# Impact of Population on Economic Development: Evidence from India

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## Abstract

**Purpose:** The main purpose of the paper is to find the association between the population and the GDP of India and whether the population has any impact on economic development and growth or not. It aims to find out the impact of the increase in population on economic development. **Research design, data, and methodology:** Gross domestic product, national income, gross saving, per capita income, and capital formation of the last six years have been taken as the major variable to measure economic growth. For the study, data were collected from the fiscal years 2014–15 through 2020–21. Statistical techniques like correlation and regression have been applied to test the hypotheses. The neural network has been applied to find the fitness of the model. **Results:** In India, there is no significant relationship has been found between GDP and population. It is found that there is no significant impact of population on economic development. **Conclusion:** The population is not affecting economic growth-; therefore, it can be said that India is overpopulated. More population is the means as well as the end of economic development. The problem of population explosion in India has proved to be a big hindrance to the success of economic planning and development.

**Keywords:** GDP, Capital formation, Population growth, Overpopulation, Economic development

**JEL Classification Code:** E01, F20, F63

## 1. Introduction[1]

The population generally assumes the means of development, particularly the economic development of a country. More people, more contributions, so they are assumed as an asset. Excess of everything is bad means, so it should be within limits. If the population is in adequate strength, it proves an asset and creates a liability if excess in strength. In India, Population has crossed the optimum limit and has become a liability. So the problem of population explosion in India has proved to be a big issue, obstacle, challenge, and limitation in the success of economic development.

The population of India is the second highest in the world and is believed to surpass the population of China in the coming year up to 2030 in coming years. It is forecasted that India will become the world's most populous country by 2030. Its population growth rate was 0.98% in 2021.

Efficient and reliable energy supplies are a precondition for accelerating the growth of the economy of a nation. Economic growth increases state capacity and the supply of public goods (Dincecco & Katz, 2016). When the economies grow, states can tax that revenue and gain the capacity and resources needed to provide the public goods and services, such as healthcare, education, social protection, and basic public services, that their citizens need.

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The Indian Economy is, at present, the world's fastest-growing economy with actual growth rates of 7.6, 7.7, and 7.3% in Q1, Q2, and Q3 of the years 2019-20, 2020-21, and 2021-22, respectively (Rondinelli et al., 1989).

Population of India represents 17.99% of the world´s total population, which arguably means that one person in every 6 people on the earth, is a resident of India (Bahadur, 2019). It is increasing at high speed and growing non-stop. With actual growth rates of 0.99%, 0.97%, and 0.95% with the population of 1,380,004,385, 1,393,409,038, and 1,406,631,776 in the years 2019-20, 2020-21, and 2021-22, respectively (Dasgupta et al., 2000).

Population explosion is adversely affecting the standard of living. Overpopulation creates the problems like unemployment, shortage of food, low per capita income, capital formation, high pressure, social problems, economic insecurity, and social insecurity, and environmental degradation (Thuku, 2013).

India's GDP has grown quickly over the past 20 years. Regarding GDP (PPP), India is now 3rd largest economy with 10.40 trillion $, but due to the population explosion, regarding per capita income, it is still placed 116th out of 183 countries, and regarding Human Development Index its' position is 130 (Falkingham et al., 2010).

## 2. Review of Literature

Overpopulation creates the problems like unemployment, shortage of food, low per capita income, the problem of capital formation, high pressure, social problems, economic insecurity, social insecurity, increases pressure on land, and environmental degradation. Although overpopulation has not affected the GDP and infects GDP of India has grown very fast in the last two decades (Bahadur, 2019).

The government may be able to consider the impact of population increase on future policies with the aid of the analysis of relationships between various (Koduru & Archana, 2019).

Calculating the effects of India's high population expansion on economic development is the goal of this endeavour. The study noted that institutional quality in India does not support financial development and that there is a feedback relationship between inflation and financial development (Hagen et al., 1959).

The effort to analyze and forecast India's economic growth is supported by a description of theoretical and empirical research on the impact of demography on labour supply, savings, and economic growth. Policy choices can potentiate India's realization of economic benefits stemming from demographic change. Failure to take advantage of the opportunities inherent in demographic change can lead to economic stagnation (Bloom, 2012).

India is now 3rd largest economy with a GDP (PPP) of 10.40 trillion but due to population explosion still, it is ranked 116th country in terms of per capita income and 130th position in terms of HDI (Tilt, 2016).

**Table 1:** Shows the Economy Status of the Last 17 Years from 2004-05 to 2020-21

|         | GDP        | GVA        | GNI        | NNI        |
|---------|------------|------------|------------|------------|
| 2020-21 | 1,97,45,670 | 1,79,15,167 | 1,95,61,348 | 1,74,61,759 |
| 2019-20 | 2,03,51,013 | 1,84,61,343 | 2,01,57,899 | 1,79,94,301 |
| 2018-19 | 1,88,86,957 | 1,71,61,213 | 1,86,84,632 | 1,67,04,645 |
| 2017-18 | 1,70,90,042 | 1,55,05,665 | 1,69,05,230 | 1,51,40,418 |
| 2016-17 | 1,53,91,669 | 1,39,65,200 | 1,50,77,384 | 1,34,92,657 |
| 2015-16 | 1,37,71,874 | 1,25,74,499 | 1,36,12,095 | 1,21,62,398 |
| 2014-15 | 1,24,67,959 | 1,15,04,279 | 1,23,20,529 | 1,09,78,238 |
| 2013-14 | 1,12,33,522 | 1,03,63,153 | 1,10,93,638 | 98,97,663 |
| 2012-13 | 99,44,013 | 92,02,692 | 98,27,250 | 87,66,345 |
| 2011-12 | 87,36,329 | 81,06,946 | 86,59,505 | 77,42,330 |
| 2010-11 | 76,34,472 | 70,83,671 | 75,52,665 | 67,56,720 |
| 2009-10 | 63,66,407 | 59,74,906 | 63,28,407 | 56,38,126 |
| 2008-09 | 55,14,152 | 51,72,838 | 54,81,229 | 48,87,836 |
| 2007-08 | 48,98,662 | 44,90,188 | 48,78,150 | 43,69,214 |
| 2006-07 | 42,54,629 | 39,04,895 | 42,21,395 | 37,83,068 |
| 2005-06 | 36,32,125 | 33,26,914 | 36,06,009 | 32,26,040 |
| 2004-05 | 31,86,332 | 29,04,299 | 31,63,957 | 28,29,998 |

Table 1 shows the gross domestic product (GDP), gross value added (GVA), gross national income (GNI), and net national income (NNI) of India from 2004-05 to 2020-21. These indicators are increasing year after year, but the main problem is needed to identify whether its growth rate is equal to the population growth rate or not.

**Table 2:** Country's the Share of World Population

| Year | Population | Yearly % Change | Country's Share of World Pop | World Population | India Rank |
|------|------------|-----------------|------------------------------|------------------|------------|
| 2020 | 1,38,00,04,385 | 1.04% | 17.70% | 7,79,47,98,739 | 2 |
| 2025 | 1,44,50,11,620 | 0.92% | 17.66% | 8,18,44,37,460 | 2 |
| 2030 | 1,50,36,42,322 | 0.80% | 17.59% | 8,54,84,87,400 | 1 |
| 2035 | 1,55,37,23,810 | 0.66% | 17.48% | 8,88,75,24,213 | 1 |
| 2040 | 1,59,26,91,513 | 0.50% | 17.31% | 9,19,88,47,240 | 1 |
| 2045 | 1,62,06,19,200 | 0.35% | 17.09% | 9,48,18,03,274 | 1 |
| 2050 | 1,63,91,76,033 | 0.23% | 16.84% | 9,73,50,33,990 | 1 |

The population of India represents 17.70% of the world´s total population, which arguably means that one person in every 6 people on the earth is a resident of India. India is the second most populated country in the world and is believed to surpass the population of China in the coming years. India is projected to be the world's most populous country by 2030. Its population growth rate is 1.04% in 2020. (United States Census Bureau, He et al., 2016)

Table 2 shows India's share of the world population is very high. It currently ranks 2nd in the world. It is forecasted that the share of the world population would be decreased only by 1% even after the next 3 years.

**Table 3:** Country's Share of World GDP

| # | Country | GDP (abbrev. In trillion) | GDP growth | GDP per capita | Share of World GDP |
|---|---------|---------------------------|------------|----------------|--------------------|
| 1 | United States | 19.485 | 2.27% | 59,939 | 24.08% |
| 2 | China | 12.238 | 6.90% | 8,612 | 15.12% |
| 3 | Japan | 4.872 | 1.71% | 38,214 | 6.02% |
| 4 | Germany | 3.693 | 2.22% | 44,680 | 4.56% |
| 5 | India | 2.651 | 6.68% | 1,980 | 3.28% |

Source: Worldometer (www.Worldometers.info)

Table 3 shows India has a significant global GDP share, ranking sixth in the world. India accounts for 3.28% of the global GDP. In terms of population, it is ranked second, but fifth when looking at GDP. Based on GDP (PPP), India's economy in 2021 is projected at $10,207 billion which is 3rd highest in the world, behind the United States and China. India contributes 7.19% of the entire world's GDP (PPP)(Statistics Times, 2021).

## 2.1. Research Gap

**The questions for further study now occur:**
A - Is there any association between population and economic development?
B - Is there an overpopulation risk to economic development?
C - Is there any impact of the increase in population and its growth rate on economic development in terms of GDP, capital formation, national income, gross savings, and per capita income?

## 3. Research Methodology

The research methodology comprises the research design, sample design, sources of data, selection of data, and various designs and techniques used for analysing the data. The methodology used for the study at hand is as follows:

## 3.1. Research Design

The research design used for the research problem at hand is causal research, as the objective is to determine which variable might be causing certain behavior, i.e. whether there is a cause-and-effect relationship between variables. To determine cause and effect, it is important to hold the variable that is assumed to cause the change in the

other variable(s), constant, and then measure the changes in the other variable(s). This type of research is very complex and the researcher can never be completely certain that there are no other factors influencing the causal relationship, especially when dealing with people's attitudes and motivations.

**Dependent variable** - Economic development (Growth in Population, Growth Rate of Population)
**Independent variable** - Population growth
**Measuring factor**s - Gross Domestic Product, National Income, Gross Saving, Per Capita Income, Capital Formation

## 3.2. Objective of the Study

To identify the association between population and e conomic development
• To find out the impact of the increase in population on economic development in terms of GDP
• To find out the impact of the increase in population on economic development in terms of national income
• To find out the impact of the increase in population on economic development in terms of per capita GDP
• To find out the impact of the increase in population on economic development in terms of gross saving
• To find out the impact of the increase in population on economic development in terms of capital formation

## 3.3. Hypotheses

**H1**: There is no significant association between population and economic development
**H2**: There is no significant impact of the increase in population on economic development in terms of GDP
**H3**: There is no significant impact of the increase in population on economic development in terms of National Income
**H4**: There is no significant impact of the increase in population on economic development in terms of gross saving
**H5**: There is no significant impact of the increase in population on economic development in terms of per capita Income
**H6**: There is no significant impact of the increase in population on economic development in terms of capital formation

## 3.4. Research Technique Applied

Following statistical tests and tools will be used to meet the above-mentioned objectives and to prove the hypotheses:

- Correlation and Regression
- Neural Network technique to find the fitness of the model

## 4. Result Analysis

For proving the hypotheses, statistical tool logistic regression is used.

**H1:** There is no significant association between population and economic development

**Table 4:** Correlations

|  | Population (in Lakhs) | Gross Capital Formation | Gross Saving | Net National Income | Net National Disposable Income | Per Capita GDP (₹) |
|---|---|---|---|---|---|---|
| Population (in Lakhs) | 1 | -0.24 | -0.25 | -0.365 | -0.244 | .969** |
|  |  | 0.605 | 0.589 | 0.421 | 0.598 | 0 |
|  | 7 | 7 | 7 | 7 | 7 | 7 |
| Gross Capital Formation | -0.24 | 1 | .998** | .964** | .998** | 0.007 |
|  | 0.605 |  | 0 | 0 | 0 | 0.989 |
|  | 7 | 7 | 7 | 7 | 7 | 7 |
| Gross Saving | -0.25 | .998** | 1 | .967** | 1.000** | -0.005 |
|  | 0.589 | 0 |  | 0 | 0 | 0.992 |
|  | 7 | 7 | 7 | 7 | 7 | 7 |
| Net National Income | -0.365 | .964** | .967** | 1 | .971** | -0.126 |
|  | 0.421 | 0 | 0 |  | 0 | 0.789 |
|  | 7 | 7 | 7 | 7 | 7 | 7 |
| Net National Disposable Income | -0.244 | .998** | 1.000** | .971** | 1 | 0.002 |
|  | 0.598 | 0 | 0 | 0 |  | 0.997 |
|  | 7 | 7 | 7 | 7 | 7 | 7 |
| Per Capita GDP (₹) | .969** | 0.007 | -0.005 | -0.126 | 0.002 | 1 |
|  | 0 | 0.989 | 0.992 | 0.789 | 0.997 |  |
|  | 7 | 7 | 7 | 7 | 7 | 7 |

Note: **. Correlation is significant at the 0.01 level (2-tailed).

The finding indicates that population has a major impact on economic development, but negatively high. It means overpopulation is not contributing to the economy. It means that, aside from per capita GDP, most of the indicators of the state of the economy are negative.

**H2:** There is no significant impact of the increase in population on economic development in terms of GDP

**Table 5:** Coefficients[a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
|  |  | B | Std. Error | Beta | | |
| 1 | (Constant) | 72889794.599 | 104397972.504 |  | .698 | .524 |
|  | Population (in Lakhs) | -.034 | .054 | -3.143 | -.624 | .567 |
|  | growth percentage | -24258695.455 | 29665883.568 | -4.122 | -.818 | .459 |

Note: a. Dependent Variable: Gross Domestic Product

Table 5 indicates that the P value is more than 0.05, which leads the researcher to reject the null hypothesis. It signifies that a negative influence on GDP shows that population growth is not a factor in the advancement of the economy.

**H3:** There is no significant impact of the increase in population on economic development in terms of National Income

**Table 6:** Coefficients [a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
|  |  | B | Std. Error | Beta | | |
| 1 | (Constant) | 1281851389.421 | 688179448.992 |  | 1.863 | .136 |
|  | Population (in Lakhs) | -.632 | .358 | -7.005 | -1.768 | .152 |
|  | growth percentage | -393945351.893 | 195554098.587 | -7.983 | -2.015 | .114 |

a. Dependent Variable: Gross National Income

Table 6 indicate that the P value is more than 0.05, which leads researchers to reject the null hypothesis. It means there is a significant impact of the increase in population on economic development in terms of gross national income.

**H4:** There is no significant impact of the increase in population on economic development in terms of gross saving

**Table 7:** Coefficients [a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
|  |  | B | Std. Error | Beta | | |
| 1 | (Constant) | 3548976256.832 | 1436374450.697 |  | 2.471 | .069 |
|  | Population (in Lakhs) | -1.847 | .747 | -39.493 | -2.473 | .069 |
|  | growth percentage | -1003255932.430 | 408162306.140 | -39.251 | -2.458 | .070 |

a. Dependent Variable: Gross Saving

Table 7 indicates that P value is more than 0.05, the null hypothesis is rejected as a result. It means there is a significant impact of the increase in population on economic

development in terms of gross saving.

**H5:** There is no significant impact of the increase in population on economic development in terms of per capita income

**Table 8:** Coefficients [a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 11283127.724 | 5917700.254 | | 1.907 | .129 |
| | Population (in Lakhs) | -.006 | .003 | -8.308 | -1.822 | .143 |
| | growth percentage | -3421739.011 | 1681582.530 | -9.279 | -2.035 | .112 |

a. Dependent Variable: Per Capita GDP (₹)

Table 8 indicates that the P value is more than 0.05; the null hypothesis is rejected as a result. It means there is a significant impact of the increase in population on economic development in terms of per capita income and negative effects that show that overpopulation does not aid in economic development.

**H6:** There is no significant impact of the increase in population on economic development in terms of capital formation

**Table 9:** Coefficients [a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 3845353449.402 | 1510842800.835 | | 2.545 | .064 |
| | Population (in Lakhs) | -2.001 | .786 | -40.050 | -2.547 | .063 |
| | growth percentage | -1087318440.393 | 429323343.578 | -39.818 | -2.533 | .064 |

a. Dependent Variable: Gross Capital Formation

Table 9 indicates that the P value is more than 0.05; the null hypothesis is rejected as a result. It means there is a significant impact of the increase in population on economic development in terms of capital formation. Additionally, negative effects that show overpopulation do not promote economic development.

The neural network technique is used to find the fitness of the model.
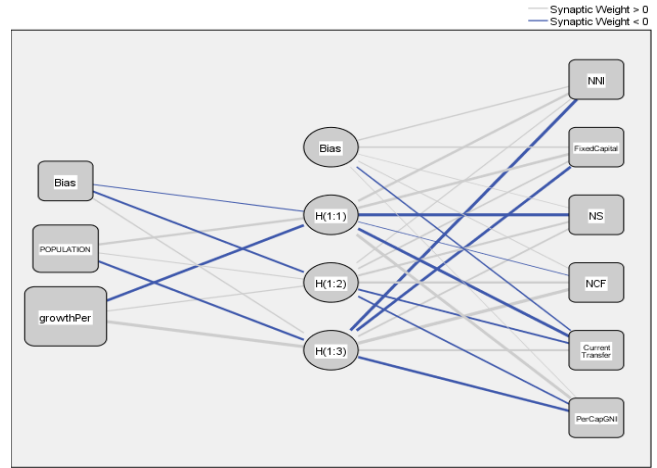


**Figure 1:** Application of Network Showing Independent Variable Importance

Figure 1 shows the importance of how the network classifies the prospective applicants. Therefore, statistical models will help in this situation. It has been discovered that population has a considerable impact on the majority of the dependent variable, India's economic standing. One of the elements affecting the economy is population, although overpopulation is not one of them.

## 5. Conclusions

The population is very important for the development of a nation. It is the means as well as the end of economic development. The population is an important asset for a nation but becomes a liability if it is uncontrolled. The population has crossed the optimum limit in India and has become a liability. Therefore, the problem of population explosion in India has proven to be a big hindrance to the success of economic planning and development. In the last two decades, the population has increased from 983 million in 1998 to 1355.40 million in 2021, which is a 37.88% increase (Martins, 2020).

Overpopulation has negatively affected Gross domestic product, national income, gross savings, per capita income, and capital formation. The economy of India is a middle-income developing market economy. It is the world's sixth-largest economy by nominal GDP and the third-largest by purchasing power parity (PPP). (Statistics Times, 2021)

According to the International Monetary Fund (IMF) on a per capita income basis, India ranked 145th by GDP (nominal) and 122nd by GDP (PPP) (Statistics Times et al., 2019). Population explosion is adversely affecting the standard of living. Demographic changes have a

big impact on India's economic planning and development. Overpopulation always creates a hindranceto economic development.

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