

Deforestation and Its Commercial Management in Mountain Region of India

Chandra Prakash Agarwal, and Yuvraj Singh Rathore

Abstract—Forestry in India is a significant rural industry and a major environmental resource. India is one of the ten most forest-rich countries of the world along with the Russian Federation, Brazil, Canada, United States of America, China, Democratic Republic of the Congo, Australia, Indonesia and Sudan. Together, India and these countries account for 67 percent of total forest area of the world. India's forest cover grew at 0.22% annually over 1990-2000, and has grown at the rate of 0.46% per year over 2000-2014, after decades where deforestation was a matter of serious concern. Around 80% of rural people and 48% of urban people are use fuel-wood. Unless India makes major, rapid and sustained effort to expand electricity generation and power plants, the rural and urban poor in India will continue to meet their energy needs through unsustainable destruction of forests and fuel wood consumption. India dependence on fuel-wood and forestry products as a primary energy source is not only environmentally unsustainable; it is a primary cause of India's near-permanent haze and air pollution

Paper deals with deforestation, its causes and related environmental problems in the Indian Mountains region of Indian sub-continent forming part of the state of Jammu & Kashmir, Uttarakhand, Rajasthan and Gujarat. The deforestation trend from 1957 to till is assessed by means of Indian topographical sheets and satellite images. It is reported that the natural vegetation cover has decreased from 30% in 1982 to 15% in 2015. Mountain regions were once famous for its greenery. A number of factors are involved in the deforestation. This study attempts to highlight the deforestation trend, and its associated causes, effects and its commercial management, so that this grave problem can be properly understood. It is also observed that the nomads and tribals of mountain regions followed unique type of tree mortgage system especially in Aravalli Mountains of Rajasthan state.

Keywords— Aravalli, Deforestation, Himalayas, Mortgage..

I. INTRODUCTION

INDIA is one of the mega-biodiversity nations and seventh largest in the world and second largest in Asia having an area of 328.72 m ha. It has about 17,000 species of flowering plants and about 5400 endemic species. India is considered to be one of the 12 centers of origin and diversity of several plant species in the world. Deforestation was in the form of tree felling during the pre-colonial era in India, when tribal folks were more hunter-gatherers and who subsequently

practised shifting cultivation for their living. This was followed by settled form of agriculture where forest lands were cleared for cultivation and later, gradually forests came to be cleared for commercial purposes, as raw material sources and use in forest-based industries. The major drivers of forest cover changes in India are shifting cultivation along with encroachment for agricultural land, mining, quarrying, expansion of settlements, dam construction and illegal logging.

Deforestation has become a matter of serious concern throughout the developing countries of the world, which have large population to support. According to the Food and Agricultural Organisation 35% of the world's forests have disappeared since 1950. It is claimed that nearly 30% of the total forest area in Bangladesh has been destroyed in the past 25 years. The percentage of net deforestation in India from 2001-03 is 0.21 and in 2009-11 is -0.03. Overall, there was net decreased in global forest area of 1.7% between 1990 and 2005, Deforestation is caused not only by development activities, but also by the new land reforms and change in land use.

II. STUDY AREA

The Indian Subcontinent is a land of immense physiographic variety. It is divided into northern mountains, southern peninsular plateau and in between the belt of river lowlands. The northern mountain consists of Himalayan, Karakoram, Assamese uplands, Aravalli and Vindhayan.

My study specially focuses on northern Himalayan mountains and Arravalli Mountains. Himalayan Arravalli covers nearly 32550 km sq or 70% of the entire Great Aravalli mountain region of north-west India. This part of the Great Aravalli Mountain region constitutes 11% of the total geographical area of Delhi, Haryana, Rajasthan and Gujarat States. The entire forest area (70 %) of this region falls in the main Great Aravalli region, which is characterised by high hill ranges, valleys, plains, and plateau. The vegetation consist mainly moist deciduous, dry deciduous, montane, tropical thorn, mixed deciduous and dry teak species.

III. DATA SOURCE AND ANALYSIS

The principal sources of data for this study are the Survey of Indian topographical sheets published on scales on 1: 50,000 and 1: 250,000 scale published in 1957, 1974 to 1976, Landsat images for 1975 at 1: 250,000 and 1982 on 1:

Chandra Prakash Agarwal Professor& Registrar Jm Rajasthan Vidyapeeth University, Udaipur. Rajasthan India

Yuvraj Singh Rathore Asst.Prof. In Dept. of Geography Jm Rajasthan Vidyapeeth University, Udaipur. Rajasthan India E

250,000. The colour composite satellite. IRS-WiFS, IRS ID LISS III data for year 1998-2001 on 1: 250,000 scales have been used. Forest areas are demarcated in all the topographical sheets of Great Aravalli Mountain region. It can be seen that the area under forest cover in the Great Aravalli, Mountain region had been reduced to around 9% by 1975, although the official figure for area under forest was a little over 21%. It is evident that at the opening of 20th century, 80% of total geographical area of Great Aravalli mountain region was under natural vegetation covers. Between the first phases of the survey, i.e. within 20 to 22 years, the vegetation cover was reduced to about 40%. In other words, a depletion rate of around 30% is recorded for this period, indicating an annual rate of depletion of 1.5 sq.km. The latest data so far available from the IRS WiFS images for 1998-2014 suggest that the vegetative cover is, confined to around 7% of the total geographical area of Great Aravalli region. Hence, depletion in the second phase i.e. 1982 to 1998-2014, in a span of 15- 20 years is a little over 15%. Comparing the actual vegetative cover (6116 sq km) under government control, it is observed that around 60% of legal forestland has been lost. Deforestation is caused by number of factors, and if the present trend continues, the obvious environmental problems will be multiplied, upsetting the entire economic structure and eco-system of the Great Aravalli mountain region.

Present Scenario of Deforestation in India: The data released by the National Remote Sensing Agency (NRSA) in mid 1984 show that India lost 1.3 million hectares of forests every year between 1972-73 and 1980-81. The maximum deforestation has occurred in Madhya Pradesh, which lost nearly two million ha. Maharashtra over a million ha. Orissa, Andhra Pradesh and Jammu and Kashmir nearly a million ha. And Himachal Pradesh and Rajasthan over half a million ha. Punjab, Rajasthan, Haryana and Gujarat have lost over half of their forest cover. Deforestation has been disastrous in the western Himalayas where the forests below 2000 m have almost been removed. In 1950 Himachal Pradesh had 38.5% of its area under forests which has now gone down to 15%. In Jammu and Kashmir the actual forest cover is only 6% of the total area against the official record of 60 per cent

India's top five states with maximum forest cover (in km²) are as follows:- Madhya Pradesh (77,462), Arunachal Pradesh (67,248) ,Chhattisgarh (55,586),Maharashtra (50,628) Orissa (50,354)

Top five states / UTs with maximum forest cover as percentage of their own geographical area are as follows:- Mizoram (88.93%), Lakshadweep (84.56%),A&N islands (81.84%),Arunachal Pradesh (80.30%),Nagaland (78.21%).

Altitude Zones	Percentage of Forest Found
500 meters	52.50
500-1000 meters	28.27
1000-2000 meters	10.88
3000-4000 meters	5.76
Above 4000 meters	0.13

Out of the total forest cover, the maximum [share](#) is of

Moderate Dense Forests, followed by Open Forests. The very dense forests in India are in just around 2.5% of total geographical area of the country. Among all the states of India the states which have shown considerable improvement in their forest cover are: Tamil Nadu, Jammu and Kashmir, Uttar Pradesh, Kerala, Karnataka. The states where forest cover has decreased substantially are Mizoram ,Telangana, Uttarakhand, Nagaland, Arunachal Pradesh. The total forest cover in the hill districts of the country is 283,015 sq km which is 39.99 % of total geographic area of these districts. In the latest report the hill districts have recorded a net increase of 1680 sq km area. North east constitutes only 7.98% of geographical area of the country but it occupies one fourth of the forest cover. However according to the current report there is a decrease in the forest cover in the north east by 628 sq km which is primarily because of shifting cultivation and increase in biotic pressure

IV. CAUSES OF DEFORESTATION

The important reason for destroying forests in India is poverty, which brings untold suffering and misery to people. Fodder and firewood are becoming expensive due to illegal felling of trees by organised groups in this country. Commercial exploitation for high-value logs accounts for much of the deforestation. In India, 5.3 million hectares of forest land (about 7 per cent of the total forest area) is estimated to have been diverted to such other uses as agriculture, river valley projects, mining, industries, townships, roads and transmission lines.

The Forest (Conservation) Act of 1980 slowed down the diversion of forest land to other uses. In shifting cultivation, a common practice in north- eastern India, forests are cleared for farming and after raising a few crops, the site is abandoned (left fallow) and a fresh site cleared.

Timber extraction is one of the major causes of deforestation. Timber constitutes about 50 percent of the total wood extraction from forests. World's major sources of timber are the tropical forests. Most of the developing countries depend on underdeveloped countries for satisfying their needs for timber.

Due to rapid industrialization, demand for fossil fuels and minerals is also increasing day-by-day in the different parts of the world. It is, therefore, mismanaged and uncontrolled mining which is responsible for the increase in deforestation.

Dams and hydro-electric projects submerge forests, displace local people and cause water logging. Narmada Valley Project has destroyed and submerged about 40,000 hectares of land in Gujarat. Similarly is the case with Tehri Dam in Uttaranchal.

The complex reasons are increase in population and urbanisation in India. As population rises, the pressure on the forests increases. However, it is difficult to link population growth and urbanisation to all deforestation problems. As population rises in conjunction with certain lifestyles (e.g.

subsistence agriculture and grazing), it accounts for deforestation in some regions.

Population growth and poverty are not the only causes behind increased rates of deforestation. External forces or processes such as expansion of commercial plantations or farms, ranching, logging and mining also attract or push migrants into slash-and-burn, causing considerable deforestation. In Africa, the expansion of cash crops for export (e.g., groundnut, cotton, coffee, cocoa) has considerably reduced land availability for food crops, increasing forest encroachment and reducing the fallow period.

Land deforested by poorly managed agriculture or grazing activities in arid, erosive, or otherwise sensitive conditions can result in depletion of soil structure so that forests will not grow again. Consequently, other areas are cleared for agriculture or grazing and the deforestation is continued.

In the Aravalli mountain region process of deforestation just started after independence because of land reforms and the practice of shifting cultivation. Decade of the 1960s heralded different development activities, such as irrigation projects, road construction, agricultural and residential expansion, population pressure etc. As a result, the clearance of forests became a normal practice for settlements, roads, agriculture, land allotment to landless people and other development work. Forest is no longer the province of the tribal people. Even people from the surrounding plains have migrated to the highly forested areas of Aravalli mountain region. The combined influences of economic pressure, population explosion, cattle population and government policies have together precipitated the present alarming situation.

V. ENVIRONMENTAL PROBLEMS

Deforestation from slash-and-burn places agriculture in disequilibrium that can lead to several negative environmental consequences, including soil erosion and degradation, watershed degradation and loss of biodiversity. These repercussions at the local level signify resource depletion and decline in production.

Recent estimates indicate that about 18 per cent of global warming is due to the clearing of tropical rain-forests which is occurring now at a rate of 14 million hectares of primary forest per year. Deforestation rates are expected to increase in the next decades, and the overall contribution to global warming is expected to equal or exceed that of fossil fuel combustion by the second or third decade of the 21st century. If this trend continues, much of the remaining tropical forests will be diminished by the end of the 21st century.

Deforestation alters the water flow over and within the soil as well. Elimination of the trees reduces the evapotranspiration and so allows more water to flow into ground water reservoirs and aquifers as long as the soil structure is maintained. Because there are no trees to

regenerate, the organic matter and structure of the soil degenerate shortly after deforestation.

Due to deforestation, a number of environmental problems occur; these have far reaching consequences. The adverse impact of deforestation on rainfall pattern is a controversial issue. In the Great Aravalli Mountain region, the decreasing levels of rainfall and rainy days are closely related to deforestation. The increasing rate of soil erosion due to deforestation is another well-established phenomenon. Deforestation also affects the ground water conditions. Vegetation cover regulates the surface runoff by holding a certain amount of water in the soil particles around the root system; this water then gradually seeps down during the dry period. Once the forest is cleared, the entire process is hampered. Rocky outcrops due to soil erosion occur frequently on the slopes and premature terraces have been formed by salutation reservoir. The Great Aravalli Mountain region has undergone slow deforestation because of the widespread felling of the trees due to biotic interference, mining, industrialisation, climatic changes and other direct or indirect factors. In the changes the degree of deforestation is very drastic in forest reserve areas on hilly region. Up to 1960s the Aravalli hills had dense forests and higher density of tree cover in the vast tracts of higher hills and deep valleys. However, massive felling of trees, caused by the need of human beings and increasing demand for timber, fuel, fodder etc., has caused severe strain on the Eco-system.

VI. COMMERCIAL MANAGEMENT OF DEFORESTATION

Unfortunately, the Great Aravalli mountains one of the most degraded hill ranges of the country. A massive disorder in the availability of even the basic resources like fuel, fodder, timber and water has taken place. It is therefore, essential that a comprehensive strategy for the management and development of the environment and physical resources of the Aravalli is evolved and implemented without any further loss of time. For the revival of the rich forest habitat in the barren areas, different afforestation schemes should be implemented on priority level. The Social-forestry and pasture economy should be the corner stone of hill area development. Special mention may be made of a variety of horticultural development programmes, which may provide a great boost both to the individual and to the regional economies. Tribals and the hill people reside, should be provided with incentives to develop, maintain and manage their own forest farms and get returns for subsistence from their agro-forests. The plantation of trees in and around the individual residences and at the common places should also be encouraged to develop the green belts in the urban environs. The wastelands should be developed by the local people under afforestation programme in the hill areas under various schemes.

During pre-historic period the tribals living were the most civilised than their counter parts elsewhere. Even today the life style, costume and, socio-economic structures of these

people are far more advanced than the tribals living in any other parts of the world. These inhabitants knew the economic importance of the forests thousands of years ago. The finest example of this is that they treated the forest tree as a mode of exchange in the economic transaction. Nomadic people and other tribals of the world are don't the more importance of tree but the nomads and tribals people of India including Nagas of Nagaland, Khasi of Meghalaya, Santhal of Jharkhand, Gond of Andhra Pradesh and Madhya Pradesh, Tharus & Bhotia of Uttaranchal, Kharias of Orissa, Todas of South India and Gaddi of Himachal Pradesh were also not knowing the system of tree mortgage which was followed in the Great Aravali region. At present hundreds of trees are still available in the districts of Rajsamand, Udaipur, Sirohi, Dungarpur, Banswara and Chittorgarh in Rajasthan State, Jhabua district in Madhya-Pradesh and Banaskanta and Sabarkanta districts in the Gujarat State. The trees were given on mortgage by the tribal and other people of Aravalli mountain region to the wealthy people at the time of famine, drought and their needs and got the things of their requirements in return. This system was followed till independence.

Many tribal are giving up their traditional livelihood and taking up farming and cattle rearing in the forest areas causing un-repairable damage to forests. The erstwhile protectors of forests are slowly turning into bane of forests and its wildlife. Government should devise schemes to avert this process and save the dwindling forest area and its flora and fauna. Tribal people have extraordinary understanding of forest flora and fauna which can be productively utilized. All the tribals shall be employed by the government in the expansion and protection of forests and its wildlife till their descendants get educated and diversify into industrial and service sectors. Government should make some policy to enhance skills of tribal to protect the tree in their own by their own knowledge.

VII. CONCLUSION

Remotely sensing data, showing that actual forest cover on Mountains and its surrounding area. It is apparent that a considerable area of forest has already been denuded. The environmental problems related to deforestation not only affect the ecology, but also threaten the agrarian economy. It is imperative that we take stock of this serious situation and amend our current forest management for the ultimate benefit of the society. Due to the aforestation programme near about 2000 sq. km. of barren area has been converted into the greenery. And last tip of the Great Aravalli Mountain region in north near Delhi. The data reveals that only 7% of area is under forest cover in 1998-2001 against the 33% which is stipulated in 1952 forest policy of India. Tribal's knew the economic importance of the forest thousands of years ago. The finest example of this is that they treated the forest trees as a mode of exchange in the economic transaction during

pre-historic period. New challenges from climate change require urgent action to explore and protect the local value of forests for livelihood even more. This is particularly true in the case of emerging activities undertaken as part of REDD+ activities where broad forest governance are aligned with it along with people's participation ensuring livelihood benefits of the people dependant on forests. These renewed activities will safeguard traditional ways of life and the environmentally important forest ecosystems of the world.

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