



सत्यमेव जयते  
Government of India

VOLUME-2

2016 - 17

# ECONOMIC SURVEY





# Economic Survey 2016-17

Volume 2

Government of India  
Ministry of Finance  
Department of Economic Affairs  
Economic Division  
August, 2017

## Acknowledgements

The Economic Survey is a result of teamwork and collaboration. Contributors to the Survey from the Economic Division and Office of CEA include: ArchanaS Mathur, H.A.C. Prasad, Sanjeev Sanyal, A. S. Sachdeva, Vijay Kumar, Rohit KumarParmar, G.S. Negi, Arun Kumar, Rajasree Ray, Antony Cyriac, R. Sathish, P.K. Abdul Kareem, Ashwini Lal, Nikhila Menon, AshutoshRaravikar, Rangeet Ghosh, Abhishek Acharya, Mrityunjay Jha, Rabi Ranjan, Vijay Kumar, M. Rahul, Aakanksha Arora, Gaurav Kumar Jha, Dipak Kumar Das, Kanika Wadhawan, Abhishek Anand, Sonal Ramesh, Subhash Chand, Riyaz Ahmad Khan, Shobeendra Akkayi, Salam Shyamsunder Singh, Md. AftabAlam, Pradyut Kumar Pyne, Narendra Jena, Sanjay Kumar Das, Vijay Kumar Mann, Parveen Jain, Rajesh Sharma, Amit Kumar Kesarwani, Mritunjay Kumar, Gayathri Ganesh, Josh Felman, Tejaswi Velayudhan, Rohit Lamba, Siddharth Eapen George, Sutirtha Roy, Shoumitro Chatterjee, Sid Ravinutala, Amrit Amirapu, M R Sharan, Parth Khare, Boban Paul, Dev Patel, Justin Sandefur, Ananya Kotia, Navneeraj Sharma, Kapil Patidar, and Syed Zubair Husain Noqvi.

The Survey has greatly benefitted from the comments and insights of the Hon'ble Finance Minister Shri Arun Jaitley and the Ministers of State for Finance - Shri Santosh Kumar Gangwar and Shri Arjun Ram Meghwal.

The Survey has also benefitted from the comments and inputs from officials, specifically Arvind Panagariya, Nripendra Misra, P K Mishra, P K Sinha, Urjit Patel, Ashok Lavasa, Hasmukh Adhia, Subhash C. Garg, Anjuly Chib Duggal, Neeraj Gupta, Amitabh Kant, Sushil Chandra, Vanaja N Sarna, Shaktikant Das, Bibek Debroy, Amarjeet Sinha, Nagesh Singh, T V Somanathan, Tarun Bajaj, Brajendra Navnit, Anurag Jain, Alok Shukla, Amitabh Kumar, AnandJha, Ajay Bhushan Pandey, A P Hota, Viral Acharya, Ramesh Krishnamurthy, Pankaj Batra, Prashant Goyal, Dr. Saurabh Garg, Dr. M.S. Sahoo, Ranjeeta Dubey, Anindita, Dr. Alka Bhargava, Sudha P. Rao, T Rajeswari, David Rasquinha, S. Prahalathan Iyer, Ashish Kumar, Sreejith K B, Rupali Ghanekar, Bishakha Bhattacharya, Nirmala Balakrishnan, Ritu Prakash Singh, Chetna Shukla, Indranil Bhattacharyya, Amit Agrawal, H.K. Srivastava, Saurabh Shukla, R. Vyasan, Vivek Chaudhary, Anand Jha, Naveen Kumar, Prakash Kumar and GSTN team, Bijay Prusty, Somit Dasgupta, Vandana Aggarwal, Ritu Maheshwari, Mayur Maheshwari, P.C. Cyriac, Rahul Aggarwal, Navin Kumar Vidyarthi, Dipak Kumar and a number of external collaborators including Dr. Prodipto Ghosh, Dipak Dasgupta, Swati Agarwal, Deepak Kumar, Pranjul Bhandari, Sajjid Chinoy, Pankaj Batra, Devesh Kapur, Harish Damodaran, PratapBhanu Mehta, Ashish Gupta, Kush Shah, Shishir Bajjal, Samantak Das, Mayank Shekhar, Akhilesh Awasthy, Kshitij Batra, Reuben Abraham, Vaidehi Tandel, Jessica Seddon, Pritika Hingorani, Sagar Gawade, Rajamohan, Jyoti Tirokdar, Sharad Shingade, Suman Kumar and Priam Pillai, Rajeev Malhotra, Ranen Banerjee, Manoranjan Pattanayak, Mehul Gupta, Amitabh Khosla, J D Giri, Komal Chouhan, Abhilasha Arora, Gokul Arunkumar, Shivang Dongra, Punith, Puneet Kumar and Tirthankar Mukherjee.

Apart from the above, RBI, various ministries, departments and organisations of the Government of India made contributions in their respective sectors. Able administrative support was given by S. Selvakumar, R P Puri, R K Sinha, N Srinivasan, R Vijaya Kumari, V K Premkumaran, Gurmeet Bhardwaj, Pradeep Rana, Sadhna Sharma, Jyoti Bahl, Sushil Sharma, Manish Panwar, Sushma, MunaSah, Suresh Kumar, Aniket Singh, Jodh Singh, Puneet, Ombir, R R Meena, Subash Chand, Raj Kumar and other staff and members of the Economic Division and the Office of CEA. R B Aniyeri, SuwarchaVasudev and their team of translators along with Prof. B.S. Bagla and Santosh Kumar carried out the Hindi translation. Hindi typing was done by Pankaj Kumar, Y.S. Rathor, Meena Pant, K.K. Wadhawan. The cover page for the Survey was designed by Jacob George of George Design, Kochi, assisted by Vineeth Kumar. Viba Press Pvt. Ltd., Okhla undertook the printing of the English and Hindi version of the Survey.

Special thanks to the people who kept us caffeinated throughout - Sitaram and Aditya for coffee and Satish jee for tea.

Finally, the Economic Survey owes a huge debt of gratitude to the families of all those involved in its preparation for being ever so patient and understanding and for extending their unflinching support and encouragement throughout its preparation.

**Arvind Subramanian**  
(Chief Economic Adviser)  
Ministry of Finance  
Government of India

## PREFACE

This volume of the Economic Survey-a historic first because it is the second to appear within a year-needs explanation, especially for an audience that might be Survey-addled.

Prior to 2014-15, the Economic Survey had a more analytical/policy chapter attributable to the Chief Economic Adviser (CEA). The Survey was tabled, and hence became public, on the day before the Union Budget presented by the Minister of Finance.

In the last two years, the pattern changed. There were two volumes that were released on the day before the Budget. While Volume 1 was analytical, and policy and ideas-oriented, the second volume featured a backward-looking review and included historic data tables.

This year, the pattern has changed yet again but forced by the advancement of the Budget calendar from early March to early February. The backward-looking review of past years was always a little awkward because data availability limited the review to the first three quarters of the year gone by. Accordingly, this time it was decided to split the Economic Survey into two volumes: Volume 1 as in the previous two years continued to be analytical/policy-oriented and was released just before the Budget. Volume 2 could come out at a time when data for the full year gone by became available (also in the process replacing the Mid-Year Economic Analysis that used to come out in December). That data availability largely dictated the timing of the tabling of Volume 2 in Parliament.

However, since Volume 2 appears almost half a year (an event-rich period with GST implementation, demonetization impacts, farm stress etc.) after Volume 1, a fresh macro-economic update with an analytical review of the pressing issues seemed necessary. This update-contained in Chapter 1 ("State of the Economy") in this volume-like its counterparts in the years before 2014-15 can be attributed to the CEA, with the Economic Division taking the lead for the other chapters. It is in this respect that this volume of the Survey is more akin to the Surveys prior to 2014-15. Whether this practice of issuing two volumes continues will depend in part on the future timing of the Budget calendar.

Another innovation this year is that along with the Economic Survey, electronic versions of the data-going back to the 1950s in some cases-will also be released. This should greatly facilitate teaching, analysis, and research by the public at large.

A final point to note is that, in response to strong demand from a wide cross-section of users, the Hindi version of Volume 1 is being re-issued in a fresh translation by Professor Bagla of Delhi University.

As always, deep gratitude is owed to all those, especially the staff of the Economic Division, for their efforts in bringing out the second volume of this year's Survey.

**Arvind Subramanian**  
Chief Economic Adviser  
Ministry of Finance, GOI

# Industry and Infrastructure

*A higher industrial growth supported by well-connected infrastructure facility is vital for India to maintain the momentum of higher sustainable economic growth. Moderation of industrial growth in 2016-17 can be attributed to decelerated global economic growth, twin balance sheet problem and depressed private investment cycle. Meanwhile, the eight core infrastructure supportive industries have achieved reasonable growth in the same period. The Government has initiated a number of measures in crucial sectors to accelerate higher manufacturing growth and create jobs for millions. The Government's commitment to provide qualitative physical infrastructure has been reflected in global ranking of the World Bank's 2016 Logistics Performance, where India jumped to 36th rank in 2016 from 58th rank in 2014. Although initiatives are being taken for bringing well-structured infrastructure projects, yet some issues continue to constrain the development of road, railways, port, civil aviation, telecom and power sector etc. It is some of these challenges that are discussed in the chapter. The chapter has also attempted to make an initial assessment of the programme Ujval DISCOM Assurance Yojana (UDAY) in addressing some of the problems with the power sector.*

## TRENDS IN INDUSTRIAL SECTOR

8.1 The Industrial sector in India, including construction, is an important contributor to the growth with the sector accounting for 31.1 per cent of the total Gross Value Added (GVA) in 2016-17. A strong and a robust industrial and manufacturing sector helps in promoting domestic production, exports and employment, all of which can be catalysts for higher growth in the economy.

8.2 As per latest Central Statistics Office provisional data, the overall growth of GVA for 2016-17 is estimated at 6.6 per cent, and the industrial performance has declined from 8.8 per cent during 2015-16 to 5.6 per cent in 2016-17 (Table 1). This is against the

background of decelerated overall global economic activity.

8.3 The slowdown of manufacturing sector of the economy can be attributed to the Twin Balance Sheet (TBS) problem (Economic Survey 2016-17 Vol I, Ch.4). The TBS refers to impaired balance sheets of public sector banks due to higher Non-Performing Assets (NPAs) and precarious financial position of corporates slowing down credit offtake, thereby leading to a further slowdown in Gross Fixed Capital Formation (GFCF) and hence industrial growth. Credit to industry in 2016-17 has contracted by 1.6 per cent, while GFCF has slowed down to 2.4 per cent in 2016-17 as compared to 6.5 per cent last year.

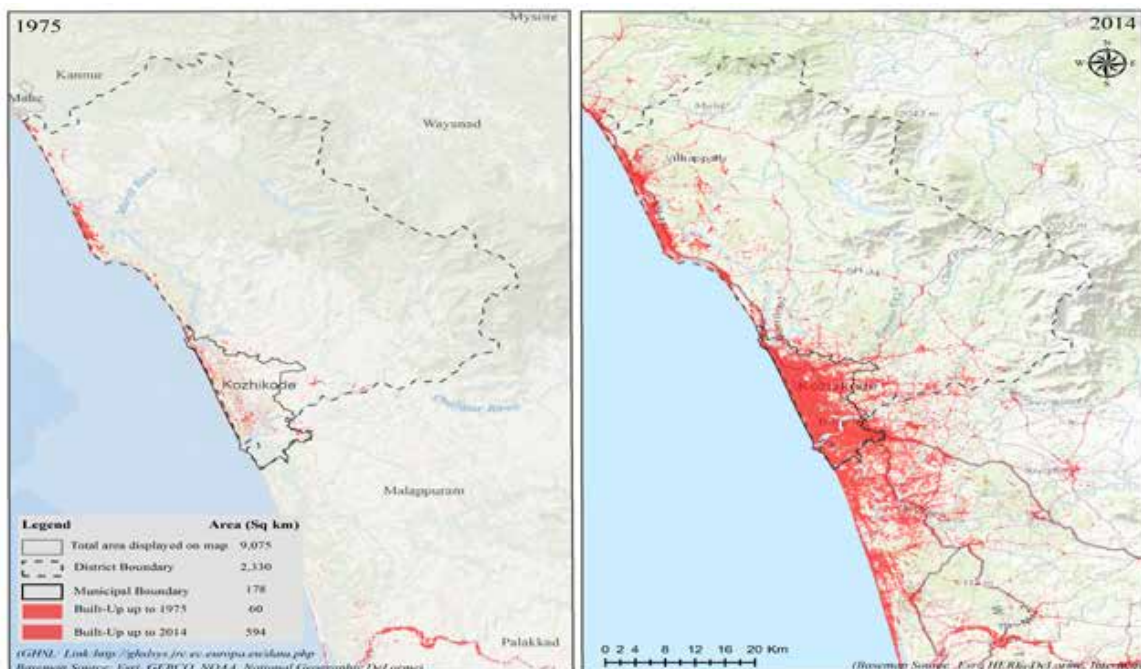
**How Urban is India?**

8.86 India is rapidly urbanizing, but does the 2011 census based urbanisation rate of 31.2% fairly capture it? Urbanisation in India is officially defined by two metrics: (i) Administrative definition: which considers the population living in areas governed by urban local bodies such as municipal corporations, municipal councils or notified town committees. These urban settlements governed by urban local bodies are referred to as “statutory towns”. Using the administrative definition, India was approximately 26% urban in 2011. State governments determine the administrative status of a settlement. By default all settlements are rural and become urban only after the state government converts them, following a requisite legal process. While there are guidelines for classifying a settlement as urban, these are not binding on state governments. (ii) Census definition: Under this definition, the population living in statutory towns described above as well as census towns together constitutes the

urban population. Census towns are a category created by the census that fulfill the following three criteria: population of at least 5,000; density of at least 400 persons per square kilometer, and at least 75% of the male main working population engaged in non-agricultural activities. India stood at 31.2% urban in 2011 according to the census definition.

8.87 As India rapidly urbanises, these traditional measures are inadequate to capture the complex phenomenon, especially when we study this at the state or local level. To begin with, there is a large difference between urbanization as defined by the two official definitions. For example, Kerala is 15% urban by the administrative definition, but 47.7% by the census definition. The built-up density on ground processed from the satellite map of Kozhikode shows how the urban expansion ignored the administrative boundary between 1975 and 2014. Other definitions reveal even larger gaps.

**Map 2. Built-up Area in Kozhikode Metropolitan region 1975 vs 2014**



Source: IDFC Institute, Mumbai.

8.88 In countries like Ghana and Qatar, all settlements with 5000+ population are deemed urban. India would be 47% urban in 2011 by this definition. In Mexico and Venezuela, a 2500+ threshold is employed. India would be 65% urban in 2011 by this definition. Kerala is 99% urban both by the 5000+ and 2500+ population definitions. A 2016 World Bank report uses an agglomeration index to measure urbanisation and finds that more than half the population in India is urban.<sup>3</sup> Research by Jana, Sami, and Seddon finds that if we relax the population size and occupation categories and only use

the density criteria of 400 persons per square kilometer, India is around 78% urban.<sup>4</sup> It finds that even if we use density criteria of 800 persons per square kilometer, India will still be more urban (55%); far more than the current official numbers suggest. The point is that different definitions give very different answers and the appropriateness of a particular framework really depends on the application. Also note that the urbanization is not black-and-white as there are many shades of semi-urban settlements. Thus, one needs to be careful of making blanket assumptions about the nature of urbanization in India.

**Table 14. State Wise Urbanization Rate in 2011 as per different definitions**

State Names	Admin	Census	5000+ pop	2500+ pop
Jammu & Kashmir	23.44	27.38	40.35	61.58
Himachal Pradesh	9.59	10.03	10.02	15.82
Punjab	34.44	37.48	46.83	64.49
Chandigarh	91.11	97.25	99.21	100.00
Uttarakhand	24.66	30.10	40.22	51.20
Haryana	31.01	34.88	56.79	78.90
Nct Of Delhi	67.92	97.50	98.56	99.70
Rajasthan	22.93	24.87	35.08	52.69
Uttar Pradesh	20.37	22.27	37.10	60.12
Bihar	10.80	11.29	48.61	72.19
Sikkim	24.19	25.15	27.79	41.18
Arunachal Pradesh	22.66	22.94	21.50	24.60
Nagaland	25.55	28.86	38.75	56.84
Manipur	24.77	32.45	41.90	59.51
Mizoram	52.11	52.11	50.64	58.63
Tripura	18.26	26.17	57.77	85.26
Meghalaya	12.67	20.07	21.42	26.81
Assam	10.64	14.10	21.08	43.42
West Bengal	23.11	31.87	50.71	70.64
Jharkhand	16.08	24.05	29.54	44.22
Odisha	14.24	16.69	19.56	33.10
Chhattisgarh	22.27	23.24	25.19	38.92
Madhya Pradesh	25.85	27.69	33.24	46.34
Gujarat	38.37	42.60	56.71	74.55

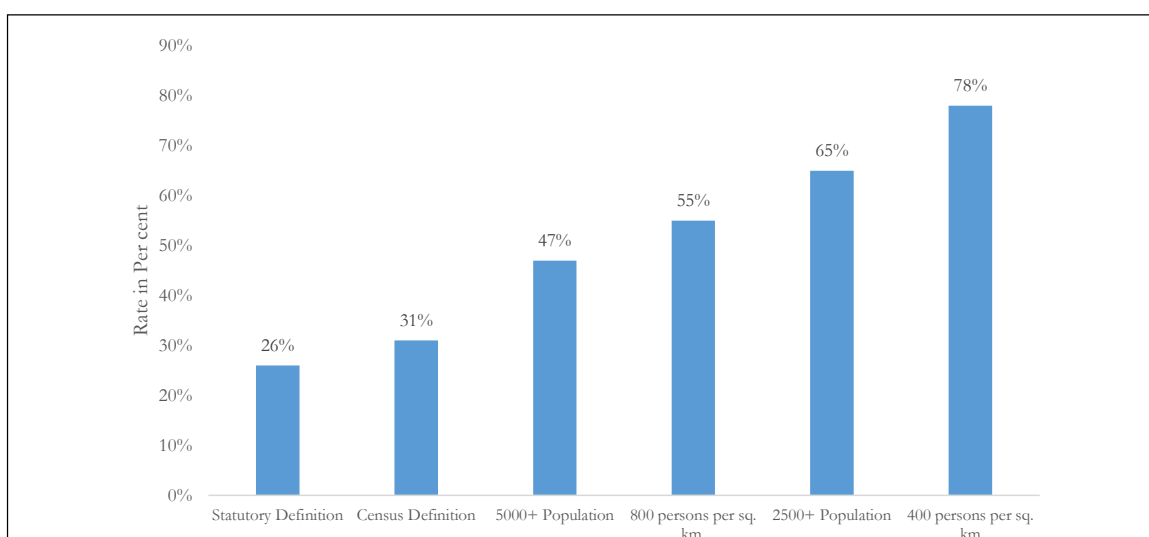
<sup>3</sup> See: <http://www.worldbank.org/en/region/sar/publication/urbanization-south-asia-cities>.

<sup>4</sup> See: <https://www.theigc.org/wp-content/uploads/2014/08/Arindam-Jana.pdf>.

State Names	Admin	Census	5000+ pop	2500+ pop
Daman & Diu	28.07	75.17	89.87	95.15
Dadra & Nagar Haveli	28.59	46.72	62.22	88.83
Maharashtra	41.63	45.22	56.39	69.55
Andhra Pradesh	27.20	33.36	57.31	77.88
Karnataka	36.28	38.67	51.35	67.17
Goa	27.56	62.17	66.64	85.74
Lakshadweep	0.00	78.07	82.88	95.85
Kerala	15.71	47.70	99.22	99.89
Tamil Nadu	41.35	48.40	65.86	83.73
Puducherry	59.96	68.33	86.02	96.33
Andaman & Nicobar Islands	28.39	37.70	40.35	56.53
All India	26.31	31.16	47.20	64.94

Source: IDFC Institute, Mumbai and Census of India, 2011.

Figure 28. Alternative Definitions of Urbanisation Rate



Source: IDFC Institute, Mumbai and Census of India, 2011

Note: Percentage of India that was Urban in 2011 according to the different definitions

### Using Satellite Data

8.89 With recent advances in remote sensing technology and machine learning for processing satellite images, we can get much more granular data on how urbanisation is happening across India (see map 3). Based on publically available data from the Global

Human Settlement Layer (GHSL),<sup>5</sup> we look at how built-up areas show the evolution of human settlements across India since 1975. It is also possible to disaggregate official census population numbers according to the density and form of these settlements to get granular population figures across the country.

<sup>5</sup> See: <https://ec.europa.eu/jrc>.



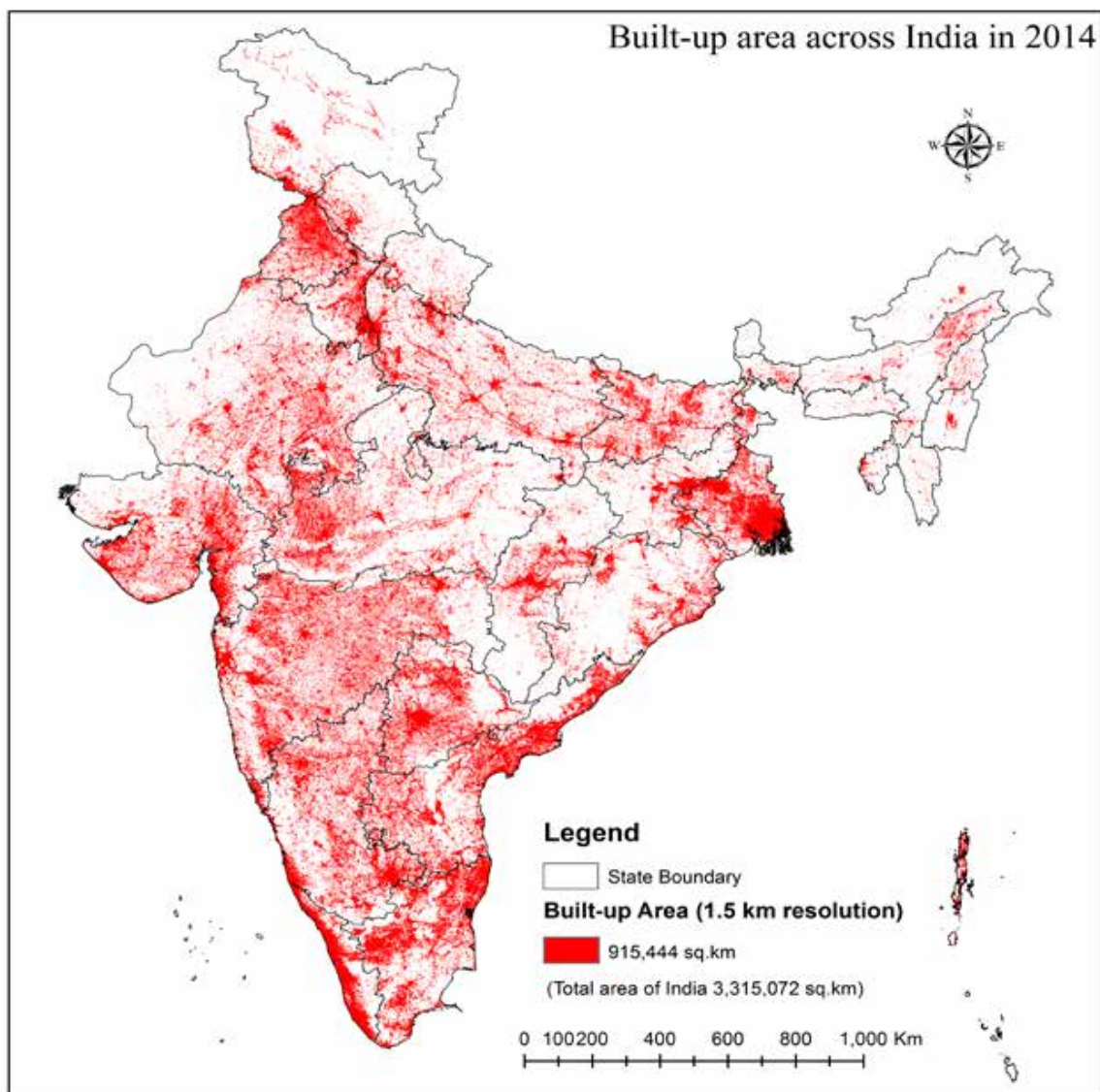
8.90 Using these satellite image datasets, we can then apply spatial definitions to classify urban areas. For instance, the Joint Research Center of the European Commission Science Hub, that generates the GHSL data, defines “high density clusters” (HDCs) as those areas that meet all of the following criteria:

- a) 4 contiguous cells with at least 1,500 persons per square kilometer,
- b) Minimum of 50,000 persons per cluster, and

c) Density of built-up area greater than 50%

8.91 Based on this more detailed data and scientific definition of High Density Settlements, India was 63% ‘urban’ in 2015 -- more than double the urbanization rate estimated by the 2011 Census. Moreover, we can go into a much greater level of spatial detail with this data to uncover important insights for promulgating expeditious public policy at center, state and urban local body level.

**Map 3. Built-up area across India in 2014**



#### **APPENDIX 4. EXPLANATION OF SATELLITE IMAGE EXTRACTION & PROCESSING**

Primary Data Source: The built-up analysis has been conducted using the processed satellite imagery from the Global Human Settlements Layer (GHSL). Extracted and processed by the Group on Earth Observations at the European Commission, GHSL is constructed using a combination of different satellite imagery sources collected over the last several decades. This is in the form of built up maps, population density maps and settlement maps. This information is generated with evidence-based analytics and knowledge using new spatial data mining technologies. This framework uses heterogeneous data including global archives of fine-scale satellite imagery, census data, and volunteered geographic information. The GHSL data is processed fully automatically and generates analytics and knowledge reporting objectively and systematically about the presence of population and built-up infrastructures. The current study uses four widely-spaced time intervals: 1975, 1990, 2000 and 2014. The approach is still experimental and we hope to refine it and apply it in many new fields and geographies.



© Government of India  
Controller of Publications  
Non-priced edition

Cover Design by Jacob George of George Design, Kochi

Printed by Viba Press Pvt. Ltd.  
C-66/3, Okhla Industrial Area,  
Phase-II, New Delhi-110020