



IDENTIFYING THE FACTORS OF LAND DEGRADATION RELATED TO DEFORESTATION IN CHAMARAJANAGARA DISTRICT - USING GEO-SPATIAL TOOLS

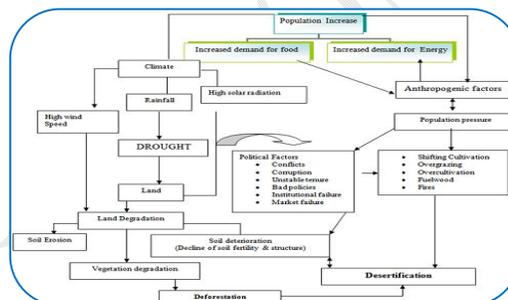
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ABSTRACT :

Chamarajanagara district laying in a southern most part of the Karnataka enjoyed good climate condition in the past has been now experiencing drastic climate change. Detecting the paleo climate to substantiate the climate change and land degradation is one of the challenging tasks to accomplish without any lapse. Pertinently, there are many techniques which can be employed to ascertain the statement claimed. In this paper, deforestation has been chosen as one of the parameters to substantiate how this region has incurred a huge loss of dense forest growth and later pushed into a semi-arid pasture land. The entire analysis is based on primary data generated from 1:250000 1:1:50000 topographical map and Landsat thematic data (ETM+).



KEYWORDS : Deforestation, Degradation.

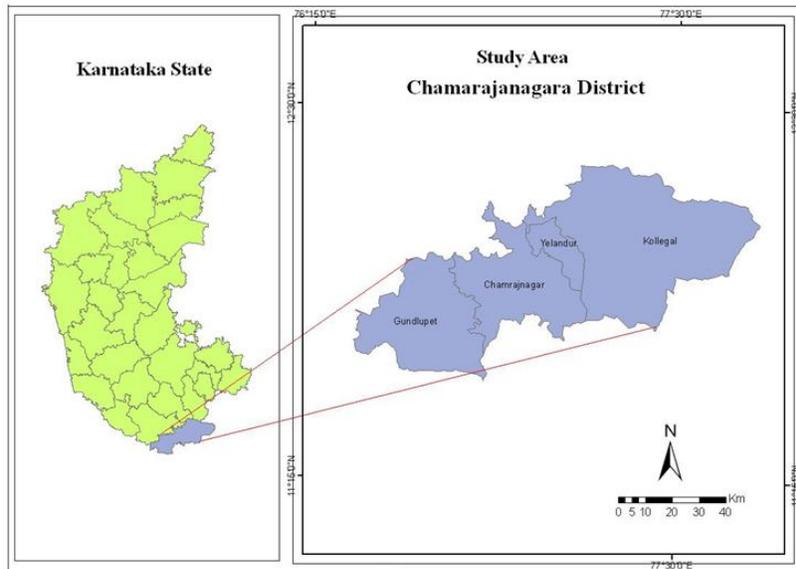
1. INTRODUCTION

Vegetal removal is defiantly has negative impact on land. Removal of forest cover leads to so many land related erosions and water erosions. Ministry of Environment and Forests, Government of India, in his report Nation Action Program to Combat Desertification, listed out the major factors of land degradation and desertification in India. Among these factors, Deforestation caused by Forest land Clearance for agricultural activities, Over grazing, Excessive Fuel wood collection and forest fire are directly yields land degradation, where deforestation is happening continuously. In the study area also, deforestation and over exploitation of underground water are the two major factors of land degradation. On this grounds the present research included study of Deforestation related land degradation.

2. STUDY AREA

The district, Chamarajanagara, is situated in the southernmost tip of the Karnataka state with 5648 Sq km of geographical area(See Figure No 1) and receive 751 mm rainfall annually from both the south east and north eastern monsoon winds along with conventional rains during summer season. Karnataka is divided into ten agro-climatic regions; under this Chamarajanagara falls in the south interior dry region. As per the 2011 census district has over 10 lakh population with the density of 181 people per sq km; these people are habited in 428 village with 5 towns and 81 villages are uninhabited.

Figure 1: Map of the Study Area.



3.RESULT AND DISCUSSION

Entire district has been divided into two geographical area, out of this 33 percent of the total geographical area is occupied by the agricultural land and 48 percent of the total geographical area is forest land. Natural vegetation of the study area is dry Deciduous forest, low yield scrubs and undulating and hilly forest. About 48 percent of the geographical area of the district covered by protected forest or reserved forest. The study area had 3370 sq km of forest during 1930, Its accounts 60 percent to total geographical area. After the independence, due to the increase of agricultural land with deforestation the forest area started to decrease. During period between 1930 and 1970 around 8 % percent of forest area has disappeared from the total forest area. This phenomenon continued until 2010. Totally around 19 % percent of forest has vanished during this period i.e 1930 to 2010(See table 1& 2). To get the rate deforestation mapping of forest cover from 1930 to 2010 was done (See Figure 2,3&4) and the detailed study was done on factors of deforestation, such as Encroachment for Agriculture, Livestock and overgrazing, Rehabilitation for Tibetans and Frequent forest fires.

Table1: Deforested area

Year	Total Forest	Deforested area (Sq. Km)	In Percentage
1930	3370	NA	NA
1970	3098	272	8.07
2010	2730	368	10.91

Figure 2: Forest Cover map of Chamaranagara during 1930.

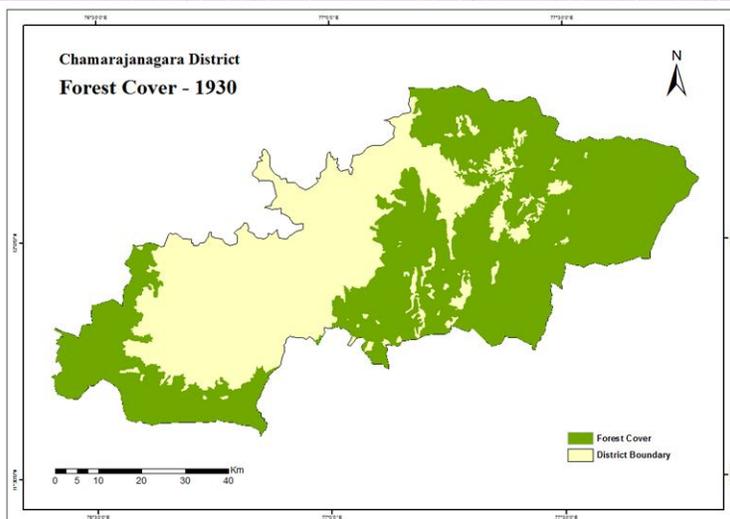


Table 2: Geographical area and Forest area

Years	Geographical Area(Sq. Km)	Forest Area(Sq. Km)	In Percentage (%)	Loss of Forest to total Geographical area in Per %
1930	5688	3370	59.25	NA
1970	5688	3098	54.47	4.78
2010	5688	2730	48.00	6.46

Figure 3: Forest Cover map of Chamaranagara during 1970.

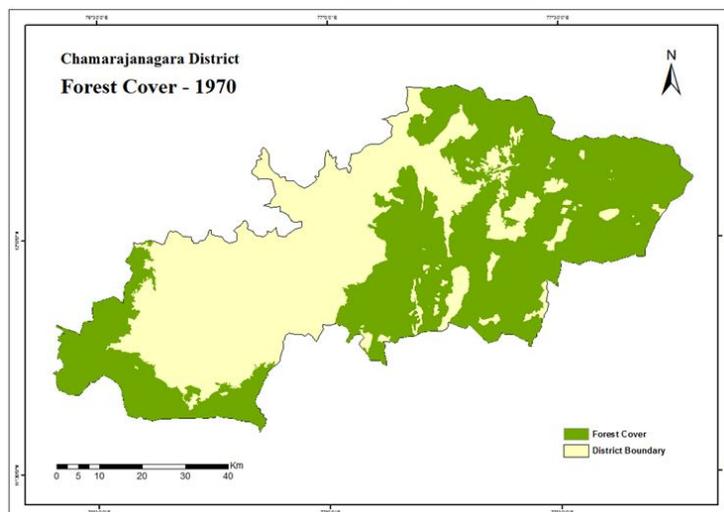
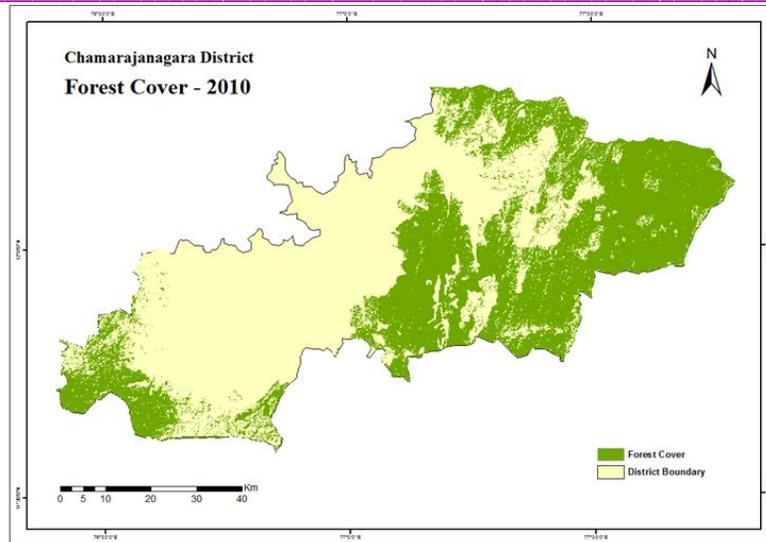


Figure 4: Forest Cover map of Chamaranagara during 2010.



4. MAJOR CAUSES FOR DEFORESTATION

Increasing population definitely has negative impact on forest land. Rapid growth population and increasing dependency on available cultivable land is reason for encroachment of forest area for agriculture and fuel wood. Clearing of forest to increase the agricultural is the sole reason for deforestation in all the taluks of Chamarajanagara. District had lush green of forest earlier. In 1930s district had around 60 percent of forest land in the total geographical area. Gundlupet, Yalandur and Kollegal taluks come under Bandipur National Park. This park is sharing boundary with Tamilnad and Kerala state. 80 percent of the people of this district are engaged in agricultural activities, which mainly depends on rainfed cultivation. Villagers of the forest fringe always tend to clear forest for the increase of their agriculture land towards forest. Along with their domestic animals each and every day, they are involved in the process of clearing the forest. Each year in the summer season, these people cut the trees and put fire to them. Sometimes, frequent forest fires also help these people to clear the forest despite the strict rules by government and forest department. Clearing of forest does not happen in a short span of time, it is a long and continuous process. Year after year gradually villagers encroach the forest area without being noticed by forest department but only the wild animals can notice this. In recent years, with the help of advanced technologies like GPS, Satellite images and camera trapping, forest department is monitoring the forest land as well as wild animals.

4.1 Encroachment for Agriculture

All the economic and social indicators show that Chamarajanagara district is backward economically and socially. Physio-graphically, also Chamarajanagara shows some of the drawbacks; most of the area fall under rain shadow of Western Ghats, and rainy areas are occupied by forest. Non-forest area receives an average 600 mm rainfall and it's not sufficient to grow cash crops. Whenever the monsoon fails in Southern India, it will result in continuous drought in the district. With the above mentioned anthropogenic and Physiographic backwardness, it puts pressure on available limited agricultural land and forest area. District has four taluks, out of these Kollegal, Yalandur and Gundlupet are occupied by forest. Kollegal and Yalandur Physio-graphically covered by Hilly area, undulating topography with natural vegetation. In both the taluks flat and plain lands are occupied by people. Gundlupet, taluk attached to Bandpur National Park, is also flat and plain. Here plain land is occupied by people with agricultural land. People of this district mainly dependent on agriculture activities only, because of absence of secondary and tertiary activities in the district. To increase the agricultural production and living standard, people are cultivating land intensively, but Physiographic backwardness of the land yields low production and income, In this scenario, people have

started to increase their agriculture land towards surrounding forest area in the mindset of larger agricultural plot yielding higher income. Another notable reason is availability of underground water, the level of underground water nearer in forest compared to non-forest area. Naturally vegetative covered areas withholding runoff and improve the percolation, fresh tree cleared areas are good in soil fertility, with this underground water and moderate rainfall are attracting people towards the forest and extension of agricultural land towards the forest.

4.2 Livestock and overgrazing

In India agriculture and animals are inseparable. Cattle, oxen, buffaloes are used for agriculture activities as well as milk and food. Cattles, buffaloes, sheep and Goats are the major domestic animals in the study area (see the table), these animals clash with wild animals for fodder in the fringe areas of the forest. Due to overgrazing in forest fringe area, all the plant species have vanished and even people used to cut the tree, stem and leaf for feeding to domestic animals. This type of situation is common in dry and overgrazed areas of study area. Increased density of the domestic animals and roaming of these animals in the forest fringe, the land becomes hard and soil fertility will definitely reduce. Finally, the productive capacity of the land will come down, it leads to barren and desert like condition.

Historical documents, records and topographical maps show that, Kollegal taluk is famous as grazing land for Tamil Nadu state land owners. These people used to camp, inside the forest and graze the thousands of cows and sheep's inside the forest, locally known as Doddi and Patti. It means shepherd camps. Shepherd camps widely distributed in Kollegal taluk, areas like Ponnachi, Gopinatham, Kowdalli, Sathyamangala, Okkiyam, Minya, Vaderaplya are known for shepherd's camps. Still we can find the illegal camps of domestic animals inside the forest. Religious places like MM Hills and Biligirirangana Hills are full of roaming domestic animals. These animals brought and dumped by people of surrounding areas. It also indicates activities of overgrazing. Overgrazing in the forest has its own negative impact on vegetation type and growth. Heavy grazing in the same land over a long period of time reduces vigor of grazed plants and alter the plant growth pattern and changes the micro biodiversity composition of that particular grazed land.

4.3 Rehabilitation for Tibetans

The Government of India established refugee centers in different states for the Tibetans refugees during 1950 to 1960. Under this scheme, three refugee centers were established in Karnataka namely Mundgod in Dharwad district, Bailukuppe in Mysore district and Odeyarpallya in Chamarajanagara district. The Odeyarpallya refugee center in Kollegal taluk of Chamarajanagara district is covered in an area of 3121 acre. Indian government has provided the settlements as well as agricultural land for the migrated Tibetans to lead their livelihood. As Chamarajanagara district has the shortage of agricultural land; and as non-availability of government owned agricultural land, the forest land was given for the cultivation. According to the Karnataka forest act 1963, the forest land cannot be used for the non-forestry purposes, on this account, the given 3121 acre of agricultural land of Tibetan refugees, recorded as a forest land in government records. This incident reflects the duality in the rule of Indian government. Basically the forest act was passed for the conservation of forest but this type of usage of forest land for the non-forestry purposes indicates the failure of government in this regard. And in order to hide its failure, government is showing the interest of conservation in records only.

4.4 Frequent forest fires

Summer season of every year in dry deciduous forest, forest fire is common phenomena, occasionally, nature himself puts fire on, and man induced forest fire is also common in India. Cow herders and poachers and forest fringe villagers put fire during the summer and drought periods. Bandipur National Park in Gundlupet and surrounding forest area is facing this problem during summer season of each year. Frequent forest fires destroying valuable vegetation and plant species in Gundlupet taluk. Capitalizing on this man induced calamity, forest fringe villagers try to occupy and encroach the fresh burned forest and ash

land. Already burned and cleared forest land gives easy access to encroachers. Forest fires and vegetative ash welcome the villagers for encroachment and poachers for the hunting of scattered animals. Protective measurements like camera trapping, solar fence and barricaded walls can stop the people but not the fire. Fire, is the easy way for clearing the forest and poaching in Gundlupet taluk.

5. CONCLUSION

The study area is situated at the Southern tip of the Karnataka state. Geographical location indicates that the district is situated in rain shadow region of Western Ghat. Thus this region receives less rainfall compared to leeward side of Western Ghat and surrounding districts like Mysore and Mandya. During North East rainy season, the district receives some considerable amount of rainfall, which can facilitate the dry crops like ragi and jowar crop. After the independence, the Indian government started schemes to increase the cultivable area. In this process, large area of forest was converted into agricultural land in the district. Realizing the importance of conservation of forest, Indian as well as Karnataka government has taken several measurements to check the deforestation. Along with United Nations Convention to Combat Desertification (UNCCD) Programme, Central of government of India under the National Action Programme to Combat Desertification established the separate wing for arrest the land degradation and desertification process in India, UNCCD celebrating June 17th as a the “world day to combat Desertification” and especially in 2016, the theme of UNCCD is “Inclusive Cooperation for achieving land Degradation Neutrality”(UNCCD). Among the factors of land degradation, deforestation is one of the major contributor. Along with government, local community participation is also one of the major concerns here. People should be aware of forest conservation; and major threat for forest is the local population. If local community cooperates with forest department, our natural resources will be available for the posterity.

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