

## A GEOGRAPHICAL STUDY OF ROAD DENSITY IN AHMEDNAGAR DISTRICT OF MAHARASHTRA STATE

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### Abstract:

Road transport is important the achieving the Sustainable Development Goals (UN, 2017&2020) of UN's 2030 Agenda. Road Transport is a critical infrastructure for the economic development of a country (GoI MRT&H, 2021). The transportation network is critical to facilitating the movement of resources, people and goods to accelerate economic development and social prosperity. Road Transport Network provided door-to-door service. Road safety can be achieved by improving the road network and the quality of roads. The International Road Federation (IRF) encourages and promotes better, safer and more sustainable development and maintenance (UN, 2017). The road is an important indicator in the development of any nation and it is the average and important factor in the transportation network system. Road density means the length of the road network in a unit area. The development of a region depends on the development of its road network system. Often assessment of structural properties and density of road networks is essential for future modification and development. This paper examines the density of the road network geographically in terms of area and population in the Ahmednagar district of Maharashtra State.

**Key Words:** Road Density, Road Network, Development.

### 1. Introduction: -

Roads are initial, oldest and popular mode of transport. As per traffic share and contribution to the national economy, road transport is dominant mode of transport in India (GoI MRT&H, 2021). Transportation plays an important role in the development of any region. The density of the road network varies according to the population of the region and the area of the area. The high density of roads has a positive impact on the overall development of the region. But in most areas, there is a difference in road density in terms of area and population just like there is road density in Mumbai. The Ahmednagar district is the largest district of Maharashtra having 22216.61 km length of the road network. The present paper is based on a tehsil-wise analysis of Ahmednagar district's road density and road density per 1000 sq. km population.

### 2. Objectives of the Study:

The main objective of this attempt is to understand the level of road network density in terms of geographical area and per 1000 population of tehsil places and accessibility of individuals.

### 3. Data Collection and Methodology:

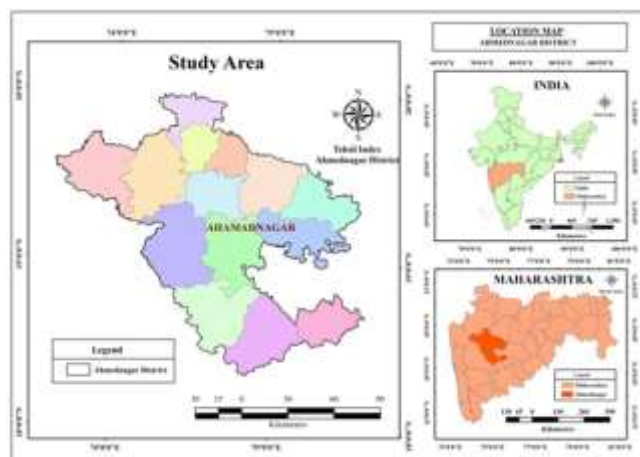
The present research work is based on a secondary source of data obtained from the socio-economic Abstract of Ahmednagar district (2021-22) and the PWD office in Ahmednagar district. The population data has been collected from the District Census Handbook of Ahmednagar district, 2011. Secondary data has been collected and computed by recent research techniques and the results are brought about through tables, graphs, and maps Software like GIS Arc Map- 10.4 has been used to create the maps. The density of the road network per 100 sq. km and per 1000 population is calculated with the help of the following formula.

$$\text{Density (Per sq.km.)} = \frac{\text{Road Length}}{\text{Geographical Area}}$$

$$\text{Density (Per 1000 Population.)} = \frac{\text{Road Length}}{\text{Populaation}} \times 1000$$

The results are shown in the table and map of the study region

#### 4. Study Area:



Ahmednagar district has been selected for a present research study. The district is first in the sense of geographical area (17048 sq. km.) in the state of Maharashtra. It is situated between 18° 20' and 19° 59' north latitudes and 73° 40' to 75° 43' east longitudes (Map.1) administratively; Ahmednagar district consists of fourteen tehsils. This study region is divided into there are three physical divisions namely, first Sahyadri mountain ranges, the second Plateau and the third plains area. The average annual rainfall is 566 mm. and means daily maximum temperature is 39°C and the mean daily minimum temperature is 11° C. The population of the Ahmednagar district according to the 2011cesus is 4543159 with about 51.57% as male and 48.43 % as female population. The density of the population was 266 persons per sq. km.

**Table No. 1. Ahmednagar District Road Density (Per 100 Sq. Km and Per 1000 Population)**

Sr. No.	Name of the Tehsil	Road Length in Km	Density Per 100 sq.km	Density Per 1000 Population
1	Akola	1785.32	117.17	3.95
2	Sangamner	2092.34	120.69	4.29
3	Kopargaon	1093.97	150.66	3.62
4	Rahata	1350.55	213.07	4.21
5	Shrirampur	1273.25	223.45	4.43
6	Nevasa	1841.78	149.44	5.15
7	Shevgaon	1275.90	123.69	5.19
8	Pathardi	1388.62	114.37	5.38
9	Nagar	1950.56	127.66	2.85
10	Rahuri	1510.82	161.00	4.68
11	Parner	2040.21	105.60	7.44
12	Shrigonda	1841.70	120.46	5.83
13	Karjat	1740.11	112.54	7.38
14	Jamkhed	1031.49	113.55	6.51
	<b>Total</b>	<b>22216.61</b>	<b>130.32</b>	<b>4.89</b>

Source: - Socio-economic Abstract of Ahmednagar district (2021-22) & Calculated by Researcher

#### 5. Road Network in the District:

The total road length of the district is 22216.61 km and out of that 461.65 Km length is the National Highway, also the length of the State Highway is 1814.08 Km, the length of

the Major District Roads is 4234.03 Km, Other District Roads are 4155.60 and the length of rural roads are 11357.04 Km. The total length of the national highway is 210.70 kilometers, of this, a length of 61 kilometers was accounted for by the Pune- Nasik (NH 50) national highway which passes through Sangamner tehsil from South to North of the region. One more national highway was added recently, the Kalyan Visakhapatnam (NH 222) national highway and passes east to west of the district through Parner, Nagar, and Patherdi tehsils and its length is 114 km. in the district. Also, all tehsil places are connected with the State Highways passing through the entire district.

**Table no. 2. Road Density (Per 100 Sq. Km) In Ahmednagar District.**

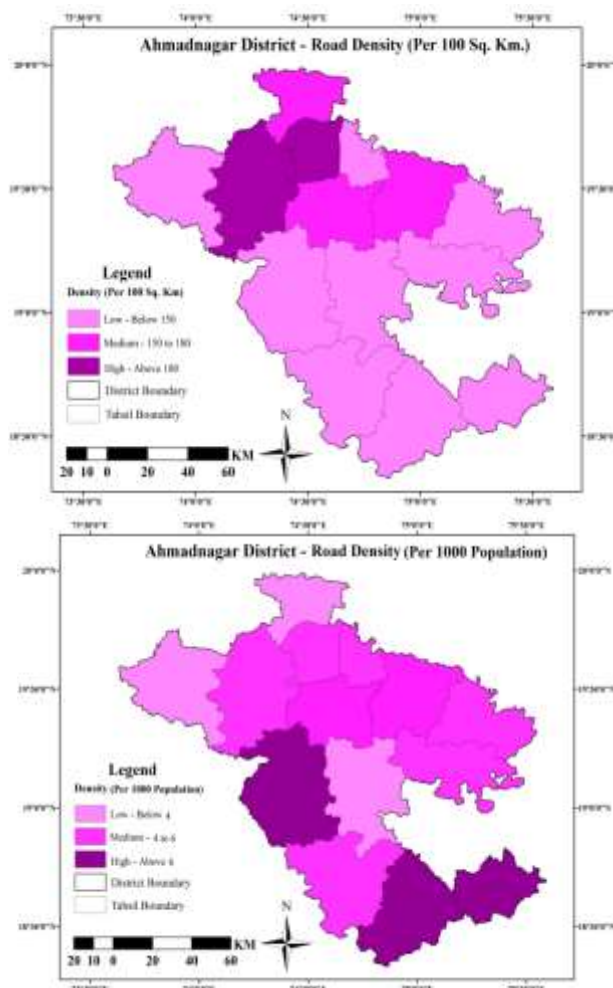
Category	Class in %	Number of tehsils	Name of Tehsils
<b>Low</b>	Below 150	9	Akola, Shrirampur, Shevgaon, Pathardi,, Nagar, Parner, Shrigonda, Karjat, Jamkhed
<b>Medium</b>	150 to 180	3	Kopargaon. Nevasa, Rahuri
<b>High</b>	Above 180	2	Sangamner, Rahata

Source: - Calculated by Researcher

**Table no. 3. Road Density (Per 1000 Population) In Ahmednagar District.**

Category	Class in %	Number of tehsils	Name of Tehsils
<b>Low</b>	Below 4	3	Akola, Kopargaon. Nagar,
<b>Medium</b>	4 to 6	8	Nevasa, RahuriShrirampur, Shevgaon, Pathardi, Shrigonda, Sangamner, Rahata
<b>High</b>	Above 6	3	Parner, Karjat, Jamkhed

Source: - Calculated by Researcher



## 6. Road Network Density in Per 100 Sq. Km:

The total road density of Ahmednagar district is 130.32 per 100 sq. km in an area. The highest density of the geographical road network per unit area is recorded in Shirampur (223.45) tehsil because the geographical area is the lowest in the district. Maximum road length occurs in Sangamner tehsil and the ratio of road length and the area is greater than in other tehsils of the district. Shirampur is the main tehsil in the district and the length of the other district road and rural roads are higher in this tehsil. In all the tehsils of the district, the road density is more than 100 per 100 sq. km of area. The lowest road density is in Parner tehsil (105.60) and the density of the rest of the tehsils per 100 sq. km is found to be between 112 to 223 km. Rahata tehsil has got the second highest density of road network per 100 square kilometers of area. The density of the road network per 1000 population in all the tehsils has been found to be 2.85 to 7.44 km i.e. 2.85 to 7.44 roads are available per 100 population. But according to the population, the density of roads is less than in the other area. Parner tehsil has the highest road population density. Because this tehsil has the largest area in the Ahmednagar district but a relatively less population on the other hand, Nagar tehsil has the lowest road density because geographically this tehsil has the smallest area and the largest population. Map. No. 1 shows the road density in Ahmednagar district as 100 Km. per sq. Km.

## 7. Evaluation of Road Density:

There is a difference between the tehsil-wise density of the road network per 100 sq. km as well as per 1000 population. The density of the road network per 100 sq. km area as per the tehsil-wise distribution of population in Ahmednagar district is lower. It is very difficult to build new roads according to the increase in population because the growth rate of the population and the growth rate of the road network cannot match each other. But we can control population growth in the region to balance the development of roads in the region. In terms of area, the density of roads was found to be the highest in tehsil Shirampur and in terms of population, the density of roads was found in Parner tehsil to be the highest. Sangamner tehsil has a higher population compared to other tehsils and the highest road length in the district but the road length is not sufficient compared to the population distribution. In this tehsil near about more than 4 Km, roads are available in per 1000 population. Jamkhed tehsil has the lowest distribution of the district's total population as compared to other tehsils. The density of roads per 100 sq. km. in Parner tehsil is the lowest in the district and the largest tehsil per 1000 population because of the poor area of this tehsil is highest in the district. Map No 1 shows the tehsil-wise density of the road network per 100 sq. km and Map No 2 shows the tehsil-wise density of the road network in per 1000 population.

## Conclusion & Suggestion:

The network of roads across the district has not been fully developed. The road length is uneven across the district. The development of the road network in the district was seen as one-sided. Parner tehsil had the highest road length and density in terms of area. It is important to develop the road network uniformly throughout the region. Nagar, Sangamner, Kopargaon and Sherigonda tehsils have the least network of roads compared to their area and population, So both densities are low in these tehsils. There are differences in road network density per 100 square kilometers and per 1000 population. Increasing the length of old roads constructing new flyovers, subways etc. This will help reduce over-traffic and increase the development of the region's roads. The network of roads always plays an important role in the

development of any region so it is important to develop. It also controls additional population growth in the district for the development of a network of roads as per population.

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