

2.5.3. Landslide

The denuded areas under Ghoom Simana range have suffered badly due to the erosion. Particularly affected blocks are Barbatia, Bhanjang, Ghoom and Majidhura. A large landslide has taken place in Kankibong forest block near Trishulay. The extent of landslide is estimated to be around 5.0 ha.(Annual Report-1998-99, Darjeeling Forest Division).

A picture on landslide affected areas during 1998-99 is given in table 2.10.

Table 2.10

Landslide affected forest area (1998-99)

Sl No	Forest Range	Name of the forest area affected by landslide	Location
1.	Dhodrey	Rithu forest area	Rithu
2.	Dhodrey	Plantation area 1994	Selimbarg-1
3.	Takdah	Hum block near 'O' centre	Hum-1 & 2
4.	Ghoom-Simana	Gurasedara - 4	Gurasedara - 4
5.	Darjeeling	Plantation area -1998	Risihat -1
6.	Tista valley	Peshok area -1	Peshok - 1
7.	Tista valley	Peshok area -1 & 2	Peshok - 1&2
8.	Tista valley	Approach road to Range Office	Approach road to Range Office
9.	Badamtam	Badamtam -1 & 2	Badamtam-1&2
10.	Badamtam	Sumbong	Sumbong

Source - Annual Report 1998-99, Forest Department, Darjeeling Division.

2.5.4. Flood / Bank erosion :

Flood also cause heavy damage to forest land every year (Photo 2.6). Most of the rivers of the area is subjected to occasional flooding. Some times the rivers of the districts change their courses. As a result many young and old plantation are damaged. The plantations(1996) were damaged seriously by flood in the Jalpaiguri division.(Table 2.11)

Photo 2.5 Degradation of forest land at Batabari

Photo 2.6 Flood affected forest area at B.T.R.

Table 2.11

Flood affected forest areas (in ha.) in Jalpaiguri division.

Forest range	Forest beat	Plantation model	Affected area in ha.
Madarihat	Gosaihat	P1	04.00
Dalgaon	Bandapani	P3	01.75
Nathua	South Diana	P3	01.00
Nathua	Ramsai	P3	05.00
Nathua	Ramsai	P3	15.00
Daina	Central Diana	P3	05.00
Dalgaon	Dalgaon	P5	02.50

Source - Annual Report 1996-97, Forest Department, Northern Circle, W.B.

In addition to the above causes, one of the most important direct loss caused by the unscientific and illegal mining activities in the sub-Himalayan West Bengal adjacent to Bhutan is the destruction of Jalpaiguri's rich forest, the best in West Bengal. Recent study reveals that in between 1993 to 2000, 850 hectares of good forest land was destroyed either by bank failure or by shifting river cources. Over two million trees were destroyed - the market price for which are approximately 15,000 million rupees. Huge dolomitic dust transported by air and river water accumulates on the forest floor, and rises the pH value of the soil (pH 7.5 to 8.1 recorded near Jainti). Alkalinity of the soil hinders the availability of phosphate to the plants. Non availability of phosphate along with Alkalinity is found to be responsible for dying of valuable timber especially Sal around Santalabari-Jainti area. Survey during 2000 reveals that over 5000 trees were dead around Santalabari-Jainti area. In addition to this, dolomite dust is also found to be responsible for the destruction of undergrowth rich bio diversity of this area. This also exerts detrimental effects on the wild life of the region. Shifting of river courses like Jainti and Dima has also destroyed rich bio diversity of this region. It also affects the animal migration. Moreover calcium richness in the fodder and drinking water may cause health hazard to the wild life.

2.6. ESTIMATED GROWING STOCK OF TIMBER AND NON-TIMBER

Growing stock for the different forest division is collected from the secondary sources.

There are some work on the growing stock which were conducted at the government levels by the Office of the Joint Director, Forest Survey of India (FSI), Eastern zone, Calcutta, in the year 1996 - 97. This survey reveals that the total growing stock of timber in the districts estimated at 3,27,87,690 (cu.m.). The present market price of this timber is more than 1,000 crores. A renowned N.G.O. (NESPON) of the study area has also conducted an extensive field survey for the growing stock pattern of forests of Darjeeling and Jalpaiguri district. Government records as well as N.G.O. records are considered to evaluate the exact growing stock of forest of the area. These survey report regarding growing stock of timber is given in table 2.12(a) and table 2.13(b)

Table 2.12(a)

Growing stock of timber as per forest type (in cu.m.)

Forest Type	Sample Range	Average timber per Ha.
Plains sal forest	Moraghat Apalchand	160.00 150.00
Wet mixed sal & moist deciduous forests	Chilapata Tondu	41.99 117.58
Riverine forest	Jaldapara Daina	37.08 22.62
Middle hill forest	Takhda	90.06
West temperate forest	Singalila Tonglu Lava	107.25 141.41 140.00

Source - Nagarik Mancha,2000.P355

Table - 2.12(b)
Total Growing Stock (in thousand cu.m.)

District	Growing Stock
Darjeeling	14887.69
Jalpaiguri	17900.00
Total of the study area	32787.69

Source - W.B. State Forestry Action Plan - 1996 - 2015

2.6.1. Growing stock of NTFPs

NTFPs are drawing greater attention in the area today which can supplement livelihood and income generation to the fringe people . The most important NTFPs of the study area are Citronella oil, Sal leaves, Sal seeds, Mushroom, Medicinal plants, Turmeric, Black pepper, Muster seeds, Cotton, Brooms, Khata etc. The following table (2.13) gives a picture about the present annual growing stock of some important NTFPs which is prepared by the investigator through sample survey with the guidelines of MFP Division.

Table 2.13
Growing stock of some NTFPs

Sl.No.	Name of NTFPs	Unit	Quantity/vol.
1.	Citronella oil	Ltr.	2049
2.	Blakpepper	Kg.	412
3.	Turmeric green	Qtl.	480
4.	Mushroom	Kg.	352
5.	Sal leaves	Kg.	2210
6.	Sal seeds	Kg.	2010
7.	Phul Jharu	No. of finished Pcs.	3015
8.	Bamboo	Number (matured)	6048
9.	Cotton	Kg.	1115

Source - Based on Sample Survey and MFP Division Report 2000 - 01

2.7. CONCLUSION

Forest is an important segment of economic development of the study area. They not only directly provide forest produce, employment to the rural poor, contribute immensely to rural energy, indirectly sustains the natural system which enriches human life in the districts. Most important matter of the forest of study area is that the proper inputs should be given to increase the production such as quality of multipliers like seed, clone, cuttings, grafts etc. to be selected from seed stand, seeds orchards only and all types of improved pre-planting techniques should be adopted like - seed collection, seed storage, treatment etc. Intensive silviculture should be adopted which is neglected in many cases like weed cleaning and finally thinning. Economically important species should be planted more to get a good amount of revenue which can improve the economic condition of the study area. Not only the wood matter but some NTFPs should be exploited on sustainable yield basis apart from natural means, propagation as inte-rcrop, value addition of the same by processing and marketing support for all forest produce should be ensured .

The forest sector is lacking proper data base and whatever data have generated are preserved in haphazard manner and become impossible to retrieve when needed. Great difficulties are found while collecting the different data for growing stock of timber in the study area. No ready made data are available for the estimation of NTFPs in the study area. So the activities F.S.I and Monitoring Cell of the forest department should be improved to preserve the data in systematic manner.

The vital problem of the forests of the area at present is the massive deforestation. There is no specific record with the forest department regarding deforestation of Darjeeling and Jalpaiguri districts. But this is an environment event in the study area. Forest department should not neglect such an important issue. During the course of sample survey, it is observed that there are some areas where the rate of degradation is more than 50% of the total forest area. The State Government should take immediate steps to stop such great extent of degradation of forest lands of the area. Otherwise this valuable natural resource of the area will be exhausted in near future.

REFERENCES :

Annual Reports(1996-2000): Forest Department, Jalpaiguri and Darjeeling district.

Banerjee, U.(1964) : A short note on the forest of Darjeeling district, W.B. Forest Cetenary Commemoration Volume, Govt. of West Bengal PP. 91-95.

Basu, A (1999) : Impact of deforestation in parts of south western area of West Bengal, Unpublished Ph.D. Thesis. University of Burdwan .

Chatterjee C.D. (1964) : Forestry in Ancient India, West Bengal Forest Centenary Commemoration Vol. Director of Forest, Govt of West Bengal. PP 65-77

Champion,H.S.and Seth, S.K(1968) : General Silviculture of India,F.R.I.Dehra Dun.

Chowdhury,A.B.(1964) : Forest of Jalpaiguri District, study in composition in West Bengal, Forest Centenary Commemoration, Volume 1964, Govt of West Bengal.

F.A.O.(1997) : Forestry information notes. FAO Forestry Development March 1997, Rome.

Forest Survey of India (1987) : Results of Plantation Inventory in Darjeeling and Kalimpong division of West Bengal, Eastern Zone, 1987.

Mukherjee,S.K.(1965) : A sketch of the vegetation of Jalpaiguri District, West Bengal, Bulletin, Botanical Survey of India, Vol.7, No.1-4,PP.134-137.

Nagarik Mancha(2000) : Bipanna Paribesh, Calcutta 2000

Rohatgi,S. (2000) : Forests in West Bengal, Geographical Thought, North Bengal University. P 75-87

Singh, B and Upadhayay R.G. (2000) : Contribution of forest to Indian Economy. Indian Journal of Agricultural Economics, July, 2000.

State Forestry Report (1999-2000) : Ministry of Environment & Forest, Govt. of India

State Forestry Action Plan (1996-2015) : Forest Deparment, Govt. of West Bengal

Westoby,J.C (1978) : Forest industries for socio-economic development. Common Wealth Forestry Review 58(2):107-116.