

Economic, Environmental, and Health Impacts of Urbanization in India

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Abstract

Urbanization is an increasing global phenomenon that, while improving economic growth, has been linked to many adverse health and environmental impacts. In developing countries, such as India, these impacts are even more prominent, as they lack the resources and infrastructure to address the consequences of rapid urbanization. The goal of this study is to explore the economic growth that has occurred as a result of urbanization in India, as well as to show some of the health and environmental impacts of urbanization. In order to do this, GIS was used to compare percent urbanization to other variables, such as energy consumption, GDP, and respiratory illness to determine if urbanization is related to these variables. The results support the idea that urbanization is related to environmental degradation and negative health consequences in India. This relationship suggests the need for policy measures aimed at regulating the impacts of urbanization in India in order to promote land conservation and "smart growth" in these urban areas.

Introduction

Urbanization is currently occurring at an unprecedented pace in India. Since Independence, the urban population has grown six-fold, and a recent report predicts that India will have 87 cities with a population of over one million by 2030, with a predicted 590 million people living in cities. Though this rapid urbanization has allowed for economic growth within the country, it also has caused a number of adverse impacts related to health and environmental degradation (Sankhe et al 2010).

Between now and 2030, the economy is estimated to grow 7.4% annually. Coupled with economic growth, the emergence of a young generation is expected to create 119 million jobs in cities. Because of this development, it is expected that 70% of GDP will come from cities, meaning that there is an unprecedented potential for economic growth and further development in the urban areas of India (Sankhe et al 2010).

Our study focuses on the economic, health, and environmental impacts of urbanization in India. By analyzing past data, we can better understand the trends related to urbanization and gain insight into what can be done in the future to address its negative impacts, while sustaining economic growth in India.

Methods

In order to analyze the impacts of urbanization on the economy, environment, and health in India, we collected state-level data from various sources, including the India Ministry of Statistics, World Prospects 2007, and India National Health Profile 2009. We imported this data into GIS, along with a shapefile of India. In doing this, we were able to spatially map and compare percent urbanization to other variables to understand the relationships. Excel and SigmaPlot were also used in analysis.

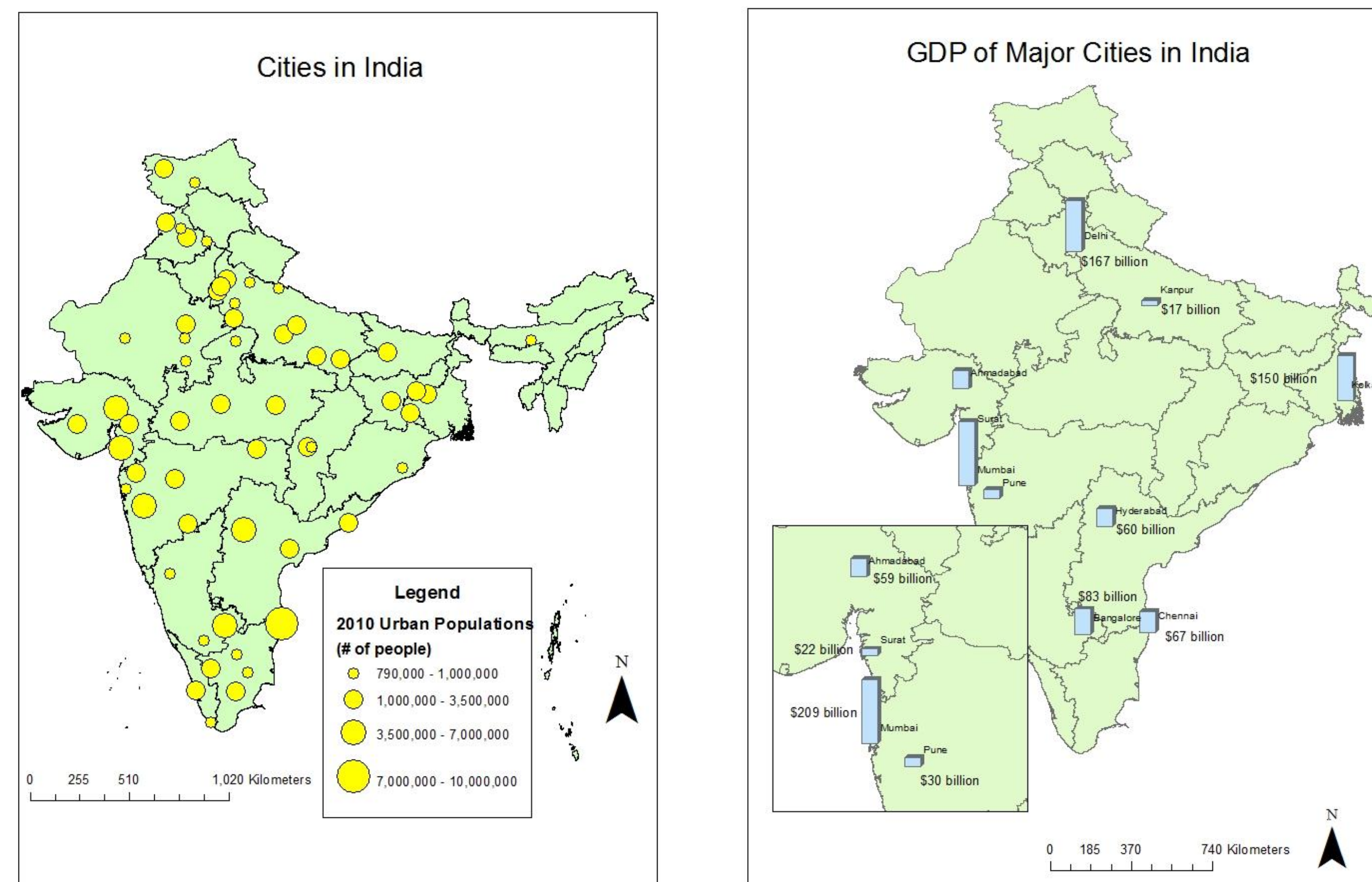


Figure 1 and Figure 2

This map illustrates the distribution of large cities (population greater than 750,000) throughout India. It shows that there is significant distribution of large cities within the country. As of 2010, there were 42 cities with a population greater than 1 million. The GDPs of the ten largest cities are modeled in figure 2. Mumbai accounts for 25% of all industrial output in the country, while New Delhi accounts for 4.94% of national GDP (New Consumer Dynamics 2006).

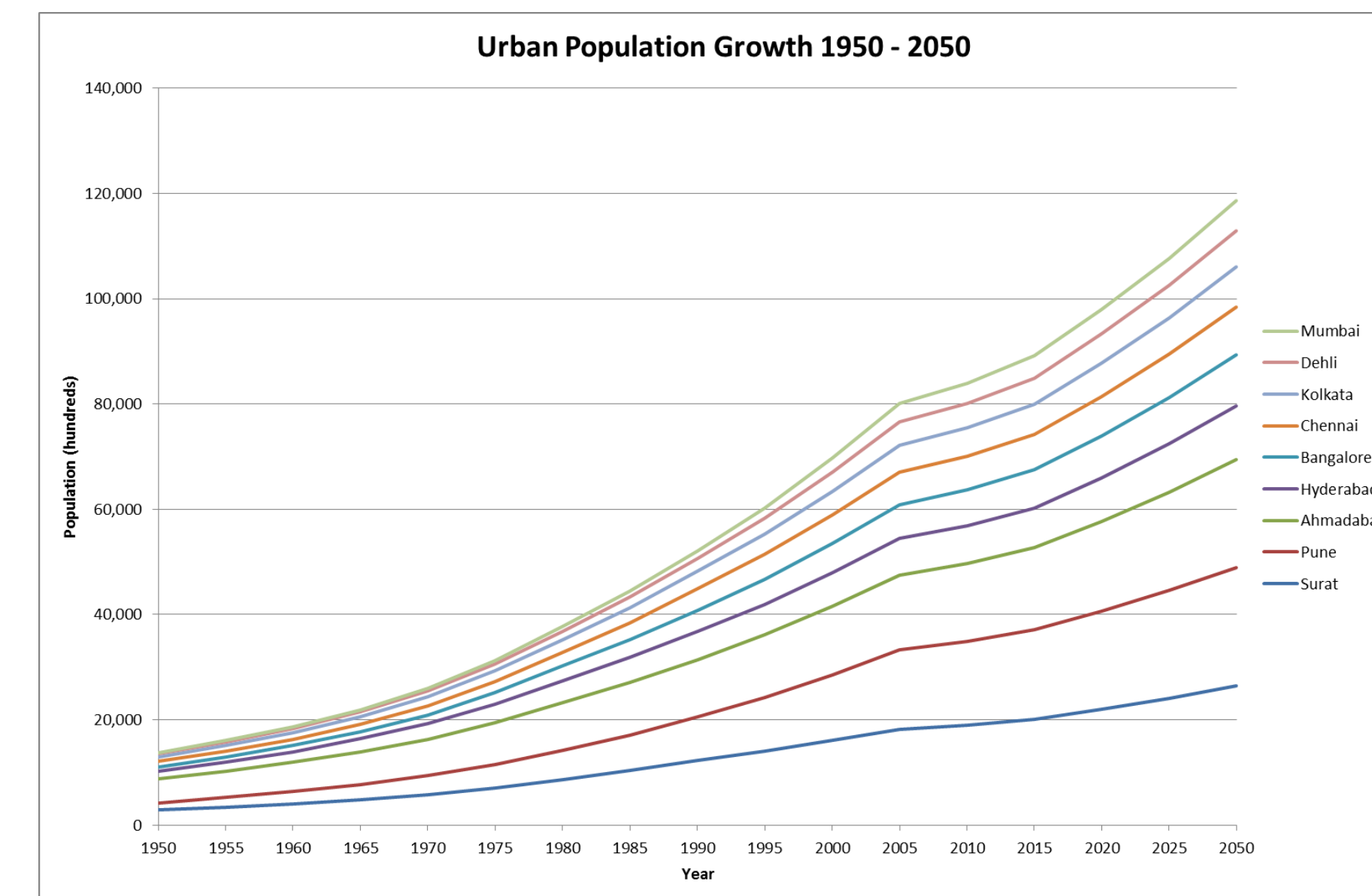


Chart 1

This chart represents the growth rate of the ten most populous cities in India from 1950 to 2050. It shows that cities have steadily grown since 1950 and will continue to rapidly grow in the future. The data predicts the emergence of three mega-cities (population over 10 million), Mumbai, Delhi, and Chennai.

Vehicle Use

One major result of urbanization is increased use of motor vehicles, resulting in increased air pollution and greenhouse gas emission, which has both health and environmental implications. In India, the use of motor vehicles is increasing at a rate of 8% per year (Badami 2005).

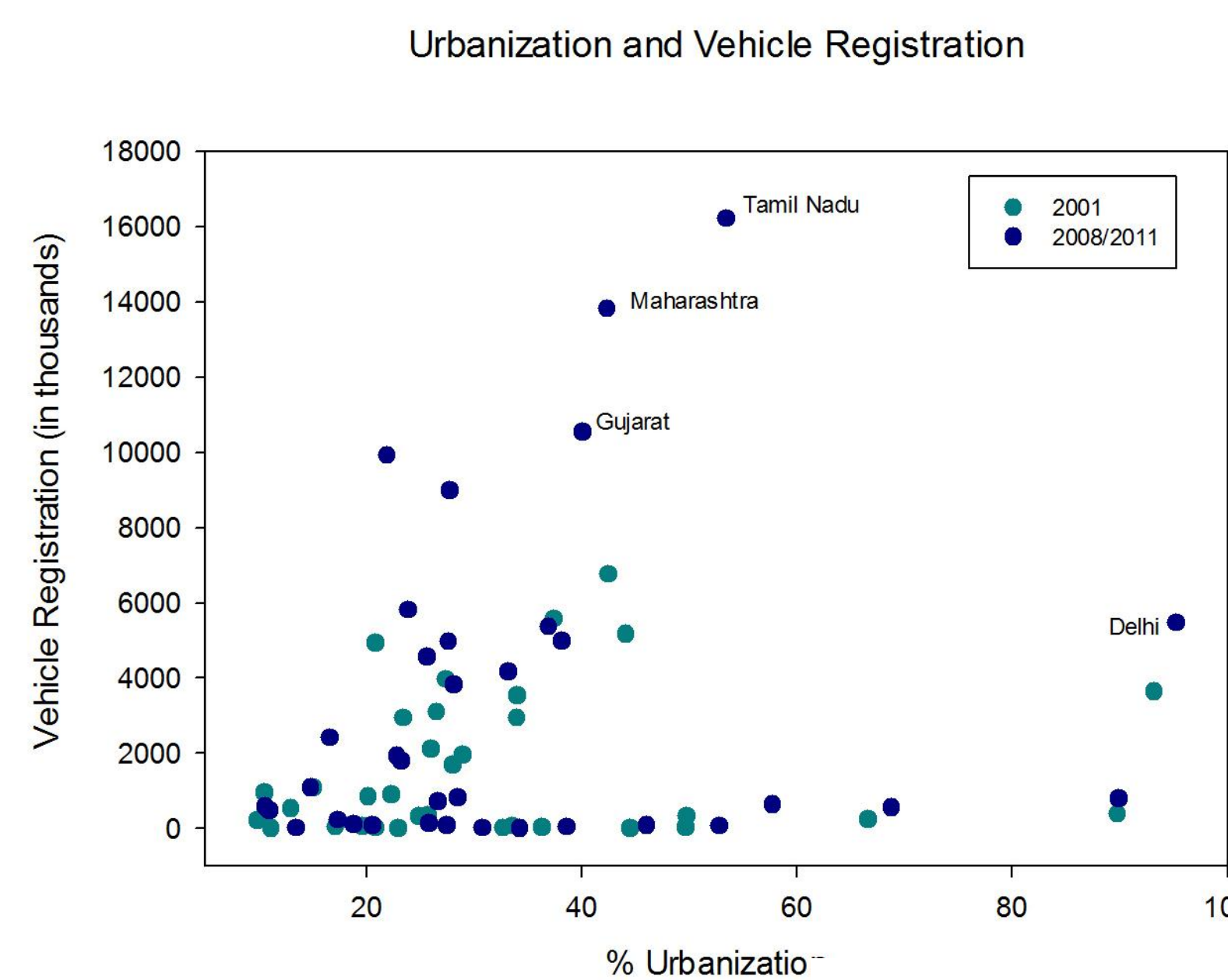


Chart 2

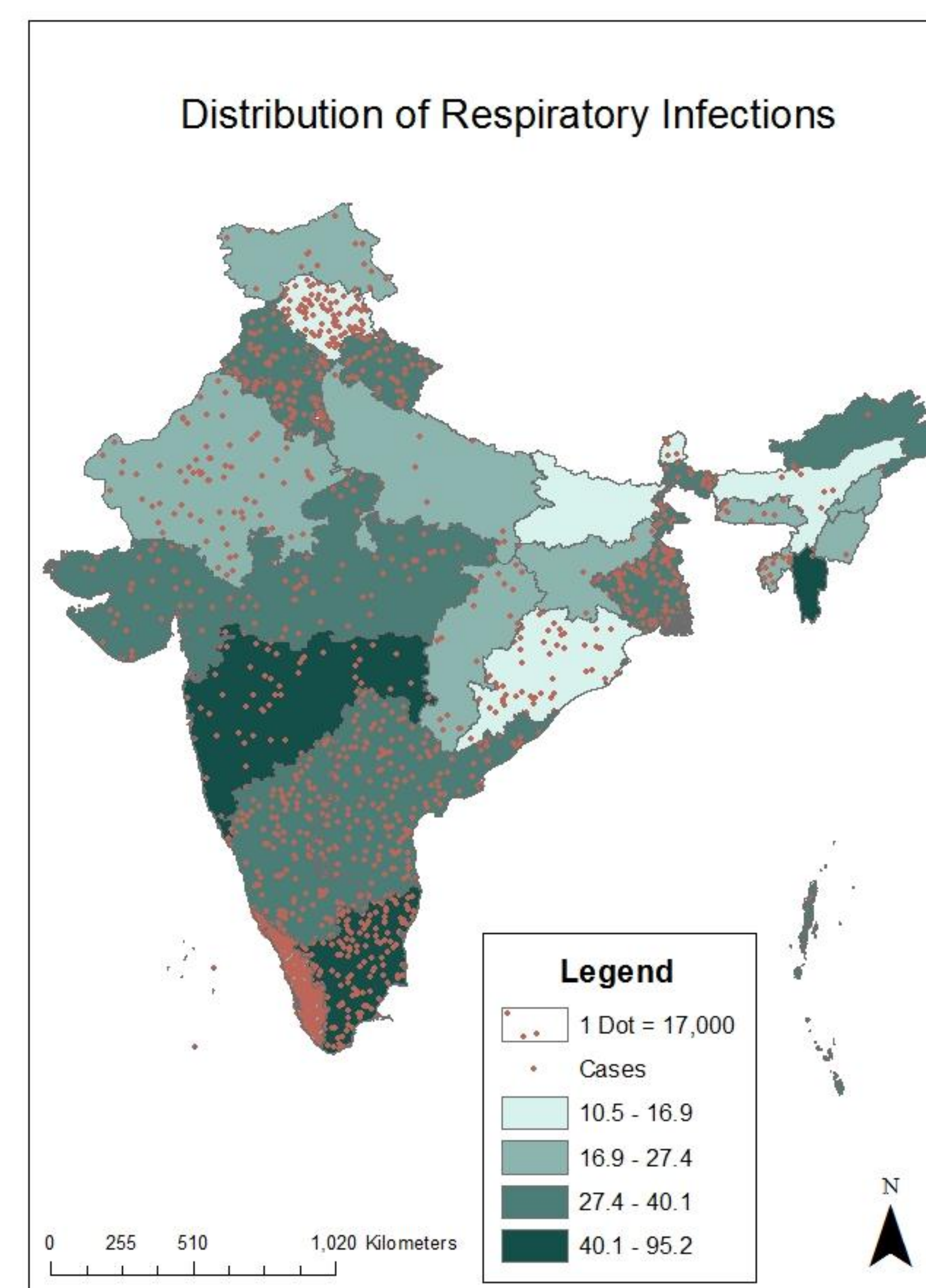
In this figure, each dot represents a state in India. The graph shows that, in general, as percent urbanization increases, vehicle registration increases. Additionally, between 2001 and 2008, total number of registered vehicles increased from 55,024,000 in 2001 to 111,399,000 in 2008 (India Ministry of Statistics 2008).

Health

In terms of health impacts, increased air pollution causes increased morbidity and mortality (Frumpink 2002). Data from WHO, for example, indicates that air pollution is responsible for about 673,000 deaths per year in India (Nagdeve 2004). Additionally, increased automobile use leads to automobile crashes and pedestrian injuries and fatalities (Frumpink 2002). In India, the death toll due to motor vehicle accidents rose from around 56,400 deaths in 1991 to about 80,000 deaths in 2001 (Badami 2005).

Figure 3

This map shows that states in India with a higher percentage of urbanization also have a higher prevalence of respiratory infection.



Environment

Not only does increased urbanization lead to increased motor vehicle activity, but it also causes increased electricity use. Increased urbanization causes increased energy use as result of new industrial production methods and lifestyle changes of city-dwellers, as they become more energy consumptive (Jones 1989). Environmentally, there are many negative consequences of increased air pollution and greenhouse gas emission. First of all, increased greenhouse gas emission contributes to global climate change. Locally, increased air pollution leads to damage to soils, vegetation, and surrounding forest and aquatic ecosystems, as well as groundwater pollution (Badami 2005).



Image 1

Source: NASA Earth Observatory
This image shows the distribution of light in the Indo-Gangetic Plain. It shows that electricity use is concentrated in a few major cities. In India, though urbanization has increased energy use in cities, a large percentage of the country still lives in energy poverty, with 89% of urban and 49% of rural populations having access to electricity (Jiang 2008).

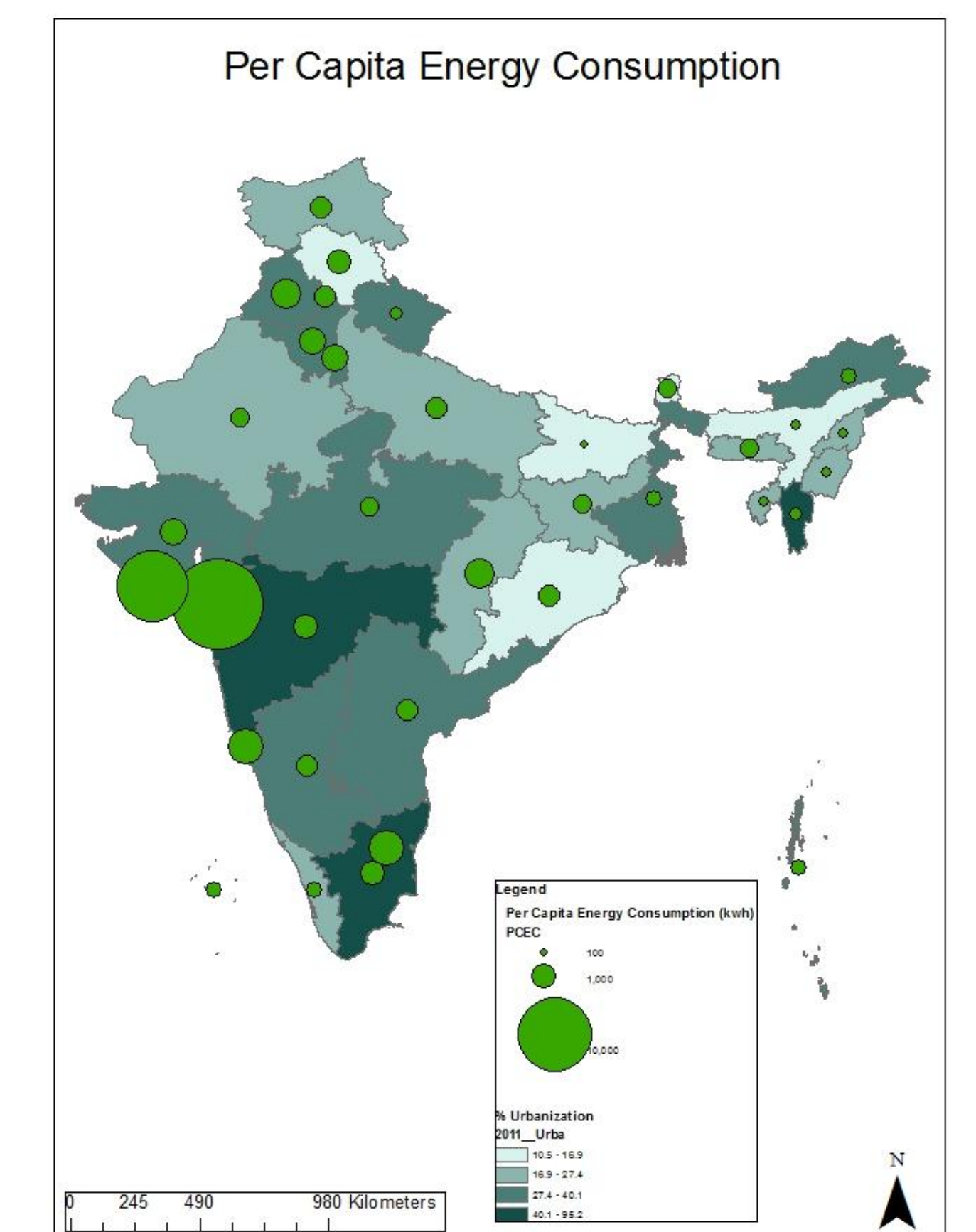


Figure 4

This map shows that, in areas with higher percentages of urbanization, per capita energy consumption is also higher. Energy use is especially high in the Mumbai and Pune metropolitan areas.

Conclusion

Urbanization in India is inevitable and ongoing, and will only continue to increase with population growth. Without equitable economic growth, urbanization will further increase disparities in the country, with those who are impoverished bearing the majority of the negative impacts of urbanization (Jiang 2008). The rapid speed of India's urbanization poses unprecedented managerial and political challenges, because policy makers must address the adverse health and environmental impacts, while sustaining economic growth into the future. Therefore, policy measures that address the impacts of urbanization are needed in urban areas in order to promote "smart growth" within the country, where economic growth is sustained, while reducing health and environmental impacts.

Sources

- Badami, M. (2005). The Urban Transport in Challenge in India. IDPR 27(2), 169-174.
- Frumpink, H. (2002) Urban Sprawl and Public Health. Public Health Reports 117, 201-217.
- Jones, D. W. (1989, October). Urbanization and energy use in economic development. The Energy Journal, 10(4), 29+.
- Jiang, L. (2008). Population, Urbanization, and the Environment. World Watch, 21(5), 34-39. Retrieved from EBSCOhost.
- Nagdeve, D. A. 2004. Urban air pollution and its influence on health in India. IIPS Mumbai, 1(3). ENVIS Center.
- New Consumer Dynamics: The Impact on Modern Retailing. (2006-2007). PricewaterhouseCoopers.
- Sankhe, S., Vittal, I., Dobbs, R., Mohan, A., Gulati, A., Ablett, J., Gupta, S., Kim, A., Paul, S., Sanghvi, A., and Sethy, G. (2010) India's Urban Awakening: Building Inclusive Cities, Sustaining Economic Growth. McKinsey Global Institute.
- Total Registered Motor Vehicles in India (State-Wise). (2008) India Ministry of Statistics. http://mospi.nic.in/Mospi_New/site/Home.aspx.