



## Geographical analysis of forest resources in Maharashtra State

Dr. Sanjay Dagu Pagar

### Abstract

*The main aim of the present paper is to assess the spatial distribution of forests in Maharashtra State and explain the factors responsible for deforestation in the study region. Maharashtra State is one of the major state of India which is located in western coast of India. This research is totally based on secondary data. The district has been taken as a unit for analysis of forest area. A forest is a large area of land inhabited by dense growth of trees and other woody plants. The forest is concentrated in three prominent areas of the state. It includes Western Ghat, Satpura-Melghat and eastern Vidarbha hill areas. At least 33 percent land of any region should be under forest to fulfill the forest related requirement of the people of the region and to maintain environmental equilibrium of the region. But in case of Maharashtra State only 16.50 percent (2019) area is covered with forest which was 20.77 percent in the year 1960-61. It is decreased by 4.27 percent during the last six decades.*

*According to the Indian Forestry Report of 2019, Maharashtra state had an area of 50,778 sq. Km (16.50 %). It includes very dense forest (8,720.53 sq.km.), moderate dense forest (20,572.35 sq.km.) and open forest (21,484.68 sq.km.). Area-wise Gadchiroli (68.81 %) has the largest forest cover in the state followed by Sindhudurg (54.31 %), Ratnagiri (51.31 %) and Raigarh (41.10 %). On the other hand Latur (0.18 %), Solapur (0.33 %), Jalna (0.47 %), Parbhani (0.65 %) and Osmanabad (0.66 %) are the major districts where area under forest is very low (less than 1 percent) Deforestation is a main reason to decrease the land under forest in the study region. Latest data (2019) of forest indicated that only six districts have forest area more than 33 %. Government is also trying to improve forest cover in Maharashtra but people's response is not good enough towards government scheme like social forestry, agro-forestry etc. People are not aware or say they are not convinced that the schemes are for their own good.*

**Keywords:** Forest, Forest Fire, Social forestry, Deforestation and Forest Conservation.

### Introduction:

Forest is one of the natural resources of the country. Many Forest constitute of the largest, complex and most important natural resource, mostly dominated by trees (Todkari & Patil, 2010). Forests are invaluable property of a nation because they provide raw materials to modern industries, timber for building purposes, habitats for numbers types of animals and micro-organisms (Savindra Singh, 2010). Forest, thus play an important role in environmental and economic sustainability. Forest also plays an important role in enhancing the quality of environment by influencing the life of supporting system. Forest is also a major factor of environmental concern, providing protection to wildlife, help in balancing the gaseous cycles of atmosphere, regulate the earth temperatures regimes and reduce the floods havoc (Alka Gautam, 2007). Forest has been playing a vital role in the socio-economic development of our country. They have been an important source of subsistence, employment, revenue earning and raw materials to various industries (Kamble, 2018).

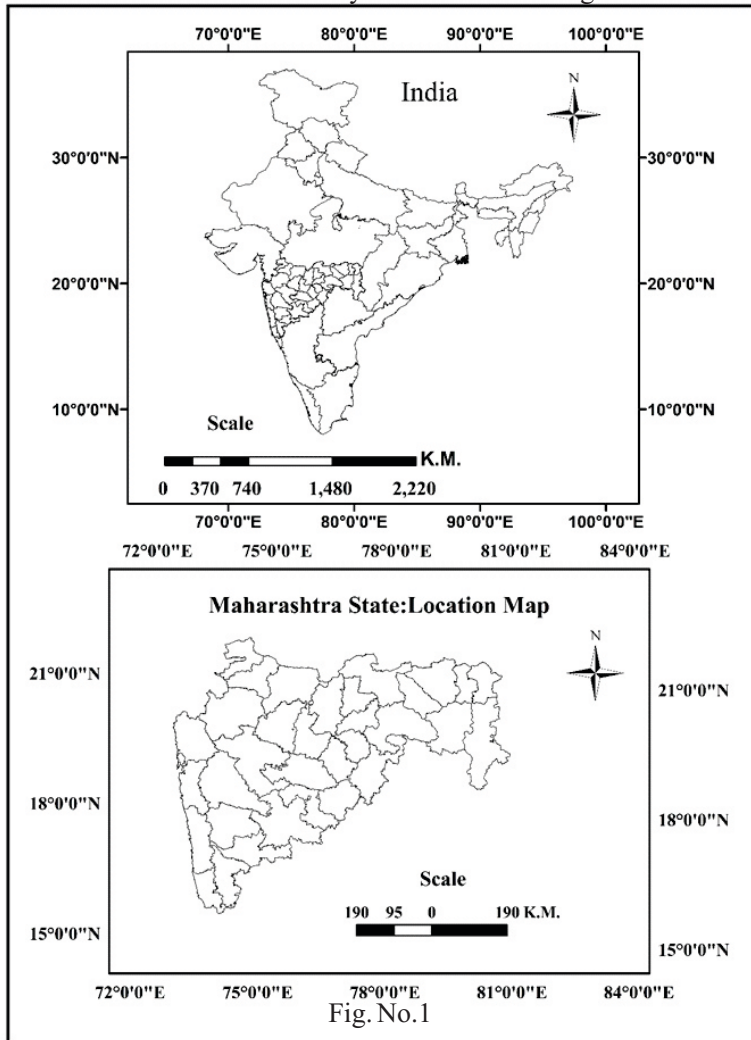
At least 33 percent land of any region should be under forest to fulfill the forest related requirement of the people of the region and to environmental equilibrium of the region. But in Maharashtra it is very less (16.50 %) than expected area (33 %). The deforestation is increased during two decades in Maharashtra because of expansion of industrializations, urbanization, construction of roads and dams, extension of crop land, requirements of fuel wood, mining operations etc. Therefore it

is very important to maintain balance between development and natural balance of forest, otherwise in future it will be challengeable to increase the area under forest.

**Study Area:**

Maharashtra State is the major state of India which is located in western coast of India. It extends between 15° 33'46" N to 22° 02'13" N latitudes and 72° 38'45" E to 80° 53'17" E Longitudes. Maharashtra state is well known to be progressive state of India. Its geographical area is 3.08 lakh Sq.k.m, which is 9.36 % of the geographical area of the country. Maharashtra state is bordered by Gujarat to its northwest, Madhya Pradesh its north, Chhattisgarh to its east and Goa, Karnataka and Telangana are located to the south of Maharashtra and Arabian Sea on the west. Maharashtra State had 11, 23.72,972 population as per the 2011 census. It is the third largest State in the country and is ranked second among the States in terms of the recorded forest area. Western Ghats of the State have very rich biodiversity.

The average population density of the state is 365 persons per sq.km. and literacy is 82.34 percent as per 2011 census. Location of the study area is showed in Fig No.1.



It has 355 tahsils and 36 districts and grouped them into Konkan, Pune, Nashik, Aurangabad, Amaravati and Nagpur administrative divisions. It is divided into three major physiographic divisions namely the Western Ghats, The Deccan Plateau and the coastal lowland of Konkan. Godavari, Krishna, Tapi and Pirna are major the rivers of Maharashtra. The average rainfall for the state as a whole is 1067 mm, and the major portion of the rainfall is received during the monsoon. Agriculture is major occupation in rural areas. The state receives rainfall from the southwest monsoon winds during the periods from June to September. Average annual temperature from 25<sup>o</sup> C to 27.5<sup>o</sup> C marked variation in diurnal and seasonal range of temperatures occurs in the state. The forest is concentrated in three prominent areas of the state. It included the Western Ghat, Satpura-Melghat and eastern Vidarbha hill areas (Patil, 2019).

**Objectives:**

The main objectives of the present paper are as follows:

- i. To assess the forest distribution in Maharashtra State.
- ii. To know the factors responsible for deforestation in the study region.
- iii. To highlight the need of forest conservation for sustainable development in the study area.

**Data and Methodology:**

Present study is based on the secondary source of data. Secondary data obtained from State of Forest Report 2001 and 2019, Economic Survey of Maharashtra (2019-20), online research articles and newspapers articles. The information about the study area is obtained from Maharashtra Census CD Rom of 2001 and 2011. The district has been taken as a unit for analysis of forest area in the study region. Data is processed and represented with the cartographic techniques such as line graph and choropleth map. Various thematic maps have been prepared with the help of GIS software.

**Results & Discussion:**

Forest, vegetations generally includes trees, bushes, creepers and grass etc. Area under forest is continuously decreased in the study area from the year 1960-61 to 2019. During 1960-61 it was 21.77 percent, which is decreased up to 16.50 percent in the year 2019. Table No.1 indicates that area under forest is decreased by 4.27 percent during the span of sixty years. In other hand at national level, area under forest is increased by 3.57 percent during same periods, which is shown in Fig No.2. According to the Indian Forestry Report of 2019, Maharashtra state had an area of 50,778 sq. Km. It includes areas of very dense forest (8,720.53 sq.km.), moderate dense forest (20,572.35 sq.km.) and open forest (21,484.68 sq.km.). Since last 19 (2001 to 2019) years, the area under forest is increased by 1.27 %, which is good symbols, but it should continue in future. Table No.2 indicate that the area under forest is not uniform in the study region. Total area under forest cover in the state accounts to 16.50 percent of the area of the state. But there is large variation in the area under forest in one district to another in the state. Based on area under forest all districts of the state are grouped under five categories, which are given in the Table No.3 and also shown in the Fig.No.3

Table No.2. Maharashtra & India from 1960-61 to 2019

Sr. No.	Year	Maharashtra (Forest Area in % )	India (Forest Area in % )
1	1960-61	20.77	18.10
2	1970-71	20.23	21.03
3	1980-81	20.85	22.18
4	1990-91	20.85	22.30
5	2000-01	20.24	23.38
6	2011	16.46	23.48
7	2019	16.50	21.67

Source: India State Forest Report-2001 to 2019

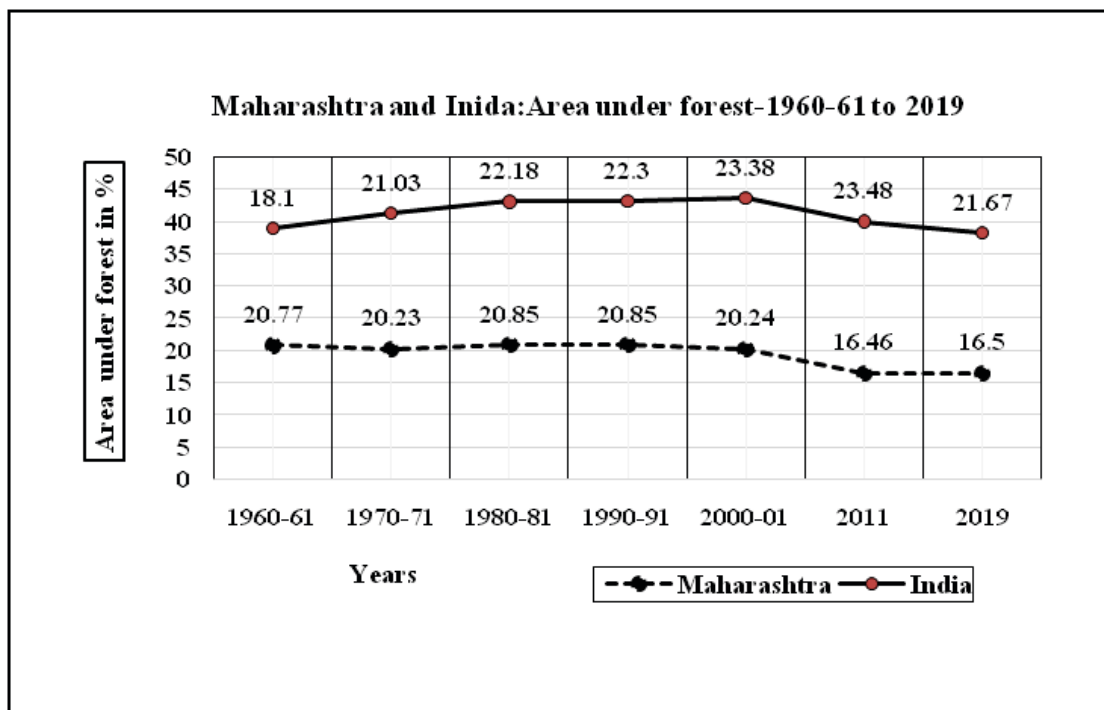


Fig. No.2

Table No.2: Maharashtra State: Area under Forest-2001 and 2019

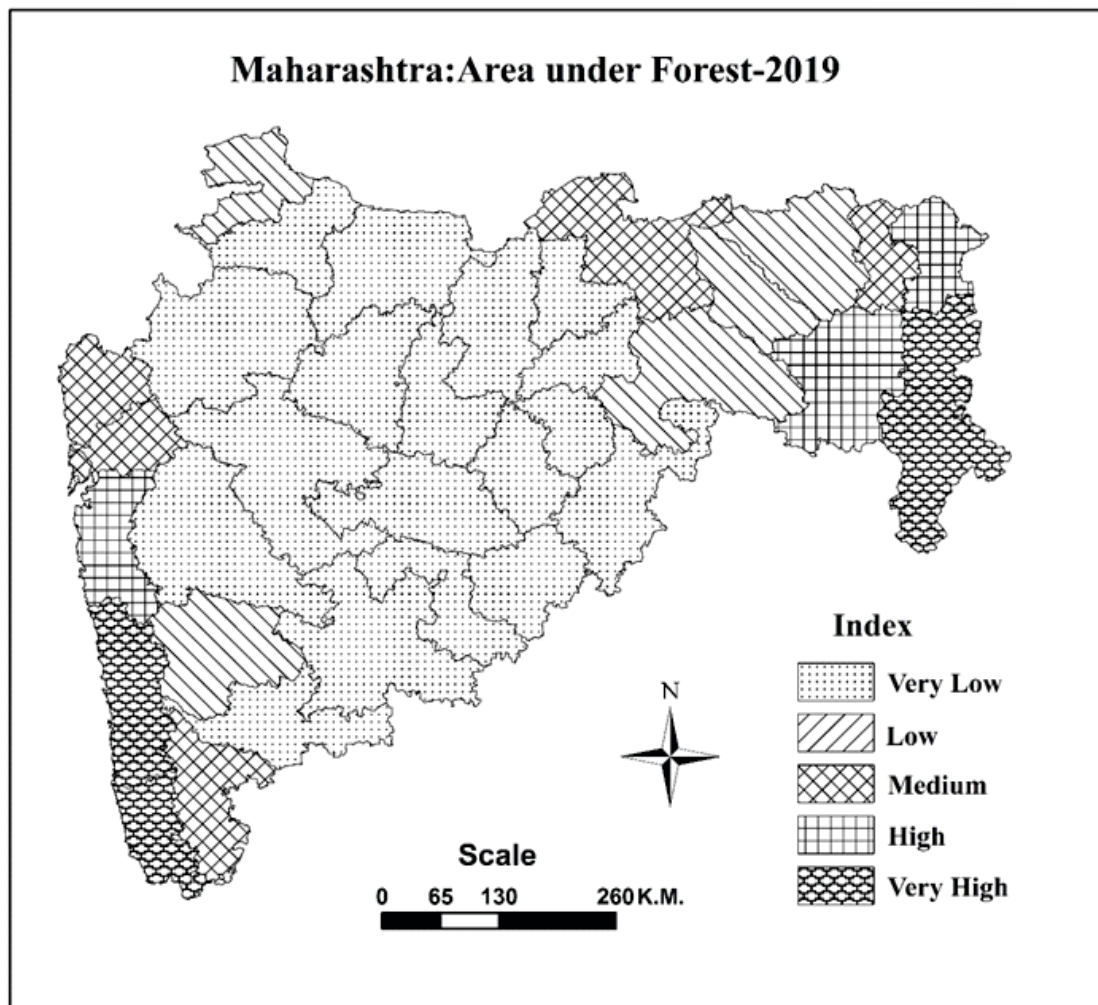
Sr. No.	District	Forest (%)		
		2001	2019	Difference
1	Ahmednagar	1.28	1.57	+ 0.29
2	Akola	5.92	6.00	+ 0.08
3	Amravati	25.44	25.94	+ 0.5
4	Aurangabad	4.02	5.61	- 1.59
5	Bhandara	26.28	24.44	-1.84
6	Beed	1.09	1.53	+ 0.44
7	Buldana	6.15	6.12	- 0.03
8	Chandrapur	35.33	35.43	+ 0.1
9	Dhule	6.59	4.19	- 2.4
10	Gadchiroli	69.87	68.81	- 1.06
11	Gondiya	37.14	37.04	- 0.1
12	Hingoli	2.62	2.28	- 0.34
13	Jalgaon	10.72	9.75	- 0.97
14	Jalna	0.66	0.47	- 0.19

15	Kolhapur	22.2	23.24	+ 1.04
16	Latur	0.15	0.18	+ 0.03
17	Mumbai City	0.64	1.91	+ 1.27
18	Mumbai Suburbs	19.28	31.36	+ 12.08
19	Nagpur	21.21	20.22	- 0.99
20	Nanded	8.32	8.9	+ 0.58
21	Nandurbar	20.37	20.08	- 0.29
22	Nashik	6.91	6.93	+ 0.02
23	Osmanabad	0.92	0.66	- 0.26
24	Parbhani	0.94	0.65	- 0.29
25	Pune	8.52	10.94	+ 2.42
26	Raigarh	32.35	41.1	+ 8.75
27	Ratnagiri	33.03	51.33	+ 18.3
28	Sangli	1.76	1.75	- 0.01
29	Satara	8.37	12.2	+ 3.83
30	Solapur	0.32	0.33	+ 0.01
31	Sindhudurg	42.69	54.31	+ 11.62
32	Thane	28.55	31.37	+ 2.82
33	Wardha	13.44	13.66	+ 0.22
34	Washim	6.13	6.06	- 0.07
35	Yavatmal	19.35	19.2	- 0.15
<b>Maharashtra</b>		<b>15.23</b>	<b>16.50</b>	<b>+ 1.27</b>

Table No.3: Maharashtra State: Area under Forest(%)in 2019

Sr. No.	Area under forest (%)	Degree	Names of Districts
1	Less 10	Low	Nashik, Aurnagabad, Parbhani, Mubai City Dhule, Jalgaon, Nagar, Sangali, Solapur, Nanded, Latur, Buldhana, , Akola, Jalana, Hingoli, Beed, Osmanabad & Washim
2	11-22	Very Low	Pune, Nagpur, Yawatmal, Wardha, Satara & Nandurbar
3	22-33	Medium	Amarawati, Bhandara, Kolhapur, Mumbai Suburban, Palghar & Thane
4	33-44	High	Chandrapur Raigad & Gondiya
5	More than 44	Very High	Ratnagiri, Gadchiroli & Sindhudurg

Source: Compiled by Author, 2020



Map No.3

**a. Very Low Forest Area:**

This category includes those districts in which area under forest is less than 11 percent. In this category, 18 districts name as Nashik, Aurnagabad, Parbhani, Mubai City, Dhule, Jalgaon, Nagar, Sangali, Solapur, Nanded, Latur, Buldhana, Akola, Jalana, Hingoli, Beed, Osmanabad and Washim included in this category. The expansion of urban area and second the shortage of rainfall, unfavourable climatic condition are the main reasons of deforestation and depletion of area under forest. Most of the districts of this category have urban area where industilization, urbanization and population growth are formed on large scale. These are Nashik, Aurnagabad, Mubai City, Sangali and Solapur district where first gruoped is responsible for depleting the area under forest. The desruction of forest in such cities due to main reason i.e. rapid exapnsion of cities. Due to exapnsion of suburban settlement, construction of roads and other commercial acivities are responsible for deforestation around such urban area therefore area under forest is declined in these districts. In case of Marathwada

districts (Aurangabad, Beed, Hingoli, Jalna, Latur, Nanded, Osmanabad and Parbhani) the main cause is the climatic condition is not too much suitable for forest development. Even whatever forests are available that are also declined due to forest fires. This region has witnessed as many as 696 forest fire incidents in the past four years. These calamities have destroyed 2,598 hectare forest cover in the region. Therefore the Marathwada region having the lowest forest cover in Maharashtra

**b. Low Forest Area:**

Second category of low forest area where area under forest is between 11 to 22 percent. In this category Pune, Nagpur, Yawatmal, Wardha, Satara and Nandurbar districts are included. Pune and Nagpur are the major districts, where industrialization and urbanization play an important role minimizing the forest area. Area under forest in other district is decreasing day by day due to the use of wood as a fuel, over grazing, and construction of various projects etc.

**c. Medium Forest Area:**

Medium forest area is found in only in six districts of the state where forest area is between 22 to 33 percent. Amravati, Bhandara, Kolhapur, Mumbai Suburban, Palghar and Thane districts are included in this group. Only Mumbai suburban area is area of overpopulation where expansion of cities is major cause for destroyed the forest. In Thane and Palghar districts local tribal people cut trees mainly for fuel purposes. One important reason for destruction of forest area in this region is that many industries are constructed their warehouses and godowns (storage place). Even new settlements are being constructed in this area. Therefore the area under forest is utilized for this purpose. In other districts main causes of deforestation are agriculture, over grazing and construction of roads.

**d. High Forest Area:**

Raigad, Ratnagiri and Gondiya are included in this category, where area under forest is between 33 to 44 percent. It is good that all districts have good forest resources but if they don't take care of this resources than in future they might be suffer due to disturbance in ecological natural balance. In this area, the area under forest is good but it should be preserve otherwise it will definitely going to decrease due to future development. Since last five years, tourism activities are rapidly increasing in Raigarh and Ratnagiri districts also various industries are being set up in this districts as a result there is threat to forest of these districts. In case of Gondiya district, mining and agriculture are major activities are slowly occupying area of forest therefore in this region proper planning is required to sustain the forest.

**e. Very High Forest Area:**

Last category is very important because area under forest in this category found more than 44 percent, which is very important and useful to ecological balance of the local region. But in study area only three districts are observed, where area under forest is too good. It included Gadchiroli, Sindhudurg and Sindhudurg.

**1. Need of Forest Conservation:**

Overall the area under forest in the study area is not sufficient for ecological balance. It is only 16.50 percent which is less than expected (33 %) forest area. Therefore forest conservation is badly required in study area. Conservation of forest is the practice of planting more trees and maintaining the forested areas for the sustainability for future generations. The protection and conservation of forest resources are not only desirable but are also necessary for the economic development of a nation and maintenance of environmental and ecological balance from local through regional to global

levels (Savindra Singh, 2010). For minimizing the frequency of forest fires (man-made), there is a need to create awareness in people, which is very important. People, who are responsible for such activities, should be given strict punishment. Afforestation programmes should be implemented by the Government with help of NGOs, private companies, schools, colleges and universities. Government can provide seeding, trees for plantation free of charge. In this regard, NSS unit, NCC unit, Grampanchayat and other local authorities will be very useful. Programmes like social forestry, Agroforestry and tree plantation should be carried out by the government with help of local people and NGOs on the occasion of various days (like Environmental days) and programmes. More trees should be planted to increase the forest cover in the state, which is very important. For that purpose, trees should be selected according to the geographical conditions (climate, soil and availability of water etc.) of a particular region and proper care should be taken during the growth of trees. In this regard, suitable sites and area selection for tree plantation is important, therefore there is a need to conduct a comprehensive survey throughout the state.

Decentralization of industries from large cities towards tahsils and rural areas is required. The State Government of Maharashtra has taken up the 50 crore plantation programme intended to increase the forest cover in the state from the current 16.50% to the nationally mandated 33% of Maharashtra's land area. Due to insufficient manpower of the Forest Department, there is a need to form the call for the initiative of Green Army. To ensure partnership from people of all walks of life, an initiative has been taken for an on-line channel for public engagement, partnership, sharing and dissemination. In this regard, social workers, students and workers from various sectors must cooperate and actively participate. States like Karnataka, Andhra Pradesh and Kerala have performed much better in tree plantation programmes during the last three years. All sectors' cooperation is highly required for such programmes. Proper implementation of afforestation policies and various schemes should be outlined in rural and urban areas to promote and encourage the local people and community. Local community and Government must give top priority for forest conservation.

### **Conclusion:**

Area under forest is continuously decreased in the study area from the year 1960-61 to 2019. During 1960-61 it was 21.77 percent, which is decreased up to 16.50 percent in the year 2019. It means during the span of sixty years, area under forest is decreased by 4.27 percent. Area-wise Gadchiroli (68.81%) has the largest forest cover in the state followed by Sindhudurg (54.31%), Ratnagiri (51.31%) and Raigarh (41.10%). On the other hand Latur (0.18%), Solapur (0.33%), Jalna (0.47%), Parbhani (0.65%) and Osmanabad (0.66%) are the major districts where area under forest is less than 1 percent. Deforestation is a main reason to decrease the land under forest in the study region. Deforestation is the process by which the area under forest is reduced. It is generally caused by urbanization, industrialization, population growth, construction of roads, and fuel purpose in tribal and rural areas of the state. Deforestation is the permanent destruction or loss of forests for the expansion of lands for agriculture, road construction, settlements etc. With the advent of industrialization, several trees have been cut at an alarming rate for raw materials and various other purposes. The depletion of the forest cover is mainly due to ever increasing population pressure on land for agriculture, indiscriminate grazing, which has denudation of forest (Rede, 2009). Overall the area under forest in the Maharashtra State is not sufficient for ecological balance. It is only 16.50 percent which is less than expected (33%) forest area. Therefore forest conservation is highly required in study area.



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**\* Dr. Sanjay Dagu Pagar**  
Associated Professor,  
Department of Geography,  
K.R.T. Arts, B.H. Commerce and  
A.M. Science (KTHM) College, Nashik