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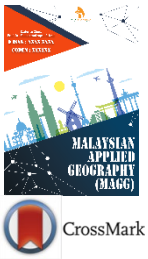

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RESEARCH ARTICLE

SPATIAL DISTRIBUTION OF DEPENDENCY RATIO AND LEVEL OF SOCIO-ECONOMIC STATUS OF THE POPULATION IN INDIA (2011)

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ABSTRACT

This study looks at how the dependency ratio and the socio-economic status of people in India're connected to each other. We used data from the 2011 Census and other sources to see how the dependency ratio and the socio-economic status of people in India vary across regions in India. The socio-economic status of a place is determined by things like how money people make how much education they have and if they have access to basic amenities like schools and hospitals. Our study shows that there are differences in socio-economic status across India.

We used a type of analysis called Geographic Information System to look at the relationship between dependency ratios and socio-economic indicators.

Our findings suggest that states with high dependency ratios tend to have a socio-economic status. For example, Bihar, Uttar Pradesh and Madhya Pradesh have high dependency ratios and lower socio-economic status. On the hand Kerala, Tamil Nadu and Maharashtra have lower dependency ratios and better socio-economic conditions.

These findings are important for people who make policies. They suggest that if we try to reduce poverty and improve education and healthcare, we can help reduce the dependency ratio and improve the socio- status of people in India. This is something that policymakers should think about when they're making decisions about how to help people in India. The dependency ratio and the socio-economic status of people in India are connected so we need to think about both things when we are trying to make life better for people, in India.

KEYWORDS

Dependency Ratio, Socio-Economic Status, India, Spatial Analysis.

1. INTRODUCTION

The dependency ratio is an important measure that shows the number of people who are not working, like children and older people, compared to the number of people who are working. This is important to know because it helps us understand how much the working people must support the -working people. The dependency ratio is a measure of the proportion of the non-working population (people under 15 and over 64) relative to the working-age population (people between 15 and 64). It is essential for assessing the burden on working people, given a higher dependency ratio, meaning they have to support more non-working people.

The dependency ratio is influenced by things like how many babies born, how many people die and how old the population is getting. All these things are connected to socio- factors like how much money people make, how educated they are, how good their healthcare is and whether they have jobs. For example, Indias socio-economic status is made up of things like how money people make per person, how many people can read and write and what kind of jobs they have. This affects the patterns and the overall quality of life in India.

Socio-economic status is different in parts of India. Some states in the north and east are not as developed as the states in the south and west. This means that the dependency ratio is different in states. The study uses data from the Census 2011 and other sources to look at how the dependency ratio and socio-economic stature distributed across different states in India. It also looks at how these two things are connected and what this means for policy.

The goal of the study is to understand the challenges that India faces in terms of socio- development and demographic changes. It wants to help come up with strategies for development and reducing regional inequalities. By looking at the connection between pressures and socio-economic conditions, the study hopes to add to our knowledge of these issues.

1.1 Literature Review

The number of people who are not working compared to those who are working is very important to know. This is called the dependence ratio. It is the proportion of people and old people to people who are of working age. This information is crucial because it affects how well the economy does and how people live their lives. Many people have looked at how this ratio varies in parts of India and what it means for the people living there in terms of money and society. Several studies have looked at the dependence ratio in regions of India and what it means for the people living there in terms of money and society and the socioeconomic consequences of the dependence ratio, across India.

Dependency Ratio in India: According to the study, migration,

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socioeconomic policies, and demographic trends all influence the dependency ratio, which varies widely between states (Census of India, 2011). States with lower fertility rates, such as Kerala, have lower dependency ratios than states with higher birth rates, such as Bihar and Uttar Pradesh (Indian Census 2011). These findings are confirmed by recent research, which shows that regional development policies and economic inequality play major roles in shaping these trends (Saxena, 2018; Sharma and Mehta, 2020).

Socio-Economic Factors Affecting the Dependency Ratio: Income, educational achievement, and health infrastructure are all significant socioeconomic determinants that influence dependency ratios. As discovered that states with better healthcare systems and greater literacy rates have lower dependency ratios due to lower birth and death rates (Bansal and Singh, 2015). Furthermore, emphasised the impact of women's employment on the dependency ratio, claiming that states that encourage women's employment saw a commensurate decrease in reliance rates (Singh, 2022).

Regional Variations: If we look at the dependency ratio in parts of India, we can see that there are big differences between the main regions. Usually, the dependency ratio is lower in states like Kerala, Tamil Nadu, and Maharashtra, which are in the south and west. On the other hand, it is higher in states like Bihar, Uttar Pradesh, and Odisha, which are in the east and north. This is what some researchers have found, such as (Choudhary, 2014; Mishra, 2017). The way people move from one place to another also plays a role in these differences. For example, states where many working-age people leave to find jobs will have a higher dependency ratio. This is because the people who are left behind are often children who are too young to work and old people who are no longer working (Gupta and Raj, 2021).

Impact of Policies and Interventions: Government policies and activities also have an impact on how dependency ratios are distributed geographically. The National Rural Health Mission (NRHM) and other welfare initiatives focused on reducing fertility and increasing maternal health have affected dependency ratios in several states (Kumar, 2016). Furthermore, attempts have been undertaken to improve the economic position of high-dependency regions and balance regional imbalances through the implementation of the Pradhan Mantri Awas Yojana (PMAY) and other socioeconomic initiatives (Reddy and Rao, 2019).

Recent Trends and Future Implications: According to a study even if birth rates are going down Indias dependency ratio is expected to go up as the population gets older. This change in population is a challenge for the economy in areas with a lot of old and young people. Experts think that better healthcare, education and job chances for women and young people are needed to balance out the bad effects of this trend. The dependency ratio will be an issue, for India. Improved healthcare and education will help to tackle this problem.

1.2 Objectives

The objectives of this study are:

- To find out the Trends of the Dependency Ratio of India from 1981 to 2011
- To analyse the spatial distribution of the dependency ratio in India at the state level.
- To examine the correlation between dependency ratio and socioeconomic status to determine patterns and regional disparities.

2. Data and Methodology

The study makes use of secondary data from India's 2011 Census, as well as key socioeconomic indicators released in government papers and databases such as the National Sample Survey Office (NSSO) and the Ministry of Statistics and Programme Implementation.

2.1 Dependency Ratio

2.1.1 The dependency ratio is calculated as follows:

$$\text{Dependency Ratio} = \frac{\text{Population aged (0-14)} + \text{Population aged (65+)}}{\text{Population aged (15-64)}} \times 100$$

2.2 Methodology

A statistical method for determining the strength and direction of a relationship between two or more variables is correlation analysis. Significant insights into the relationship between the reliance ratio and key socioeconomic indices in India's various states can be gained through correlation analysis. The correlation types, interpretation, and application of the correlation analysis approach are all covered in detail in this article.

2.2.1 Calculation of Correlation Coefficient:

- For Pearson's correlation, use the formula:

$$r = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum(X_i - \bar{X})^2}\sqrt{\sum(Y_i - \bar{Y})^2}}$$

- For Spearman's correlation, rank the data for each variable and then apply the Pearson formula on the ranked data.
- **Correlation Matrix**: Create a correlation matrix to summarize the correlation coefficients between the dependency ratio and all selected socio-economic indicators. This allows for easy identification of strong or weak correlations.

2.2.2 Interpretation:

Positive Correlation: A positive correlation means that as one variable rises, the other tends to rise as well. Higher education levels may help to reduce dependency, for instance, if there is a positive association between literacy rates and reduced dependency ratios.

Negative Correlation: A negative correlation means that as one variable increases, the other tends to decrease. For example, a negative link between the poverty rate and the dependency ratio could indicate that higher poverty levels are connected with larger reliance ratios.

Statistical Significance: Assess the p-value associated with the correlation coefficient to determine statistical significance. A common threshold for significance is $p < 0.05$

	Indicators	source
X1	Dependency Ratio (2011)	Census of India
X2	Per Capita Income (INR)	Planning Commission of India, Government of India. NSSO and the Ministry of Rural Development.
X3	Literacy Rate (%)	Census of India
X4	Urbanization Rate (%)	Census of India
X5	Access to Sanitation (%)	National Family Health Survey (NFHS); Ministry of Health and Family Welfare.
X6	Access to Electricity (%)	NFHS
X7	Poverty Rate (%) (2011)	NFHS

X8	Primary School Enrolment Rate (%)	Ministry of Education; Annual Reports on School Education Statistics
X9	Secondary School Enrolment Rate (%)	Ministry of Education; Annual Reports on School Education Statistics
X10	Child Labor Rate (%)	Ministry of Labor and Employment
X11	Crime Rate (per 100,000 population)	National Crime Records Bureau (NCRB)
X12	Infrastructure Development Index (IDI)	Government reports, World Bank indicators, Ministry of Urban Development
X13	Social Security Coverage (%)	Ministry of Labor and Employment; Reports on social security schemes
X14	In-Migration Rate (%)	Census of India 2011
X15	Out-Migration Rate (%)	Census of India 2011
X16	Rural Income (INR)	Planning Commission of India, Government of India. NSSO and the Ministry of Rural Development.
X17	Urban Income (INR)	Planning Commission of India, Government of India. NSSO and the Ministry of Rural Development.
X18	Income Gap (INR)	Planning Commission of India, Government of India. NSSO and the Ministry of Rural Development.
X19	Percentage of Households with Improved Housing (%)	Census of India
X20	Stunting Rate (%)	NFHS
X21	Wasting Rate (%)	NFHS
X22	Maternal Mortality Rate (MMR)	National Family Health Survey (NFHS)
X23	Infant Mortality Rate (IMR)	National Family Health Survey (NFHS)
X24	Life Expectancy (Years)	Ministry of Health and Family Welfare.
X25	Female Literacy Rate (%)	Census of India 2011
X26	Male Literacy Rate (%)	Census of India 2011
X27	Gender Gap (%)	Census of India and Ministry of Education.
X28	Tertiary Education Attainment (%)	Census of India; reports from the Ministry of Education.
X29	Number of Hospitals	Ministry of Health and Family Welfare; Health System Resource Centre.
X30	Scheduled Caste Work Participation Rate (%)	Census of India 2011

2.3 Study Area

India, which is also called Bharat, is a part of South Asia. The name India comes from a word "Indos" that refers to the land around the Indus River. The Romans pronounced the river Indus, and India is the country that lay beyond it. A long time ago, the Romans said the name of the river Indus in their own way, and they called the country India because it is the land that is on the other side of the Indus River. The name India has been used for a long time, and it was first written about by people, like Lambert, in the year 1960. India is still the name that people use to refer to the country that is also known as Bharat.

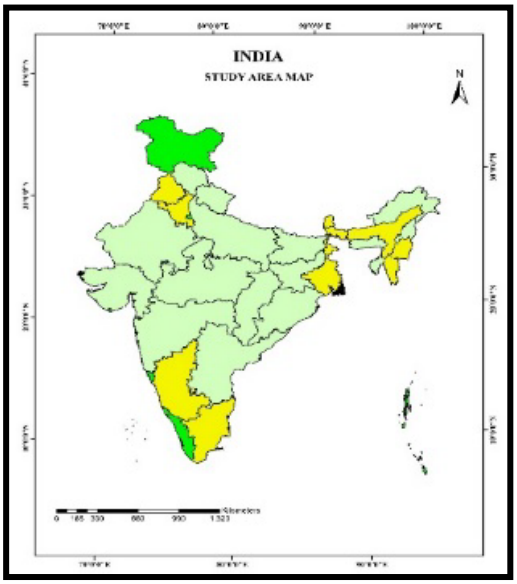


Figure 1: Location map of India, 2011

India is between latitudes 8°4' and 37°6' in the northern hemisphere and 68°7' and 97°25' in the eastern hemisphere. India has a total geological area of 32,87,263 square kilometres, or approximately 0.57% of the Earth's surface and 2.4% of the entire land hemisphere. The population is the state's most important component. As of 2011, India's population was 1210.19 million, accounting for 17.5% of the global total. India is the world's second-largest country, behind China. India has a density of 382, according to the 2011 census. The sex ratio is 943 and the literacy rate is 74%.

3. Results and Discussion

3.1 Trends of the Dependency Ratio of India from 1981 to 2011.

Dependency ratio of India from 1981 to 2011 based on census data. The dependency ratio is typically calculated as the ratio of the dependent population (aged 0-14 and 65+) to the working-age population (aged 15-64).

Dependency Ratio in India (1981-2011)			
Year	**Total Dependency Ratio**	**Child Dependency Ratio**	**Old Age Dependency Ratio**
1981	**82.3**	**76.5**	**5.8**
1991	**79.3**	**72.3**	**7**
2001	**74.9**	**63.3**	**11.6**
2011	**65.5**	**47.6**	**17.9**

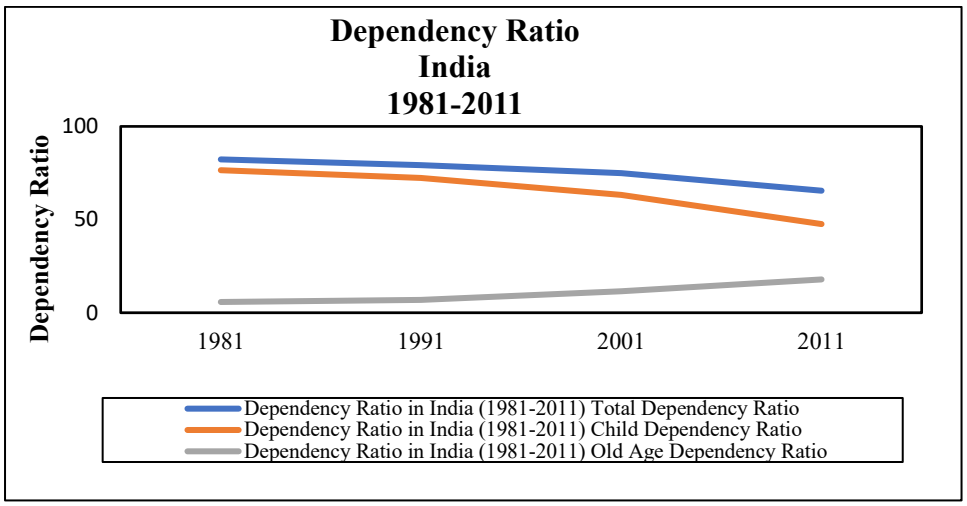
Calculated by Author

3.2 Total Dependency Ratio: A Declining Burden

The dependency ratio in India went down by 20.4 percent over thirty years from 82.3 in 1981 to 65.5 in 2011. This means that the number of people who are not working like the elderly and children decreased when compared to the number of people who are working. This is a thing because it means that India has a better age structure for the economy.

Every ten years the dependency ratio in India got better it went from 82.3 to 79.3 then to 74.9 and finally to 65.5. This change in the population is what economists call the dividend. The demographic dividend was responsible for 15 to 20 percent of Indias economic growth from 1981 to 2015. It also helped the per capita income grow by 1.9 percent every year.

The main reasons for this change are that people are having babies and India had a short time where the population was mostly working age before the population started getting older. This is shown by the fact that the total dependency ratio in India is going down. The dependency ratio, in India is still getting better because of these changes.



Child Dependency Ratio: Dramatic Decline

3.3 Old-Age Dependency Increase

The old-age dependence ratio went up a lot by 208.6% in the amount of time. It almost tripled, going from 5.8 to 17.9. This is happening because people in India are living longer. In 1981 people in India lived to be 54 years old. By 2011 they were living to be 67 years old. For men it was 51 years in 1981 and 66 years in 2011. For women it was 55 years in 1981 and 71 years in 2011. When people live longer, they need healthcare, pensions, and social assistance. This is different from children who will eventually start working. In 2011 8.58% of the people in India were over 60 years old. India is still a country compared to richer nations but the number of older people in India is clearly going up. This is especially true in states like Kerala. By 2011 older people made up than 13% of the population in Kerala. The ageing population, in India is. The old-age dependence ratio is increasing. Indias ageing population is an issue and the old-age dependence ratio is a good example of this.

3.4 State-wise spatial Dependency Ratio in India

Grade	Range	No. of States/UTs	% of Total
Very low	**29.20–42.29**	**6**	**20.00%**
Low	**42.30–51.29**	**4**	**13.30%**
Medium	**51.30–58.59**	**9**	**30.00%**
High	**58.60–66.20**	**9**	**30.00%**
Very high	**66.21–73.19**	**2**	**6.70%**

Calculated by author

3.5 Very low dependency (29.20–42.29)

Chandigarh, Delhi, Lakshadweep, Kerala, Goa and Puducherry are all part of this group. These places, including Chandigarh, Delhi, Lakshadweep, Kerala, Goa and Puducherry have something in common. They have the dependence ratios in India with less than 42 dependents per 100 individuals of working age. This is especially true in Kerala and the cities of places like Kerala, where many people live in cities can read and write and have kids, which has really decreased the number of children who are dependent, on others. Because of this, governments can allocate a significant portion of their expenditures to sophisticated healthcare, education, and infrastructure rather than just fundamental necessities. In general, social indicators and per capita incomes are higher than the national average. Population ageing is the primary rising challenge; hence, these areas need to improve their geriatric care and pension systems.

3.6 Low dependency (42.30–51.29)

Tamil Nadu, Maharashtra, Haryana, and the Andaman and Nicobar Islands have low numbers. They have around 42 to 51 people who are dependent on 100 workers. This is still a low number. The Tamil Nadu, Maharashtra, Haryana, and the Andaman and Nicobar Islands have a lot of people who are of working age. This is helping businesses and services to grow. The demographic dividend is already helping states, including Tamil Nadu, Maharashtra, Haryana, and the Andaman and Nicobar Islands in a very big way. Low fertility and diversified economies, especially in Tamil Nadu and Maharashtra, contribute to quicker growth and a decrease in poverty. However, early indicators of ageing and a slowing labour force are evident. Plans for continued employment development and ageing assistance must be created right away to maintain the current advantage.

3.7 Medium dependency (51.30–58.59)

The states in the middle range are Telangana, Karnataka, Jammu and Kashmir, Rajasthan, Daman and Diu, Himachal Pradesh, West Bengal, Sikkim, and Uttarakhand. These states fall somewhere between advantage and pressure, with roughly 51 to 58 dependents per 100 workers. Given the size of the child and young populations, governments must make significant investments in education, skills, and basic health care. In addition, if jobs are generated in manufacturing, tourism, and services, there is enough people of working age to sustain economic growth. Their primary concern is turning this demographic structure into a meaningful dividend before dependency rises once more because of population ageing.

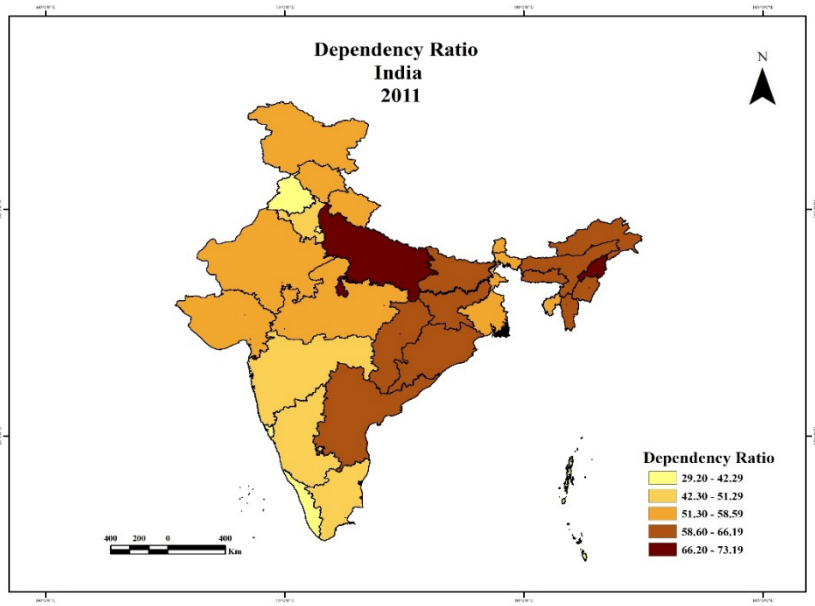


Figure 2: Dependency Ratio in India ,2011

3.8 High dependency (58.60–66.20)

The states of Chhattisgarh, Assam, Bihar, Odisha, Manipur, Andhra Pradesh, Meghalaya, Mizoram, and Jharkhand have a problem. They must support a lot of people who are not working. For every 100 workers there are 60 to 66 people who are depending on them. The population of these states is very young. This means that there are a lot of children and young people. Because of this these states have babies being born and not as many women can read and write. A lot of the money that the state has is spent on things that people need. This leaves money for things like roads and buildings and, for helping the economy grow. If the states of

Chhattisgarh, Assam, Bihar, Odisha, Manipur, Andhra Pradesh, Meghalaya, Mizoram, and Jharkhand do not improve health care and education for women they will have big problems. The young people will not have jobs. Will have to leave their homes to find work. This is not what anyone wants. The states of Chhattisgarh, Assam, Bihar, Odisha, Manipur, Andhra Pradesh, Meghalaya, Mizoram, and Jharkhand need to take steps to help their economies and societies.

3.9 Very high dependency (66.21–73.19)

The highest demographic pressure in India is found in Uttar Pradesh and Nagaland. In these places, there are a lot of people who depend on others for support. For every three people who work there are than two people who do not work. This is a problem, especially in Uttar Pradesh because it has a huge population. Many people in Uttar Pradesh are poor and young. When there are a lot of people who depend on others, it can cause poverty that lasts a long time. It also means that the state does not have a lot of money to spend on development. People do not have a lot of money to save or invest. So, these states must do something to change this situation. They need to make sure that girls get an education, that children stay healthy, and that people have good jobs. If they do these things, then maybe one day they will be able to move and become more developed. Uttar Pradesh and other states like it need to focus on these things so that they can improve over time. Female education, child survival programs, and productive jobs are very important, for the future of Uttar Pradesh and Nagaland.

3.10 Correlation between dependency ratio and socioeconomic status to determine patterns and regional disparities.

Indicators	Correlation Coefficient (r)
X2. Per Capita Income (INR)	-0.815**
X3. Literacy Rate (%)	-0.623**
X4. Urbanization Rate (%)	-0.732**
X5. Access to Sanitation (%)	-0.896**
X6. Access to Electricity (%)	-0.736**
X7. Poverty Rate (%) (2011)	0.675**
X8. Primary School Enrollment Rate (%)	-0.548**
X9. Secondary School Enrollment Rate (%)	-0.664**
X10. Child Labor Rate (%)	0.860**
X11. Crime Rate (per 100,000 population)	-0.29
X12. Infrastructure Development Index (IDI)	-0.745**
X13. Social Security Coverage (%)	-0.822**
X14. In-Migration Rate (%)	-0.576**
X15. Out-Migration Rate (%)	-0.277
X16. Rural Income (INR)	-0.781**
X17. Urban Income (INR)	-0.858**
X18. Income Gap (INR)	-0.819**
X19. Percentage of Households with Improved Housing (%)	-0.820**
X20. Stunting Rate (%)	0.711**
X21. Wasting Rate (%)	0.771**
X22. Maternal Mortality Rate (MMR)	0.388*
X23. Infant Mortality Rate (IMR)	0.560**
X24. Life Expectancy (Years)	-0.783**
X25. Female Literacy Rate (%)	-0.520**
X26. Male Literacy Rate (%)	-0.577**
X27. Gender Gap (%)	0.233
X28. Tertiary Education Attainment (%)	-0.812**
X29. Number of Hospitals	0.184
X30. Scheduled Caste Work Participation Rate (%)	0.458**

3.11 Correlation Analysis of Socio-Economic Indicators with Dependency Ratio

The table presents a correlation analysis between several socio-economic variables and the dependency ratio. Each indicator shows the degree of correlation with the dependency ratio; positive values indicate a direct relationship (higher socio-economic indicator values are associated with a higher dependency ratio), while negative values indicate an inverse relationship (higher socio-economic indicator values are associated with a lower dependency ratio). The interpretation of the correlation analysis for significant variables is as follows.

- **Per Capita Income (INR)** (-0.815**). Higher per capita income strengthens a state's economic condition. The negative relationship indicates that as income increases, the dependency ratio decreases. The most likely reason for this is that wealthier states have more resources to promote an active and productive population and reduce dependency.
- **Literacy Rate (%)** (-0.623**) Literacy Rate is very important. When a population has a Literacy Rate, it means they are well educated. This can lead to people having jobs and the economy doing well. What is interesting is that when the Literacy Rate goes up, the number of people who are dependent on others for support goes down.
- **Urbanization Rate (%)** (-0.732**) Urbanization Rate is another factor. Cities have jobs because they have better schools and hospitals. This means that people who live in cities are less likely to be dependent on others.
- **Access to Sanitation (%)** (-0.896**). When people have access to sanitation, they are healthier and can work more. The connection between Access to Sanitation and dependency is very strong. It shows that places with sanitation have fewer people who are dependent on others, probably because the people are healthier and can work.
- **Access to Electricity (%)** (-0.736**). When people have access to electricity, they have opportunities to work and do business. This is because more people live in cities and have jobs. So, places with access to electricity have fewer people who are dependent on others.
- **Poverty Rate (%) (2011)** (0.675**). It shows how many people do not have the money to live. When the Poverty Rate is high, it means that more people are dependent on others. This is because poor places struggle to have working-age people. After all, they do not have enough money.
- **Primary School Enrolment Rate (%)** (-0.548**). The Primary School Enrolment Rate is a sign of how a place is doing in terms of education. When more kids are in school, it means they will be able to work and support themselves when they are older. So, places with Primary School Enrolment Rates have fewer people who are dependent on others.
- **School Enrolment Rate (%)** (-0.664**). School Enrolment Rate for schools is also important. It helps people get the skills they need to get a job. When more people are in school it means they will be able to work and support themselves. So, places with Secondary School Enrolment Rates have fewer people who are dependent on others.

- **Child Labour Rate (%)** (0.860**) Child labour indicates socio-economic hardship. The strong positive correlation reveals that states with higher child labour rates have higher dependency ratios, as child labour is often a consequence of economic stress that affects the working-age population.
- **Crime Rate (per 100,000 population)** (-0.290) Crime Rate is a problem. It does not seem to have a big impact on how many people are dependent on others. It is still a social issue, but it does not seem to affect the economy as much as other factors like Literacy Rate and Access to Sanitation.
- **Infrastructure Development Index (IDI)** (-0.745**) Infrastructure Development Index is very important. This index shows how well a state's physical and economic infrastructure is developed. If a state has infrastructure, it means that the state has lower dependency ratios. This is because good infrastructure helps create jobs and supports activities. Infrastructure Development Index is a factor here.
- **Social Security Coverage (%)** (-0.822**). Social Security Coverage is also crucial. It refers to the percentage of people who have security. If a state has social security coverage it means that the people in that state have better support systems. This is why states with social security coverage have lower dependency ratios. Social Security Coverage plays a role in this.
- **In-Migration Rate (%)** (-0.576**). In-Migration Rate is another factor. This rate shows how many people are moving into a state. If a state has an in-migration rate it means that the state has good economic opportunities. This is why states with in-migration rates have lower dependency ratios. The in-migration rate is an indicator of economic opportunities.
- **Out-Migration Rate (%)** (-0.277). Out-Migration Rate is the opposite. This rate shows how many people are leaving a state. If a state has an out-migration rate, it may mean that the state lacks opportunities. However, the relationship between out-migration rate and the dependency ratio is not very strong. Out-Migration Rate does not have an impact on dependency ratios.
- **Rural Income (INR)** (-0.781**). Rural Income is very important. If a state has rural income, it means that the people in rural areas have good economic conditions. This is why states with rural income have lower dependency ratios. Rural Income is a factor in determining dependency ratios.
- **Urban Income (INR)** (-0.858**). Urban Income is also important. If a state has urban income it means that the people in urban areas have good economic conditions. This is why states with urban income have lower dependency ratios. Urban Income plays a role in this.
- **Income Gap (INR)** (-0.819**) The income gap measures disparities between urban and rural incomes. The negative correlation suggests that states with smaller income gaps tend to have lower dependency ratios, as equitable income distribution supports overall economic stability.
- **Percentage of Households with Improved Housing (%)** (-0.820**). Percentage of Households with Improved Housing is another factor. If a state has a percentage of households with improved housing it means that the people in that state have better living standards. This is why states with housing have lower dependency ratios. Improved housing is essential for a working population.
- **Stunting Rate (%)** (0.711**). Stunting Rate is a concern. This rate shows how many children are malnourished. If a state has a stunting rate, it means that the children in that state are not healthy. This is why states with stunting rates have higher dependency ratios. Stunting Rate has an impact on dependency ratios
- **Wasting Rate (%)** (0.771**) Wasting, another indicator of malnutrition, shows a positive correlation with dependency ratios. This suggests that states with higher wasting rates experience higher dependency ratios, likely due to the economic burden of poor health.
- **Maternal Mortality Rate (MMR)** (0.388*). Higher maternal mortality indicates inadequate healthcare and economic stress. The moderate positive correlation suggests that states with higher MMR also have higher dependency ratios, as poor maternal health affects family and economic dynamics.
- **Infant Mortality Rate (IMR)** (0.560**). Infant mortality reflects healthcare quality and socio-economic conditions. The positive correlation suggests that higher IMR is associated with higher dependency ratios, as infant deaths often indicate broader health and economic challenges.
- **Life Expectancy (Years)** (-0.783**) Life expectancy indicates overall health and living conditions. The negative correlation implies that states with higher life expectancy have lower dependency ratios, as longer, healthier lives support economic contributions.
- **Female Literacy Rate (%)** (-0.520**) Female literacy is crucial for economic participation and development. The negative correlation shows that states with higher female literacy rates tend to have lower dependency ratios, emphasizing the importance of gender equality in education.
- **Male Literacy Rate (%)** (-0.577**) Male literacy also affects economic productivity. The negative correlation suggests that states with higher male literacy rates have lower dependency ratios, supporting the idea that education is essential for economic stability.
- **Gender Gap (%)** (0.233) The gender gap in education measures disparities between male and female literacy. The weak positive correlation indicates a slight association, suggesting that higher gender gaps may contribute to higher dependency ratios but are not as influential as other indicators.
- **Tertiary Education Attainment (%)** (-0.812**). Higher tertiary education attainment indicates a skilled workforce. The negative correlation suggests that states with higher tertiary education levels have lower dependency ratios, as education enhances employability.
- **Number of Hospitals** (0.184) The number of hospitals reflects healthcare access. The weak positive correlation indicates that more hospitals do not necessarily correlate strongly with dependency ratios, suggesting that the quality of care may be more important than the number of facilities.
- **Scheduled Caste Work Participation Rate (%)** (0.458**). Scheduled Caste Work Participation Rate is a concern. This rate shows how many people from the scheduled castes are working. If a state has a scheduled caste work participation rate, it means that the people from scheduled castes in that state are working. However, this rate is associated with higher dependency ratios, which may indicate the socio-economic challenges faced by this group. Scheduled Caste Work Participation Rate has an impact on dependency ratios.

4. Conclusion

The current analysis draws attention to the notable regional differences in dependency ratios throughout India and their close correlation with state-level socioeconomic circumstances. The state of the country has improved: As fertility rates dropped from 4.5 to 2.3 children per woman, India's total dependence ratio decreased from 82.3 in 1981 to 65.5 in 2011, a 20.4% decrease. But this conceals a crucial spatial gap. As India's life expectancy increased from 54 to 67 years, child dependency sharply decreased by 37.7%, while old-age dependency virtually tripled from 5.8 to 17.9.

Northern and eastern states continue to bear the weight of child dependency, whereas southern and western states (Kerala, Tamil Nadu, and Delhi) attained below-replacement fertility decades ago and are currently dealing with challenges related to senior care. 33% of states with Very Low and Low ratings have effectively capitalised on their demographic advantage through industrialisation, healthcare, and education, allowing 70–75% of the money to be allocated to profitable investments. On the other hand, 30% of states in the highest grades are severely constrained, with only 50–55% of their budgets left over after covering their basic consumption needs. Most seriously, with more than 66 dependents per 100 workers, Uttar Pradesh (67.7) and Nagaland (73.2), both in the Very High-grade, are experiencing catastrophic demographic pressure that affects 250+ million people.

Per capita income (-0.815), female literacy (-0.520), urbanisation (-0.732), sanitation (-0.896), and infrastructure development (-0.745) show strong inverse relationships, while poverty (0.675), child labour (0.860), and malnutrition (0.711–0.771) show strong positive associations. Correlation analysis confirms that socioeconomic development fundamentally drives lower dependency ratios. According to the analysis, demographic transitions can still be achieved through coordinated policy action. Kerala's success shows that even regions with limited resources can achieve excellent results through sustained investment in female education and health. Female literacy is the most powerful intervention variable, with states with a female literacy rate of 75%+ showing ratios 20–30 points lower than comparable states with

45–55% literacy.

India's demographic destiny is not predetermined; decisions made immediately will determine whether the nation captures a national demographic dividend or experiences deepening regional polarization, locking some states into permanent poverty cycles for decades. The next 15 years (2025–2040) are critical for transforming demographic pressure into a demographic dividend across all regions.

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