

Forest Cover Changes in the North-Eastern Region of India during the Biennial Period 2015-2017

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Abstract

The peasants, tribals, pastoralists, slum dwellers and industrialists in India are heavily dependent on forest produce for fuel, fodder, construction timber and other industrial raw materials. With certain variations in use, all the units in an ecological system depend upon forest resources for sustenance and this has compelled governmental agencies to go in for conservation of forest resources. Through the National Forest Policies of 1952 and 1988, the government of India has constantly been trying to fulfill the ecological requirement that 33% (one-third) of the total land area be brought under the forest cover. In this regard, the northeastern region of India is safe enough in the sense that its latest forest cover status is 65.34% of the total geographical area. But despite this status, the region has been suffering from the menace of steady forest degradation since the last few years. As per the latest report of the Forest Survey of India, the percentage of forest cover in the region has declined from 65.57% in 2015 to 65.34% in 2017. This suffices to indicate that a decrease of 0.23% of forest cover has taken place within the span of two years as against that of the country as a whole (whose forest cover has hiked from 21.33% in 2015 to 21.54% in 2017). Such steady alterations in the forest cover of the northeastern region can be attributed to both natural and anthropogenic and the same calls for adequate attention so as to avoid further deterioration.

KEYWORDS: Forest Cover, Forest Produce, Anthropogenic Agencies, Rotational Plantations, Shifting Cultivation, Scientific Forestry

Introduction

Forest resources all over the world are being subjected to constant utilization for industrial activities, agricultural purposes and as means of sustenance by several forest dependent communities. In India too, the peasants, tribals, pastoralists, slum dwellers and industrialists remain heavily dependent on forest produce for fuel, fodder, construction timber and other industrial raw materials.¹ Hence, through the National Forest Policies of 1952 and 1988, the government of India has constantly been trying to fulfill the ecological need that 33% (one third)² of the total land area of the country should be brought under the forest cover. In this perspective, the Northeastern region of India too is not free from such trend of ecological degradation. It is to be noted that due to biodiversity richness, the northeastern region of India has been identified as one of the 18 biodiversity hot spots of the world. However, the region is not free from steady degradation of forest ecology caused by both natural and anthropogenic agencies. According to FSI Report-2015, the percentage of forest cover in the region was 65.57% of its total geographical area.³ But the recent report (FSI-2017) has revealed further decline of the same to 65.34%, thereby sufficing to indicate the loss of 0.23% since the previous assessment.⁴ Such alterations in the region's forest cover could be mainly attributed to factors like biotic pressure, shifting cultivation, urbanization, developmental projects, illicit felling, organized

encroachments, agricultural expansion and the population pressure among others. Thus, it is seen that unlike the increasing trend of the percentage of forest cover of the country as a whole, the northeastern region has been witnessing decreasing trend and calls for adequate policies to check the same from further deterioration.

Objectives of the Study

This paper is an attempt to assess the fluctuations in the forest cover of the northeastern region of India during the biennial period 2015-17 and thereby find out the nature and causes of the changes in the said region. It wishes to depict that despite richness in biodiversity and forest cover, the region is not free from steady depletion caused by both natural and anthropogenic agencies. Therefore, the paper intends to pinpoint that albeit the region's status of forest cover is 65.34% as against the 21.54% of the country as a whole, it has been witnessing a decreasing trend and thereby calling for appropriate measures to regulate the same to avoid further degradation.

Area of study

With the geographical area of 2, 62,179 square kilometers, the northeastern region of India comprises the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. The region's latest total forest cover (as of 2017 FSI report) is 171,306 sq km (65.34%) of the total geographical area. The present study depicts that despite richness in biodiversity, the northeastern region of India is under the threat of steady forest cover depletion as compared to all India level which has an increasing trend. Therefore, the study has emphasized on the assessment of the forest cover changes detected in the region through the biennial survey under the banner of Forest Survey of India (FSI) during the period 2015-2017.

Methodology and materials

This paper is historical-analytical in nature and hence is an attempt to assess the changes in the forest cover status of the northeastern states for a span of two years. The relevant data are drawn from both primary and secondary sources. The primary sources of data comprise the Reports of the Forest Surveys of India, Government documents, Statistical Handbooks of Assam, Economic Surveys of Assam, and the secondary sources of data include books, journals and the internet retrieves.

Concept of the forest

The term *forest* is believed to have derived from the Latin word *foris* which means outside, the reference being to the village fence or boundary.⁵ Perceived in this sense, the *forest* covers all uncultivated and unintended land, the land being tree growth of some sort, inclusive of scrub, brush or wasteland.⁶ The Food and Agricultural Organization of United Nations (FAO), defines *forest* as land with a tree canopy cover of more than 10 percent and area of more than 0.5 hectare.⁷ As per Global Forest Resources Assessment 2010 (FRA 2010), *forest* consists of land spanning more than 0.5 hectares with trees higher than five meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds *in situ* exclusive of the land that is predominantly under agricultural or urban land use.⁸ As per Indian State of Forest Report 2011, the forest cover refers to all lands which have a tree canopy density when projected vertically on the horizontal ground, with a minimum areal extent of one hectare.⁹ India State of Forest Report (ISFR) while defining the forest, does not differentiate between the origin of tree crops (natural or man-made) or tree species and encompasses all types of lands irrespective of their ownership, land use and legal status. In this context, forest cover includes all the tree species along

with bamboos, fruit bearing trees, coconut, palm trees and all the areas including forest, private, community or institutional lands.¹⁰ Thus, forest can mean any land managed for the diverse purpose of forestry, whether covered with trees, shrubs, climbers or not.

Importance of the forest

The forests have great economic value because they serve as a sustained source of income to many people of different walks of life and often are seen as a contested resource over which different actors of the society seek to assert control. The forests render valuable services like the maintenance of soil and water regimes, conservation of biological and genetic diversity, production of biomass for subsistence (fuel, fodder, agricultural implements, building materials), woody biomass for commercial purposes (raw materials for industrial works) and other non-timber items like cane, *sal* seeds, *tendu* leaves for commercial use.¹¹ Forests are a source of mitigation for stabilizing Green House Gases concentration and can effectively reduce the process of climate change in several ways. Growing trees absorb carbon dioxide from the atmosphere and store the carbon very efficiently. It is to be noted that about half the dry weight of a tree is carbon and this carbon remains locked up in the wood and wood products.¹² But the noble service rendered by the forests has been bypassed by the modern trend of economic development which merely looks for the profit of few at the cost of vast majority and the ecological instability. Forest has been subordinated to mere object of exploitation to feed the requirements of modern trend of market oriented society. The *scientific* forestry and *scientific* agriculture too have tended to use forests as mere commodity for supplying raw materials. In the said management system, there takes place split between forestry and agriculture as the former is merely reduced to timber and wood supply with utter negation of food commodity.¹³ Thus, it is seen that the forestry continues to stress on commercial exploitation of the forests in which the income generating tendency supersedes in most of the forest related undertakings despite denial by the respective agencies and to the great disadvantage of the forest dependent communities.

In the global context, the concern for forest management and conservation became more intense as a result of the Rio Summit of 1992, especially regarding the benefits and drawbacks of negotiating treaty for forest management. Following the footsteps of the Rio Summit, forest related negotiations for Sustainable Forest Management (SFM) institutions like the International Tropical Timber Organization (ITTO) and the Forest Stewardship Council (FSC) were set up thereby emphasizing that forests should be conserved and used in a sustainable manner. Therefore, it is evident that the primary reason for maintaining and conserving forests of the world has been the ultimate satisfaction of the desires of the beneficiaries both present and the future generations. In India too, forests whether government owned, village or private are believed to be serving the entire community and representing a community resource that meet the needs of the millions of rural people. For the better regulation, a new socio-political concept called *participatory institutions* based on the principle of *collective action* under which the state, the people and all other stakeholders would be equal partners in decision-making, implementation and sharing the gains has been introduced in the form of Joint Forest Management (JFM). The model was initiated in 1990 with guidelines drawn from the National Forest Policy document of 1988 and called for people's involvement in the development and protection of forests. These days, there are several Joint Forest Management Committees (JFMCs) active in different parts of the country which are engaged in forest regeneration and

conservation with the share of benefits derived thereafter, between the forest department and the villagers involved.

Institutional mechanism for the management of forest in India

By the 12th May 1952, the Government of India in the erstwhile Ministry of Food and Agriculture had enunciated a Forest Policy to be followed for the management of State forests in the country.¹⁴ The National Forest Policy concerned had proposed that the area under forests should be raised to 33% of the total geographical area with the proportion of 60% in hilly regions and 20% in the plains.¹⁵ Forest Survey of India (FSI), established on 1st June 1981 is one of such steps to carry out assessment and monitor the forest cover of the country on a biennial basis under the Ministry of Environment, Forests & Climate Change, Government of India.¹⁶ The mandate of FSI was revised in 1986 to make it more relevant to the rapidly changing needs and aspirations of the country. Its activities have been forest & tree cover assessment and estimation of growing stock of wood within and outside the country's forests. Vital mandate of the FSI has been to assess the forest cover of the country on a two year cycle and to publish the information in the form of State of Forest Report (SFR) and its first assessment was published in 1987.¹⁷ Since 2013, the Forest Survey of India has introduced four new features in the form of assessment of forest cover within and outside Green wash area, important characteristics of India's forest, trees in Agro forestry System and Urban Tree Resources.¹⁸ With the publication of the 2017 FSI report, it has completed 15th Forest Cover Assessments since its inception in 1987. The FSI 2017 has classified the forest cover into Very Dense Forest (VDF), Moderately Dense Forest (MDF) and Open Forest (OF). The State of Forest Report 2017 has shown Scrub separately but the same has not been counted in the forest cover. The latest assessment (FSI-2017) has noticed certain changes in the status of the forest cover of the country as a whole. Positive changes noticed in the forest cover status of the country can be attributed to conservative measures or management interventions in the form of forestation activities, participation of locals for better protection measures in plantation areas as well as in traditional forest areas and the expansion of trees outside forest. On the other hand, negative alterations of the country's forest cover status have been caused by harvesting of short rotational plantations, clearances in encroached areas, biotic pressures and shifting cultivation practices.¹⁹ It is to be noted that the FSI assesses and publishes the status of the forest cover changes of the tribal districts, hill districts and of the northeastern states of the country to know the nature and the consequences of their respective positions.

Forest cover changes of the northeast during the period 2015-17

The north-eastern states of the country such as Arunachal Pradesh, Assam, Manipur, Mizoram, Nagaland, Sikkim and Tripura are endowed with rich biodiversity and because of this the entire region is regarded as one of the 18 biodiversity hotspots of the world. The biodiversity rich region comprises only 7.98% of the total geographical area of the country, but accounts for nearly one-fourth of the total forest cover. In all India level, the northeastern state of Arunachal Pradesh has the second largest area of forest cover with 66,964 sq km because the first being Madhya Pradesh with 77, 414 sq km. Moreover, in terms of the percentage of the forest cover of the total geographical area, Mizoram has the second highest percentage of forest cover (86.27%) in the entire country (first being Lakshadweep with 90.33%).²⁰ However, shifting cultivation and biotic pressures prevalent in the region have constantly been leading to the depletion of the forest cover in successive periods. As per the present

assessment (2017), the forest cover of the region is 171,306 sq km, which is 65.34% of its geographical area in comparison to the national forest cover of 21.54%. During the biennial period of 2015 and 2017, in the country as a whole, there has taken place an increase of 6,778 sq km of forest cover as against the northeastern region which has lost 630 sq km of forest cover instead. Barring the states of Assam and Manipur which have witnessed positive changes in the forest cover status, the rest of the states like Arunachal Pradesh, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura have noticed changes in negative only. The State of Assam has witnessed an increase of 567 sq km (0.73%) of forest cover since the previous assessment of 2015. A hike from 35.10% in 2015 to 35.83% in 2017 has taken place since the last assessment due to factors like re-plantations mostly outside the forest areas and the decrease in certain districts of the state is mainly due to rotational felling in the tea gardens, shifting cultivation and developmental activities. Similarly, the state of Manipur has witnessed an increase of 263 sq km of forest cover due to plantation, conservation and re-growth in shifting cultivation areas.

As per the Forest Survey of India 2017, the top five Indian states where forest cover status has declined belong to the northeastern region. Meghalaya has lost the forest cover extending up to 116 sq km due to shifting cultivation, rotational felling and developmental activities and increase in certain pockets has been due to plantation activities. Mizoram has also lost forest cover to the extent of 531 sq km due to reasons like shifting cultivation and developmental activities. Certain increase witnessed in certain pockets has been caused by regeneration of Bamboo and other plantations. Shifting cultivation and developmental activities in Nagaland has led to the loss of its forest cover up to 450 sq km. Sikkim too has lost forest cover to the extent of 9 sq km due to developmental activities. On the other hand, decrease of the forest cover of 164 sq km in Tripura has been attributed to shifting cultivation, harvesting of mature rubber plantations and developmental activities and increase in certain pockets has been due to extension of area under rubber plantations. State-wise forest cover in the region along with the changes found during the biennial period 2015 to 2017 is depicted through the following table.

Table: 01

Assessments of forest cover changes in the north-east states (2015-2017)

Year of Assessment		2015		2017			
State	G. Area in sq km	T. Forest cover in sq km	% to total G. Area	T. Forest cover	% to total G. Area	Changes in sq km	Changes in %
A. Pradesh	83,743	67,154	80.19	66,964	79.96	-190	-0.23
Assam	78,438	27,538	35.10	28,105	35.83	+567	+0.73
Manipur	22,327	17,083	76.51	17,346	77.69	+263	+1.18
Meghalaya	22,429	17,262	76.96	17,146	76.45	-116	-0.51
Mizoram	21,081	18,717	88.78	18,186	86.27	-531	-2.51

Nagaland	16,579	12,939	78.04	12,489	75.33	-450	-2.71
Sikkim	7,096	3,353	47.25	33,44	47.13	-9	-0.12
Tripura	10,486	7,890	75.24	77,26	73.68	-164	-1.56
G. Total	2,62,179	171,936	65.57	171,306	65.34	-630	-0.23

Source: Forest Surveys of India, 2015 (updated) and 2017

The above table indicates that the northeastern region as a whole, has lost 630 sq km (-0.23%) of its forest cover due to both anthropogenic and natural agencies. The state of Nagaland has lost the highest percentage of forest cover (-2.71%) and followed by Mizoram (-2.51%) and Tripura (-1.56%) respectively. The least percentage of forest cover lost by the northeastern state is Arunachal Pradesh (-0.23%) and the second last by the state of Meghalaya (-0.51%). On the other hand, as of 2017 India State of Forest Report (ISFR), the state of Mizoram has recorded the highest percentage of forest cover (86.27%) and followed by Arunachal Pradesh (79.96%) and Manipur (77.69%) respectively. On the other hand, the least percentage of forest cover status in the region is held by the state of Assam with just 35.83% of the total geographical area. It is noteworthy that Mizoram (with 86.27%) is the second position holder in terms of forest cover of the country as a whole because the first is being retained by Lakshadweep with 90.33 percent.²¹ Steady changes in the forest cover status of the northeastern states necessitates certain concrete measures for halting the degradation of the rich biodiversity of the region before it gets too deteriorated.

Result and discussion

The study has revealed that peasants, tribals, pastoralists, slum dwellers and industrialists of the country are very much dependent upon forest produce for fuel, fodder, construction timber and other industrial raw materials. Due to over exploitation of forest resources, through the National Forest Policies of 1952 and 1988, the government of India has constantly been trying to fulfill the ecological need that 33% (one third) of the total land area of the country should be brought under the forest cover. The study has revealed that the northeastern region of India, despite being safe in forest cover status with 65.34% of total geographical area, the region is not free from the menace of steady forest degradation. The study has revealed that India as a whole has witnessed an increase of 21.33% of forest cover in 2015 to 21.54% in 2017 within the span of two years. On the contrary, the latest survey has revealed that the percentage of forest cover in the northeastern region of the country has declined from 65.57% in 2015 to 65.34% in 2017 (decrease of 0.23%). Therefore, albeit being one of the 18 biodiversity hotspots of the world, the northeastern region of India needs adequate and prompt measures for safeguarding the forest cover dwindling of the region before it gets too late.

Through the study, it is found that Assam and Manipur have witnessed positive changes in the forest cover status due to factors like re-plantations outside the forest areas in case of the former, and plantation, conservation and re-growth in shifting cultivation areas in case of the latter. The study has revealed that the top five Indian states where forest cover has declined belong to the northeastern region. Through the study, it is found that Meghalaya has lost the forest cover due to shifting

cultivation, rotational felling and developmental activities and the state of Mizoram due to shifting cultivation and developmental activities. It is revealed that shifting cultivation and developmental activities in Nagaland has led to the loss of its forest cover and Sikkim due to developmental activities respectively. Not the least, decrease of the forest cover of Tripura has been caused by shifting cultivation, harvesting of mature rubber plantations and developmental activities. Thus, the study has revealed that steady alterations in the region's forest cover has been generated both by natural and anthropogenic agencies and hence the need of the hour is to address the core problem in an amicable manner and prevent ecological imbalance in the immediate near future.

The people of the northeastern states should not have always in mind that the region is very rich in diversity to the extent of securing 18 top biodiversity hotspots of the world. It is to be noted that despite fulfilling the national requirement of the forest cover of 33%, the region should be cautious enough to check its steady decreasing trend as against that of the nation which has an increasing trend. The states of Assam and Manipur which have gained in the status of forest cover due to factors like re-plantations outside the forest areas and plantation, conservation and re-growth in shifting cultivation areas respectively. Such examples of positive changes must be noticed and followed by the rest of the states of the region which have witnessed changes in the forest cover in negative. Shifting cultivation, rotational felling and developmental activities have lowered down the forest cover of the states of Meghalaya, Mizoram and Nagaland. Similarly, developmental activities in Sikkim and shifting cultivation, harvesting of mature rubber plantations and developmental activities in Tripura also have caused decrease of the forest cover of the respective states. Therefore, their causes of forest cover decline such as shifting cultivation, rotational felling, rubber plantations and developmental activities should be probed properly so as not to deteriorate the region's rich biodiversity beyond its carrying capacity. Both the state agencies and the people dependent on nature should change their mindset that the region is still under safe forest cover status and instead work in constructive manner to arrest the problem of steady degradation in the days ahead.

Conclusion

India as a whole is still far behind the national requirement that 33% of the landmass has to be under the forest cover. Presently, the country's forest cover is only 21.54 % of the total geographical area despite several conservancy policies and re-forestation activities. On the other hand, the northeastern region of the country, despite having 65.34% of its landmass covered with forest, is not safe enough from the problem of forest cover degradation. The concerned states have constantly been losing its forest cover due both anthropogenic and natural agencies. Anthropogenic causes especially the shifting cultivation, rotational felling, rubber plantations and developmental activities should be regulated in such a way that will not damage the region's rich biodiversity beyond its carrying capacity. Hence, both the state agencies and the people dependent on nature have great responsibilities towards resolving the problem of steady degradation forest cover of the concerned states.

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