

IMPACT OF POPULATION GROWTH ON ENVIRONMENTAL DEGRADATION IN MADURAI CITY

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ABSTRACT

World population has doubled from three billion to six billion between 1960 and 1999. It reflected that people were healthier than before in history. However, during the same period, global environment began to deplete higher. As population continue to increase, limits on such resources as arable land, potable water, forests, and fisheries have come to an end. Declining farmland contributed to constant rates of food production will near the limits of arable land. This simultaneous incidence of population growth and environmental degradation specify that more people crack into greater environmental degradation. In India, rapid growth of population exploits the available resources which results in drought, flood, rainfall, ill health and pollution. While population is an important source of development, it is a major source of environmental degradation. Unless the relationship between the two can be stabilized, development programs cannot yield the best results. This study is to demonstrate how the population growth in Madurai district in Tamil Nadu State of India has been a cause to the environmental degradation. In all the decades the decadal growth rate of population of Madurai district is higher than that of the State except in the decade 2001-2011. It deals with the relationship between demographic factors (population size, distribution, and composition) and environmental change in Madurai by

investigating complex relationship of demographic and development indicators like population growth, urbanisation, industrialisation and land use pattern.

Key words: Madurai, Population, Environment.

Introduction:

India is the second largest populated country in the world. The population is considered as an important source of development. Economic development of a nation leads to over usage of available resources which results in drought, flood, ill health and pollution. Higher population results that major agricultural lands are changed into real estate and industrial estate. This leads to environmental degradation. For the welfare of state, Economic development and environmental degradation can be stabilised. The present study is to examine the impact of demographic factors on environment of Madurai District, Tamil Nadu.

Objectives:

The objective of the present study is

- to know the trend of population growth in Madurai
- to find out the impact of population growth on natural environment
- to analyse the effect of industrialisation on environment

Methodology

The present study is deals with the impact of population pressure on environment with special reference to land, water, and forest. The prime focus of the study is that higher population impact on the environment. The data used for the study is collected from the secondary source like Census 2011, Madurai District Profile 2016-17(available at website as on 13.02.2020) and Madurai Corporation website.

Results and Discussion

The environmental impact is examined by the factors like population growth, density, forest cover, factories, etc.,

This section deals with the first objective of the study

Population Growth in Madurai:

Population is the major determinant for our economic growth. The Government is also giving importance to education and health to develop the human resource as a capital for the growth of the Indian economy. It is an important factor to determine the environmental degradation of a country. Density of population is calculated as the number of persons per sq. km. The following factors have to be taken to examine the impact of population on environment.

Table 1: Decennial Growth rate of population in Madurai

Here growth rate is explained as the table given below.

Census year	population	Decennial growth rate (% of variation since previous census)
1961-1971	1730047	25.49
1971-1981	2042667	18.07
1981-1991	2400339	17.51
1991-2001	2578201	7.41
2001-2011	3038252	17.84

Source: District statistical Handbook 2017

The Decennial growth rate of population in Madurai is decreased from 1961-71 to 2001-11. For the year 1991-2001, it was found that population growth rate is only in single digit due to family planning implementation taken by Government of India. From this table, it is clear that population growth rate is declining while number of populations is increasing.

Table 2: Comparative analysis of Population Density in Madurai and Tamil Nadu

	Tamil Nadu	Madurai
Area (in sq. Km.)	130060	3710.00
Population density	555	819

Source: District statistical Handbook 2017

The population density of Madurai District is higher than the Tamil Nadu state. Population density of Madurai District leads to water scarcity in Madurai regions. Water scarcity is one of the biggest issues not only in Madurai but also in the world.

Table 3: Density of Population in Madurai

Census year	Density of population
1991	525
2001	698
2011	819

Source: Census Report 1991, 2001 and 2011

When comparing among the three decades the population density of Madurai District is higher than previous decades. It showed that there is higher population living in Madurai that results that a greater number of real estates and apartments and higher level of pollution on environment. Density of population is not only increasing the real estate but also it affects the agricultural activity. It leads to urbanisation that will result environmental degradation.

Table 4: comparative analysis of urban population in Madurai and Tamil Nadu

Population	Tamil Nadu	Madurai
Rural	3,72,29,590	11,91,451
Males	1,86,79,065	6,01,247
Females	1,85,50,525	5,90,204
Urban	3,49,17,440	18,46,801
Males	1,74,58,910	9,25,228
Females	1,74,58,530	9,21,573
Urban Population (%)	48.4	60.78

Source: District statistical Handbook 2017

Compared with the other districts in Tamil Nadu, Madurai District has highest urban population. This indicates that population is interested to live in urban area because of the facilities availed in urban area. If urban population is higher than rural, then there is a possibility of greater pollution of air, water and land. This leads to environmental depletion.

Table 5: Trends in Urban population in Madurai

Census	Rural	Urban
1991	190785	154215
2001	1134025	1444176
2011	1191451	1846801

Source: Census Report 1991, 2001 and 2011

Compared with rural and urban, urban population is higher in all the three decades. Madurai has developed with various automobile, rubbers, chemical, hand loom textiles and granite manufacturing industries. Now software companies have opened offices in Madurai. Due to industrialisation, Urbanisation has evolved. Under Industrialisation, the industry is not the cause of production of goods but also the pollution. This adversely affects the environment.

Agriculture and Rainfall in Madurai:

India is based on agricultural sector. Most of the employment is driven by the agricultural and allied activities only. The following table is explained that the area available for agricultural and how much is irrigated in Madurai.

Table 6: Agriculture in Madurai

Year	Total cultivated area	Gross area irrigated
2014-15	130298	80663
2016-17	89250	45155

The main reason for the decline of cultivable lands is less rainfall in the year 2015. Another reason is that people living in rural area in Madurai District is lesser than urban area. It is proved that the agricultural area is converted into real estates and industrial estates.

Table 7 – Average Annual Rainfall in Madurai, 2013-2018

Rainfall in mm	2013	2014	2015	2016	2017	2018
Actual	610.1	744.1	1002.4	510.2	904.6	734.1
Normal	927.9					

Source :<https://www.twadboard.tn.gov.in/content/madurai>

When compared with normal, actual rainfall of 734.1 is less than 927.9. Agriculture is mainly depending on rainfall. The average annual rainfall for the Madurai district is about 85.76 cm. The rainfall and Forest cover area has interrelated each other. The rainfall declined due to decline in forest cover area. Increase in temperature of Madurai is due to urbanization, industrialisation and pollution due to vehicles.

Forest Cover in Madurai:

In Tamil Nadu, the forest cover area is classified into three viz., Very Dense, Moderate Dense and Open Forest. The comparison situation of forest cover in Madurai under different heads are explained with the help of following table.

Table 8: Comparative Situation of Forest Cover in Madurai, 2001-2019

Year	Very Dense Forest	Moderate Forest	Open Forest	Total
2001	276		238	514
2003	31	197	303	531
2005	31	196	317	544
2007	23	291	254	568
2011	23	293	271	587
2013	23	291	288	602
2015	31	279	464	774
2017	40	231	290	561
2019	40	232	283	555

Source: various reports of forest survey of India

Except very dense forest, other two viz., moderate and open forest has decreased. The main reason for increase in forest cover are plantation and better conservation of forests and the reason for declining forest area is decline of agro forestry plantation. The forest cover area is declined because of rainfall decline in Madurai.

Major Findings:

- Number of populations is increased while Decennial growth rate of population in Madurai is decreased.
- The population density of Madurai District is leads to water scarcity.
- Higher urban population creates higher level of pollution on land, air and water.
- The various automobile, rubbers, chemical, hand loom textiles and granite manufacturing industries and software companies produce not only the goods but also the pollution also. This adversely affects the environment.
- Decline of cultivable lands is less because of rainfall in the year 2015. Another reason is that persons lived in rural area in Madurai District is lesser than urban area. It is proved that the agricultural area is converted into real estates and industrial estates.
- Increase in temperature of Madurai is due to urbanization, industrialisation and vehicle pollution.
- The main reason for increase in forest cover are agroforestry practices and better conservation of forests and the reason for declining forest area is felling of agroforestry plantation.

Implications:

- By providing education and awareness to the younger population, air, water and land pollution can be controlled.
- Proper supervision is needed for the Industry to follow the strict rules which is given by the government to prevent pollution.
- Water scarcity can be solved by proper implementation of rainwater harvesting at home.
- Environmental Impact Assessment is needed for each sector to provide eco-friendly products.

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