

## A STUDY ON THE UTILIZATION AND CONSERVATION OF FOREST RESOURCES OF ASSAM

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### **ABSTRACT**

The forest of a country is a natural asset of immense value. Nature has endowed Assam with rich potential for the development of forest. In no other parts of the world with comparable climatic, geomorphological and edaphic condition such diversity of flora and fauna exists as they do in Assam. Of the total geographical area of the state (78,523 sq. km.), the area under forest is only 22 per cent which is far below the minimum norms of 33.3 per cent prescribed by the national forest policy.

The process of exploitation was relatively slow in earlier periods but rapid increase of population from different neighboring states and countries it has been speed up creating serious problem of survival for humans. The destruction of forest is one of the burning problem of Assam which has led to increased soil erosion, loss of fertility and perhaps even to changes in the climate. Wildlife has also fallen prey to extinction due to deforestation.

Conservation in the background of rapid decline in forestry and wildlife has become essential. In this paper, therefore an attempt has been made to study the spatial distribution of forest and to appraise the change in the forest cover. Of course, the paper will further highlight the importance and methods of conservation of forest resources.

**Key words: Forest cover change, deforestation, conservation.**

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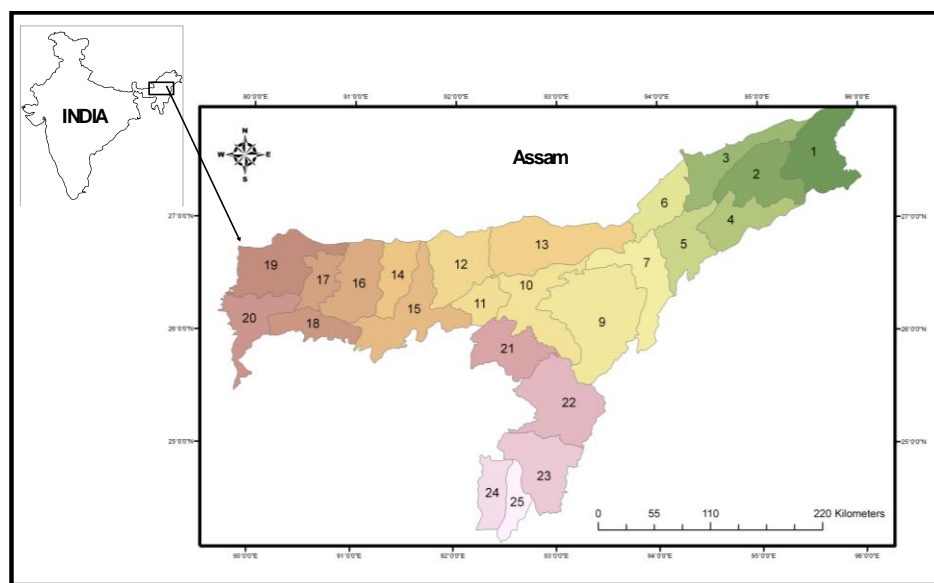
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**INTRODUCTION:**

Assam, a constituent state of India occupies a strategically vital position in the North-East region. It accounts for 78523 sq. km. of area and 266 lakhs of population (2001, Census data). The state lies between 24°10'N to 27° 58'N latitude and 89° 49'E to 97° 26' E longitude. Assam enjoys a typical sub-tropical monsoon climate with an average rainfall of 230 cm. and is endowed with a variety of resources including mineral, agricultural and forest. Forests occupy 24.9 percent of total geographical area. A brief note on the forest resources of Assam is given below:

**Vegetation:** The vegetation of Assam is primarily of tropical type covering areas of evergreen, semi-evergreen, deciduous forests and grasslands. Stretches of riparian forest found along the river banks are also very important. Some of the economically important trees found in the forest are – Agaru, Sal (Mekai), Champa, Teak and Bamboo. Assam contains nearly 400 varieties of rare orchids and medicinal plants such as neem, tulasi, manimuni.

**Fauna:** The forest of Assam is extremely rich and diverse with wide varieties of primate, carnivore, herbivore and birds. The forests are also rich in fish fauna which are found in the numerous rivers, beels, jheels, swamps and marshes.



**Fig: 1 Location map of the study area.**

**OBJECTIVE**

The objectives of the present study are:

- (a) To study the spatial distribution of forests
- (b) To appraise the change in forest cover
- (c) To study the areal concentration of forest cover using Florence (1959) Location Quotient method
- (d) To highlight the importance and methods of conservation of forest resource in Assam

**METHODOLOGY:**

To study the change in forest from 1994 to 2008, Statistical Abstracts of Assam have formed the data base and Forest Division of Assam is taken as the basic unit of the study. The variation in distribution of forest can be investigated by adopting some suitable statistical techniques. To get final investigation of spatial concentration of forest, Location Quotient is used.

**PATTERN OF FORESTS IN ASSAM**

The distribution of forest in Assam in 2008 shows 26.5 percent to the total geographical area and 28.3 percent in 1994 indicating a net decrease of 1.8 percent to the total geographical area of the state. In both the periods the area of the state under forest is far below the minimum norm 33.3 percent prescribed by the National Forest Policy. Table 1.1 gives the area under forest in the state during 1977-2008.

**Table 1.1**  
**Forest area in Assam (in hectare)**

Year	Area	P.C. of total area
1977-78	2860800	36.43
1985-86	2068600	26.34
1993-94	2217586	28.30
2008	2075164	26.50

Source: Economic Survey, Government of Assam.

From the table it is evident that the total area under forest has declined during the period 1977-2008. The following table shows the spatial distribution of forest in Assam during 1994 and 2008.

**Table 1.2**

## Spatial distribution of forest in Assam during 1994 and 2008

Forest Division	Total forest area (in hectare)		Change in forest area (in hectares)	Change in total forest area in % of total geographical area of the district
	1994	2008	Total forest	
Goalpara	39569	35253	(-)4316	(-)0.06
Kamrup East	58468	43667	(-)14801	(-)0.19
Kamrup West	68456	74336	(+)5880	(+)0.07
Kamrup North	48117	7100	(-)41017	(-)0.52
Dibrugarh	20914	35497	(+)14583	(+)0.19
Tinsukia Wildlife	65000	34722	(-)30278	(-)0.38
Digboi	64753	53937	(-)10816	(-)0.13
Doomdooma	36108	401122	(+)365014	(+)4.65
Golaghat	103794	100619	(-)3175	(-)0.04
Jorhat	28203	29497	(+)1294	(+)0.03
Sivasagar	31182	21950	(-)9232	(-)0.11
Humren	10538	13968	(+)3430	(+)0.04
Karbi Anglong East	111855	43737	(-)68118	(-)0.86
Karbi Anglong West	102646	89371	(-)13275	(-)0.16
N.C. Hills	61766	63777	(+)2011	(+)0.02
Darrang	18020	804	(-)17216	(-)0.21
Mangaldoi Wildlife	10181	10503	(+)322	(+)0.004
Lakhimpur	93677	32226	(-)61451	(-)0.78
Dhemaji	-	51411		
Nagaon	40250	37620	(-)2630	(-)0.03
Nagaon South	51275	52342	(+)1067	(+)0.01
Nagaon Wildlife	10897	10893	(-)4	(-)5.09
Sonitpur East	73929	52675	(-)21254	(-)0.27
Sonitpur West	67994	47075	(-)20919	(-)0.26
Silchar & Hailakandi	163490	214953	(+)51463	(+)0.65
Karimganj	79566	65529	(-)14037	(-)0.17
Aie valley	56489	5753	(-)50736	(-)0.64
Haltugaon	64167	64432	(+)265	(+)3.34
Kachugaon	82415	292598	(+)210183	(+)2.67
Kokrajhar Wildlife	21446	4557	(-)16889	(-)0.21
Dhubri	51249	632	(-)50617	(-)0.64
Manas Tiger Project	51662	50000	(-)1662	(-)0.02
West Assam Wildlife	25600	6561	(-)19030	(-)0.24
Assam State Zoo	544	130	(-)414	(-)5.27

East Assam Wildlife	44475	86664	(+)42189	(+)0.53
Total District Council	358891	141050	(-)217841	(-)2.77
<b>Assam</b>	<b>2217586</b>	<b>2075164</b>	<b>(-)142422</b>	<b>(-)1.8</b>

**FOREST CONCENTRATION IN ASSAM:**

Using 'Location Quotient Method' the areal forest concentration of Assam is analysed for both the periods and the name is shown in the Table 1.4.

Table 1.3

Forest Cover in percent	Forest Division	
	1994	2008
< 10	Dibrugarh, Doomdooma, Jorhat, Hamrem, Karbi Anglong west, Kokrajhar wildlife. Nagaon wildlife, Darrang, Mangaldoi Wildlife.	Kamrup east, North Kamrup, Tinsukia Wildlife, Mangaldoi Wildlife, Sonapur West, Sonapur East, Nagaon Wildlife, Nagaon, Darrang, Hamren, Karbi Anglong East, Karbi Anglong West, Sivasagar.
10-20	Sonapur west, Nagaon south, Nagaon, N.C. hills, Kamrup east, Kamrup west, North Kamrup, Tinsukia Wildlife, Digboi, Sivasagar, Karbi Anglong East, West Assam Wildlife, Manas Tiger Project, Aie Valley, Sonapur East.	Kamrup West, Dibrugarh, Digboi, Nagaon South, N.C. Hills, Jorhat.
20-30	Gogaghat, Goalpara, Kachugaon, Haltugaon	Golaghat
>30	Lakhimpur, Silchar, Karimganj, Hailakandi.	Doomdooma, Silchar, Hailakandi.

Source: Calculated by the Author.

**Table 1.4**  
**Forest Concentration**

Level of Concentration	Location Quotient Range	Forest Division	
		1994	2008
Low	<1.00	Dhubri, Manas Tiger Project, Goalpara, Hemren, Mongaldoi Wildlife, Sonitour West, Sonitpur East, Aie Valley, Jorhat, Sivasagar, Digboi, Doomdooma, Haltugaon, Kachugaon, Kokrajhar	Goalpara, Lakhimpur, Manas Tiger Project, Dhubri, Kokrajhar Wildlife, Sivasagar, Haltugaon, Aie Valley, Karbi Anglong East, Karbi

		Wildlife, Karbi Anglong West, Karbi Anglong East, N.C. Hills , Darrang, Nagaon, Nagaon South, Nagaon Wildlife, Kamrup East, Kamrup West , Dibrugarh, Tinsukia Wildlife.	Anglong West, North Kamrup, Kamrup East, Kamrup West, Hemren, N.C. Hills , Darrang, Nagaon, Nagaon South, Nagaon Wildlife, Sonitpur East, Sonitpur West, Mangaldoi Wildlife, Dibrugarh, Tinsukia Wildlife, Digboi, Jorhat.
Moderate	1.00-1.49	Golaghat , Silchar , Hilakandi.	Karimganj, Golaghat
High	>1.49	Karimganj, Lakhimpur	Kachugaon, Doomdooma. Silchar, Hailakandi.

Source: Calculated by the Author.

The areal concentration of forests in Assam is showing an increasing trend in the forest divisions of Kachugaon, Doomdooma, Silchar, Hailakandi and Golaghat, while it is in the decreasing trend in Karimganj , Lakhimpur , Karbi Anglong East and West and N.C. Hills.

### UTILISATION AND EXPLOITATION OF FOREST RESOURCES:

The forest resources of Assam have been utilized for a number of purposes which in turn are responsible for degradation of the forest. A brief description of how the forest resources have been utilized is given below.

- 1. Conversion of Forestland into agricultural land:** Assam is consistently experiencing a high rate of population growth particularly since the country's independence. According to 1991 census, the average density per square km. of area was 286 persons which increased to 340 persons in 2001. This increasing population put enormous pressures on forested land and so it becomes necessary to utilize the forest for agriculture in order to feed the increased human population.
- 2. Setting up of hydel projects:** Forest areas are being used for providing dam sites and water reservoirs for hydel projects.



3. **Drilling of Oil and Mining:** Considerable areas of forest land are involved in the establishment of drilling sites for oil and natural gas commission. Following drilling the vegetation gets destroyed due to spillage of oil.

Mining has a serious impact on forest. Some of the Reserved forest land are covered under coal mining lease. For exploration of coal, vast pits are dug, thereby causing serious damage to the land. Large areas have been clear-felled and laid barren as a result of open cast mining of coal, iron-ore, etc. and one of the area with such activity is Margherita.

4. **Jhuming or Shifting Cultivation:** This is a major cause of forest loss in Assam. Jhuming is way of life in the two hill district – Karbi Anglong and N.C. Hills. They have 42.37 percent and 59.65 percent of their respective of the total area under shifting cultivation. In 1993-95 Assam lost 22.4 (in thousand hectare) of forest cover and 25.7 (in thousand hectares) in 1995-97.

5. **Transformation of Forests into Pastures and Grazing land:** In Assam an area of 159968 hectares in 2003-04 is recorded as permanent pastures and other grazing lands. The revenue villages located along the periphery of the reserved forests where the cattle population is recordably more are acting as a source of potential hazard to the forest. To feed the cattle population which increased to 7979326 (2003) from 7277671 (1988) is really a matter of great concern. In Dibru-Saikhowa National park, about 9000 cattle and domestic buffaloes graze.

6. **Forest Based Industries:** There has been a tendency of establishing forest based industries without any respect to sustainability of the resource base that leads to forest degradation e.g. large scale bamboo harvesting is done for the two paper mills the Jagiroad and the Panchgram growth of brick industries are some of the industries found to be destructive to the forest.

7. **Construction of Transportation lines:** Many forests in the state have been destroyed for constructing lines of transport and communication.

8. **Encroachment and illegal felling of trees:** Some of the reserved forest areas have fallen prey in the hands of the encroachers who indulge in reckless felling of the forest besides some forest land along the state border are under the occupation of the neighbouring states. It is reported that

Nagaland has occupied about 19,478.95 hectares of forest land illegally in the Disoi and Tiru hills reserved forest of Jorhat district. It has also occupied 2950 hectares of forest land of Gelaki reserved forest in Sivasagar district. The total area of the 21 reserved forests covers 10,24,297 hectares and of this more than 15,384 hectares of land are encroached upon by Arunachal Pradesh.

9. **Poaching:** Poaching of rare and valuable forest resources has reduced their number and species in the state.

10. **Flood damage:** Due to heavy deforestation in the catchment areas of Brahmaputra and Barak which mostly fall within the adjoining states and union and foreign territories there is heavy annual flood in Brahmaputra and Barak valleys thereby causing depletion of forest. These are some of the reasons how the forest cover is being depleted in Assam.

### **FOREST CONSERVATION AND MANAGEMENT**

It is clear that forests are fast vanishing from our state. Forests perform three important functions and so it should be converted into a good sustainable forestry. The three functions which make it so important are:

- a) **Protective:** The first function covers the protection rule of forest i.e. protection against erosive action of wind, water, conservation of genetic diversity, etc.
- b) **Productive:** The second function deals with production of woods and other product.
- c) **Accessory:** The third function includes recreation, wildlife habitat, etc.

Forest management and conservation practices should be applied not only for the maintenance of minimum forest covered but also for the further growth of trees.

### **Objectives of management of forest:**

1. To protect the land, water, plant and animal resources for maximum good to the land and the people.
2. To provide a variety of goods to the society on a sustain basis.
3. To meet the needs of the forest and forest fringe dwellers.
4. To ensure continuity of the forest through adequate replacement of old crops and young crops.



Following measures should be taken in to consideration for scientific conservation and management:

1. **Adopting Agro Forestry:** It is known that most of the forest land in the state has been cleared to practice agriculture and so agro-forestry as a land use system should be adopted as an effective low cost means for minimizing the degradation processes associated with land cultivation and maintaining or even increasing the productive capacity of agro-ecosystem. By adopting agro-forestry we can achieve a balance between forest and agricultural land.

2. **Regulated and Planned Cutting of Trees:** One of the main reasons of deforestation in the state is commercial felling of trees for use in forest based industries- plywood factories , paper mills, etc. and the thing to be noted is that their revival cannot be possible. Therefore, cutting should be regulated by adopting methods like –

i) **Clear Cutting:** This is useful in the areas where same type of trees is available over a large area. In that case, trees of same age group can be cut down in a selected area and then marked for re-plantation.

ii) **Selective Cutting:** Here, mature trees are selected for cutting and this process is to be followed in rotation.

iii) **Shelter Wood Cutting :** In this method, first the useless trees have been cut down followed by medium and best quality timber trees and the time gap between these cuttings is helpful in re-growth of trees.

3. **Reforestation and Afforestation:** New plants of more or less of the same variety should be planted to replace the trees cut down. Similarly, any forested land destroyed either by fire or mining activities should be re-forested.

For afforestation, selection of trees should be done according to local geographical condition and care must be taken during initial growth of the trees.

4. **Social Forestry:** It is a very successful method for the growth of trees in all barren government and community land.

5. There is a great demand for fuel wood and fodder in the rural areas of Assam so the use of food for fuel should be discouraged. Thus tree plantation in rural areas for fuel is most important.

6. **People's Participation:** The people are really the custodians and users of the forest resources. So, their participation in relation to forest conservation is highly essential. Steps should be taken to make people aware of the need to plant and protect trees and relevant awareness campaign should be extended to every nook and corner of the state.

7. **Rule of Government in Forest Conservation:** Although the government of Assam is very particular about conservation of its forest resources and have several rules and laws for the protection of forest, but their effective implementation is necessary. Government should take firm steps to stop encroachment and poaching in the forest. Though there are many government laws namely the Forest Conservation Act, 1990, the Wild life (Protection) Act, 1972 etc for preserving forest resources but unfortunately many people are not aware of these laws nor are these executed with sincerity.

8. **Proper utilization of Forest Products and Forests:** Generally, forests have been cut for logs and rest of the tree- limbs, branches, etc. left out. Further waste occurs at the saw mill. There is need to use all this waste materials to produce waterproof glues, boards.

Forest can easily be used or developed as tourist centres. New "National Park", "Game Sanctuary" and "Protected Area" should be created by law and some of the existing protected area can be extended.

#### CONCLUSION:

It is obvious from the study that the forest depletion is very fast in the state. Therefore, people's movement in protecting forests and supplementing Government efforts is the need of the hour. Stringent punishment should be given to the vested interest who fell the trees indiscriminately. Therefore, time has ripen to initiate sustained and intensified efforts in letter and spirit, not only to save the existing forests which can be done by cooperative efforts of the government , non-government organizations and the public through a proper management system.

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