

LOOKING INTO THE TREND OF DEFORESTATION IN NORTH EAST INDIA: A WAY FORWARD

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ABSTRACT

The northeastern part of India, known for its diverse and most extensive lush forest cover, is sadly one of the major regions facing severe deforestation. Forests of this region are unique structurally and species composition. It is a meeting region of temperate east Himalayan flora, palaeo-arctic flora of Tibetan highland and wet evergreen flora of south-east Asia and Yunnan forming bowl of biodiversity. One of the states of this region viz., Arunachal Pradesh occupies a significant place as a crucible for the evolution of flora in north-east India and for speciation. The Brahmaputra valley sandwiched between eastern Himalaya in the north, Garo/Khasi/Jaintia and Mikir/Cachar/Barail hills ranges in the south; is a meeting ground of the temperate east Himalayan flora and the wet evergreen and wet deciduous floristic elements. The Khasi-Jaintia hills function as a corridor of the south-east Asia floristic elements into the Indian subcontinent through the Arakan arc. The altitudinal variation and rainfall patterns of southwest and northeast monsoon play a significant role in the development of ecological niches in this region of India. According to an official estimate based on satellite images (survey report of FSI), northeastern region has 1,63,799 km² of forest, which is about 25% of the total forest cover in the country (Anon., 2000). The management of the forest has suffered in the recent past due to pressure on land, decreasing cycle of shifting cultivation, exploitation of forest for timber and lack of scientific management strategy. The age-old practice of shifting cultivation has been a single factor responsible for the forest and land degradation, thereby changing the landscape extensively.

Responding to the above stated situation of the region the seminar paper has been worked out to highlight the trend of degradation of green cover; landuse change, population pressure on forests and its complex results. The paper is based on secondary data sources and GIS based maps are used to focus important issues.

Key Words: Palaeo-Arctic, Arakan Arc, Ecological Niches.

STATEMENT OF THE PROBLEM:

The growing global concern for conservation of the world's natural resources has resulted in the formulation of long-term perspective plans for conserving forests. These forests facilitate the conservation of ecological balances, biodiversity, enhance the quality of environment by checking soil erosion, water retention and conservation, regulate water cycle, act as a carbon sink which balances the carbon dioxide and oxygen in the atmosphere and facilitate in reduction of the greenhouse gases effect, etc. Population pressure, poverty and weak institutional framework have often been viewed as

the predominant underlying causes of forest depletion and degradation in developing countries. Excessive population and livestock pressure and the requirements of forest products for essential development generate a pressure on forest resources like fuel wood, fodder, timber, lumber, paper, etc. which in turn triggers a deforestation process. Overexploitation of the forest's resources as compared to its incremental and regenerative capacities escalates the forest depletion and degradation process. Excessive deforestation has not only local but also global environmental degradation ramifications. It can also affect sustainable socio-economic developmental processes in the developing countries as forests have been generating a lot of employment opportunities in the primary, secondary, and tertiary sectors and have been a source of subsistence to the poorest of the poor in the agricultural economies. Furthermore, inhuman face of deforestation is characterized by the increasing stress on the poorer sections of the society and women, as they have been primarily involved in gathering fuel wood, fodder and water in the traditional village economies.

STUDY AREA:

The Study Area, North Eastern States of India (20°N lat & 29°30' N lat and 89°46' E long. & 97°30' E long) has eight states. These are Assam, Arunachal Pradesh, Meghalaya, Nagaland, Manipur, Mizoram, Sikkim and Tripura. They cover an area of about 2,62,189 sq km which is about 7.86 per cent of total geographical area of India. Total population of these states in 2001 was more than 35.45 Lakhs Out of these, about 60 per cent of the total belonged to scheduled tribes. About 76 per cent of total geographical area of the region, are hilly as well as dominated by tribal people who are totally dependent on forests. Only 10 per cent of total area, of the region is completely tribal. Density of population per sq km in most of the states of the region except Assam is very low. Because, the region is undulating and mountainous with average height varying from 1,000 m to 2000 m above mean sea level. Maximum temperature is 38° C in summer and minimum temperature is 5° C in winter. Rainfall is very high in the whole North Eastern States and average rainfall varies from 1200 mm in Manipur to 11,000 mm in Meghalaya. The climate is a warm humid, tropical and subtropical. The climate is much suitable for dense vegetation. Major trees are tropical semi evergreen, sub-tropical pines, mountain wet temperate and tropical moist evergreen vegetation. Under these circumstances, forest areas and natural vegetation of the region play a vital role in order to maintain the ecological balance. Hence, here attempts have been made to explore the present status of deforestation in this region.

OBJECTIVES OF STUDY : The paper is based on the following objectives-

- (i) to highlight the trend of degradation of green cover,
- (ii) to highlight certain dynamics of deforestation.

METHODOLOGY : Data base is generated mainly from secondary sources of information. In this paper, data on forest cover of North Eastern states of India (1987 to 2005) is collected from Forest Survey of India, MOEF. and the percentage of annual change of forest cover is calculated out. Total population of the region (state wise), urbanisation and industrialization are collected from Census of India, Ministry of DoNER and NEC. Satellite imageries are also taken to highlight the loss of forest cover and land use change in the region.

ANALYSIS: A) FOREST COVER CHANGE [PRESENT TREND]-

Administrative classification of the FOREST COVER in the North Eastern Region-

The data of forest cover reveals some contradictory trend (Table 1). Data from the Forest Survey shows an increase in forest cover of 7896 km², at an annual rate of increase of 0.25% for Northeast India between 1987 and 2005. However, the trend analysis of the forest cover data since 1987 onwards to 2005 reveals a declining trend. To have a better picture of where exactly the increase in forest cover took place, the entire period from 1987-2005 is divided into 3 (three divisions) i.e. 1987-1991, 1991-2001 and 2001-2005. The first period (1987-1991) witnessed an increase in forest cover of 3371 Km² (annual growth of 0.4%). Increase in forest cover in the states of Arunachal Pradesh (4870 Km²) and Manipur (210 Km²) in 1989 and Meghalaya (2130 Km²) and Mizoram (683 Km²) in 1991 are the main drivers of growth during this period, while Assam, Meghalaya and Tripura along with the states like Arunachal Pradesh and Nagaland also witnessed considerable loss in the forest cover during that period (Table 2). The growth of forest cover in between 1987-1991 in the region could not be maintained in the next decade as a result during the second period (1991-2001), only 575 Km² forest cover was increased in the region with an annual growth of 0.03%. During this period, the growth of forest in the states of Assam and Tripura was maximum than any other states in the region. However, during the third period (2001-2005), there is maximum increase in forest cover of 3950 Km² with an annual growth rate of 0.46%. Thus, the individual state level data provide a clearer indication on the areas where exactly the forest cover decreases over the period.

B) DYNAMICS OF DEFORESTRATION-

(I) POPULATION PRESSURE-

The population of North-East region is 38.50 million in 2001 according to the Census of India. Out of this, Assam alone accounts for 26.64 million. Mizoram has the lowest population of less than a million, i.e. only 0.891 million. The average population density in the region is 147 persons per square kilometer. But this varies from state to state and within the states too. While Assam and Tripura have a fairly high population density of 340 and 304 persons per square kilometer respectively, Arunachal Pradesh has the figure at only 13. In Tripura, again the density of population is much higher in the small valleys than the hilly areas. The decadal growth of population in majority of the states is higher than the national average.

One of the major factors affecting forest cover is the growth of human populations throughout the Northeast India and the forests are the best place to accommodate the growing pressure of additional people. According to Census statistics, the population density in many states grew by approximately 30% between 1991 and 2001 (Table 4).

(II) ECONOMIC ACTIVITIES:

A) JHUM CULTIVATION- Shifting cultivation is prevalent in all the northeastern states. It was noted that loss in forest cover in the northeastern states was mainly due to the shifting cultivation. From 1993 to 1995 and 1995 to 1997, loss in forest cover was, respectively, 783 sq km and 316 sq km (Table 5) (refs 7, 8). According to the 1995 and 1997 reports, although 1078 sq km and 1700 sq km areas were gained from the shifting cultivation, they constituted only scrubby vegetation. Nevertheless, these growths can also help in checking soil erosion from the hilly slopes which are catchment of a number of streams and rivers of the region.

INDUSTRIALISATION-

B) North East India is industrially backward even Indian standard. Apart from a few agro-based and mineral based industries, it has practically no manufacturing industry worth the name. The table (6) reveals the fact that Assam holds the lions' share in industrialization among states of north east India followed by Arunachal Pradesh with a big gap. Industries responsible for deforestation found available are plywood industry (56 No.s), paper industry (11 No.s –both big and small), match factory (05 No.s, both big and small), cement industries (02 large and 10 small), etc.

(III) RATE OF URBANISATION: Pattern of Level of Urbanisation Across North Eastern States-

North East India being an area of subsistence economy, industrialization being almost absent and transport and communication being poorly developed, urbanisation progressed in a slow pace. Whatever urbanisation took place at that time was based on tertiary activities. TABLE-7 Shows that the percentage of the urban population to the total population is quite higher in the hilly states only. It is because of dearth of the fertile plains. Hence, majority of the people hilly states are to settle in the administrative towns or the capital towns only. In contrast, Assam shows the slow development of the urban concentrations as the people spread over the river valleys.

FINDINGS: From the above stated dynamics of deforestation in north east India, following findings can be drawn-

- (i) The slow growth of Urbanisation and Industrialization is less significant for the loss of forest cover in North East India.
- (ii) In the hilly states, the shifting cultivation, especially jhum is responsible for deforestation. The landholding size and frequency of rotation in Jhumming has become been shrinking, and as a result, afforestation cannot be done adequately.
- (iii) In the plain states like Assam, population pressure is responsible for forest cover depletion. One of the major factors affecting forest cover is the growth of human populations throughout the Northeast India and the forests are the best place to accommodate the growing pressure of additional people. According to Census statistics, the population density in many states grew by approximately 30% between 1991 and 2001.
- (iv) Apart from the above, one can easily infer that deforestation in north east India shows a different scenario. For, the statistics shows that there is no average loss of forested areas in spite of the fact that population has been increasing. But, the climatic behavior or other atmospheric phenomenon reveals that deforestation is at its moderate pace.
- (v) The categorization of forest in the tribal dominated states is different than that of the plains. So, it becomes difficult to have a standard statistics on forest at regional level in North- East India.

CONCLUSION:

According to a report of IPCC, land use change (primarily deforestation) was responsible for about 20 % of the CO₂ released to the atmosphere worldwide from 1989-1998. It may be mentioned that deforestation is responsible for nearly 26% of India's greenhouse emissions. Besides, the growing human population and livestock pressure gradually widening the gap between demand and supply of natural resources. These impacts will cut across multiple dimensions of day to day life affecting not just the environment but the communities as well. Climate change thus could impose a variety of stress on sustainable livelihood of the poor inhabitants of Northeast India through stresses on ecosystem function. The major concerns are erratic & irregular rainfall patterns, longer dry spells, and implications on agriculture calendar, productivity, new pests; food security; health and disasters like flash floods. It is presumed that there would be a change in distribution, abundance of species, more particularly wild, endemic species, crop plants, pests and vectors. Due to change in habitat condition, displacement both human and other wilderness would take place.

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Appendi

ces: Administrative Classification of Forest Cover

State	Total	Reserved	Protected	Unclassified	Total	Shifting Cultivation (1987-97)
Tripura	0.63	0.36	0.05	0.22	0.63	0.06
Sikkim	0.26	0.22	0.03	0.01	0.26	*
Nagaland	0.86	0.01	0.05	0.80	0.86	0.39
Mizzoram	1.59	0.71	0.36	0.52	1.59	0.38
Meghalaya	0.95	0.10	0.01	0.85	0.96	0.18
Manipur	1.50	0.14	0.40	0.96	1.50	0.36
Assam	3.07	1.81	0.40	0.86	3.07	0.13
Arunachal Pradesh	5.15	1.53	3.61	0.01	5.15	0.23



Table -1

Table-1: Forest Cover of the states of by Northeast India

STATE	GEOGRAPHIC AREA (Km ²)	FOREST COVER (Km ²)								
		1987	1989	1991	1993	1995	1997	1999	2001	2003
Arunachal Pradesh	83,743	64,132	69,002	68,757	68,661	68,621	68,602	68,847	68,045	67,692
Assam	78,438	25,160	24,832	24,751	24,508	24,061	23,824	23,688	27,714	27,735
Manipur	22,327	17,475	17,685	17,685	17,621	17,558	17,418	17,384	16,926	17,259
Meghalaya	22,429	16,466	15,645	15,875	15,769	15,714	15,657	15,633	15,584	16,925
Mizoram	21,081	19,084	18,170	18,853	18,697	18,576	18,775	18,338	17,494	18,583

Table-2

Table 2: Percent annual change in forest cover between 1987-2005

State	1987-1989	1989-1991	1991-1993	1993-1995	1995-1997	1997-1999	1999-2001	2001-2003	2003-2005
Arunachal Pradesh	3.53	-0.18	-0.07	-0.03	-0.01	0.18	-0.59	-0.26	0.06
Assam	-0.66	-0.16	-0.50	-0.93	-0.50	-0.29	7.26	0.04	-0.16
Manipur	0.59	0.00	-0.18	-0.18	-0.40	-0.10	-1.35	0.96	-0.51
Meghalaya	-2.62	0.72	-0.34	-0.18	-0.18	-0.08	-0.16	3.96	0.19
Mizoram	-2.52	1.81	-0.42	-0.33	0.53	-1.19	-2.41	2.93	0.27
Nagaland	0.02	-0.27	0.09	-0.20	-0.25	-0.20	-3.07	2.39	-1.08
Sikkim	4.69	-0.45	1.68	0.13	0.03	-0.18	1.17	1.06	0.00
Tripura	-3.78	0.00	0.03	0.00	0.07	1.73	9.34	6.51	0.20
NE Total	0.86	0.14	-0.16	-0.23	-0.09	-0.08	0.72	1.22	-0.08

Table-3

STATES	GEOGRAPHIC AL AREA (SQ.KM.)	TOTAL POPULATION ('000)			
		1971	1981	1991	2001
ARUNACHAL PRADESH	83743	468	628	864	1091
ASSAM	78438	.	.	22414	26638
MEGHALAYA	22489	1012	1328	1774	2306
MIZORAM	21081	332	488	689	891
MANIPUR	22327	1073	1434	1837	2388
TRIPURA	10486	1556	2060	2757	3171
NAGALAND	16579	516	773	1209	1988

Table-4

Decadal growth rate of population in North-East India			
	<u>1971-1981</u>	<u>1981-1991</u>	<u>1991-2001</u>
Arunachal Pradesh	35.15	36.83	26.21
Nagaland	50.05	56.08	64.41
Manipur	32.46	29.29	30.02
Mizoram	48.55	39.70	29.18
Tripura	31.92	34.30	15.74
Meghalaya	32.04	32.86	29.94
Assam	23.36	24.24	18.85

Table-5

Loss in forest cover in northeastern states (sq km)						
	Shifting cultivation		Other reasons		Total loss	
	1993-1995	1995-1997	1993-1995	1995-1997	1993-1995	1995-1997
Arunachal Pradesh	169	75	-	-	169	75
Assam	224	257	377	159	601	416
Manipur	65	603	-	-	65	603
Meghalaya	218	75	-	2	218	77
Mizoram	792	292	-	-	792	292
Nagaland	58	573	-	-	58	573
Tripura	-	-	-	3	-	3
Total	1526	1875	377	164	1903	2039

Source: State of Forest Report (1995, 1997).

Table-6

Large and medium industries in NER.(As in March 2000).		
State	No.of units	Percentage
Arunachal Pradesh	17	9.39
Assam	129	71.27
Manipur	12	6.63
Meghalaya	10	5.52
Mizoram	1	0.55
Nagaland	7	3.87
Sikkim	3 (As on 31-03-04)	1.66
Tripura	2	1.10
Total	181	100.00

Source: *Basic Statistics of NER 2002(NEC)*
Sikkim: A Statistical Profile-2004-05

Table-7

percentage of urban population

STATES	1971	1981	1991	2001
ASSAM	8.82	9.88	11.09	12.72
ARUNACHAL PRADESH	3.70	6.32	12.21	3.70
MEGHALAYA	14.55	18.03	18.69	19.63
MANIPUR	13.19	26.44	27.69	23.88
MIZORAM	11.36	25.17	46.2	49.5
TRIPURA	10.43	10.98	15.26	17.02
NAGALAND	9.95	15.54	17.28	17.74

source-census of india

