Chapter 7 Urban Transition and Its Impact on Mesoscale Weather: A Review

Sudhansu S. Rath

b https://orcid.org/0000-0003-4529-3719 National Institute of Technology, Rourkela, India

Jagabandhu Panda

b https://orcid.org/0000-0002-4238-1820 National Institute of Technology, Rourkela, India

Srutisudha Mohanty b https://orcid.org/0000-0002-8642-6234 National Institute of Technology, Rourkela, India

ABSTRACT

Urban transition is an unstoppable process. Globally, several planning measures are taken by the city and country administration to control the sprawling process. Despite all the planning, most of the cities experience appreciable impact of urbanization on the localized weather parameters. This chapter summarizes the understanding relating to urban modification of localized weather, that is, changes in precipitation, temperature, and wind speed in the form of increase or decrease, their spatio-temportal distribution, urban heat island (UHI), and urban wind island (UWI). The impacts of the urbanization are primarily because of changes in landsurface characteristics due to the alteration of land use in a city. The urbanization effects on local or mesoscale weather could be studied both through observations and/or numerical modeling. The purpose of this chapter is to provide a review of most of the relevant studies carried out globally and with a special emphasis on India.

DOI: 10.4018/978-1-7998-2249-3.ch007

INTRODUCTION

Urban transition is broadly the shift from rural to urban land use (LU) and economically from agricultural to industrial, commercial, or service employment (Pannel, 1995). According to the United Nations (UN), globally, 55% percent of the population currently resides in cities, and this figure projected to be two-thirds of the world population by 2050 as the growing population concentrates in cities and towns in search of better livelihoods and opportunities (DESA, 2018). This process of urbanization gives rise to the expansion of existing cities to form mega cities and evolution of new cities, which accelerates the changes in existing land use and land cover (LULC). Studies suggest that the major causes of land cover (LC) changes are neither population nor poverty alone; rather, it is people's response to economic opportunities. Mostly, global factors are the main determinants of LU change as they are weakened by the local factors (Lambin et al., 2001). Besides these causes of urban transition, the development of an area as urban land takes place only when the post-development value of the land and the percentage growth rate of rent increases. Urban transition in the outskirts of core cities is directly affected by the emerging economy and due to foreign investments.





The global trends and rate of urbanization over different parts of the world illustrated in figure 1. The rate of urbanization found to be either stagnant or declining in other parts of the world except for Asia and Africa, where the rural to urban transition mostly occurs. However, the urbanization in African countries is driven by global historical process like population dynamics and rural-urban migration, both of which are stimulated by technological and institutional changes. 28 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: <u>www.igi-</u> <u>global.com/chapter/urban-transition-and-its-impact-on-</u>

mesoscale-weather/276109

Related Content

Theoretical and Technological Perspectives on Development of Information Monitoring System for Solving Complex Problems

Alexander Bershadskyand Andrey Berezin (2019). *Optimizing Regional Development Through Transformative Urbanization (pp. 288-306).*

www.irma-international.org/chapter/theoretical-and-technological-perspectives-on-developmentof-information-monitoring-system-for-solving-complex-problems/209661

Sustainable Development in Smart Cities and Smart Villages: An Indian Perspective

Kavita Srivastava (2022). Smart Cities, Citizen Welfare, and the Implementation of Sustainable Development Goals (pp. 83-104).

www.irma-international.org/chapter/sustainable-development-in-smart-cities-and-smartvillages/290126

Role of Image Processing in Agricultural Practices

Agrima Saxena, Ayush Bharadwaj, Usha Chauhan, Divya Sharmaand Priti Kumari (2023). *Smart Village Infrastructure and Sustainable Rural Communities (pp. 69-98).* www.irma-international.org/chapter/role-of-image-processing-in-agricultural-practices/324962

"Smart City": The Concept of Resolving the Contradiction Between Production and Urban Life

Vardan Mkrttchian, Yulia Vertakova, Yuri Treshchevsky, Natalya V. Firsova, Vladimir Plotnikovand Dmitry Y. Treshchevsky (2019). *Industrial and Urban Growth Policies at the Sub-National, National, and Global Levels (pp. 300-319).* www.irma-international.org/chapter/smart-city/222084

Advertising-Cities Face to Smart-Cities: The Trends of Integration Policies for Information New Technologies in Madrid

Leticia Jácomo (2018). *International Journal of E-Planning Research (pp. 22-35).* www.irma-international.org/article/advertising-cities-face-to-smart-cities/204623