

# BHUBANESWAR BECOMES 0.5 DEGREE C HOTTER DUE TO URBANISATION

Relevant for: Indian Society | Topic: Urbanization, their problems and their remedies incl. Migration & Smart Cities

Hot days: The local surface temperature in large cities in Odisha, such as Cuttack and Bhubaneswar, has increased by 40-50% during the period 2001-2010. | Photo Credit: [Ashoke Chakrabarty](#)

How urbanisation of cities in the last decade can sharply increase the local temperature has been well documented by a recent study undertaken by researchers at the Indian Institute of Technology (IIT) Bhubaneswar.

Blame it on increased urbanisation, the local surface temperature in large cities in Odisha — Cuttack and Bhubaneswar — has increased by as much as 40-50% during the period 2001-2010. While temperature has increased by about 0.9 degree C due to regional warming, which is a global phenomenon, urbanisation or changes in land use and land cover alone has contributed 40-50% of that increase in these cities. In other words, there has been a 0.5 degree C increase in absolute local temperature in large cities in the State during the period 2001 to 2010 solely due to urbanisation.

In the case of smaller cities and town in the State of Odisha, the change in local warming caused by urbanisation or changes in land use and land cover has been about 25%.

The team used 30 years of surface temperature measurements taken from over 22 sites over the state of Odisha coupled with Earth Observation data and model output to explore the effect of land use land cover and its changes.

“When compared with rural areas, the local warming in cities in Odisha is double due to urbanisation,” says Dr. V. Vinoj from the Institute’s School of Earth, Ocean and Climate Sciences and corresponding author of a paper published in the journal *Scientific Reports*. “The local warming due to urbanisation in Odisha in 2001-2010 is comparable to any other developed region of the world.”

The 0.5 degree C increase in local temperature in Bhubaneswar can be traced back to rapid urbanisation of the city in about 15 years. An earlier study by the team led by Dr. D. Swain from IIT Bhubaneswar and a co-author of the latest paper had found 83% increase in urbanisation of Bhubaneswar between 2000 and 2014. The rapid increase in urbanisation was at the cost of dense vegetation and crop fields. While dense vegetation reduced by 89%, crop fields shrunk by 83%.

The study shows that across the State of Odisha, changes in cropping pattern and urbanisation have together had a clear effect on long term temperature changes. For instance, the cropping pattern has seen a clear shift from Kharif crops (July-October) to Rabi crops (October-March). Compared with 2004, Kharif crop cultivation area in 2010 had reduced by 28,000 sq. km, whereas there has been an increase of 38,000 sq. km in Rabi crop cultivation area during the same period.

The northeast part of the State has witnessed the greatest change in land use and land cover during the period 2001-2010. During the period 1991-2000, the western part of the State saw the

most change in land use and land cover causing more warming in that region. However, during the period 2001-2010, the trend shifted to northeast as changes in land use and land cover were more pronounced in that part of the State causing more warming in northeast Odisha.

“Our study provides crucial information for policy makers to understand the relative contribution from each land use type to surface temperature, we believe this information would help with future land use planning in the state of Odisha,” Prof. J. Dash from the University of Southampton, UK and a co-author of the paper says in a release.

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