

Preface

Study of urban growth is a branch of urban geography that concentrates on cities and towns in terms of their physical and demographic expansion. Understanding the urban patterns, dynamic processes, and their relationships is a primary objective in the urban research agenda with a wide consensus among scientists, resource managers, and planners; because future development and management of urban areas requires detailed information about ongoing processes and patterns. Analysis of urban patterns and processes, from remote sensing data, is a pertinent topic in the current urban research agenda. Detailed spatial and temporal information of urban morphology, infrastructure, population distributions, land-use/land-cover patterns and transitions among different land-uses/land covers are essential to be observed and understood. Urban remote sensing has attempted to provide such information. Determining the rate and the spatial configuration of urban growth from remote sensing data is not only a prevalent approach, rather it has a long history. However, the models and methods applied on remote sensing data, in terms of urban growth analysis, differ widely. Scientists and researchers hold different opinions. Many of them are still working to develop new methods and robust tools. This book is to document one such research.

This book aims to demonstrate some of the existing methods/models to test their fitness for the analysis of urban growth in the city of Kolkata, an important urban area from a developing country. In this study, four temporal satellite images of 10-yearly intervals (1980, 1990, 2000, and 2010) have been classified to determine the urban extent and built-up growth of Kolkata. These digitally classified imageries then have been used for the analysis. The analysis has been performed in consideration of jurisdictional boundary of Kolkata Municipal Corporation as well as the natural boundaries of the city. The main problem faced in this analysis was lack of temporal ancillary datasets that were essential for many of the widely practiced metrics. Therefore, the intention was to use some metrics that are less demanding in terms of data and computation. However, it has been found that most of these metrics are inferior in capturing insights into urban growth and sprawl. In this study, therefore, most of these metrics have been modified, either to overcome their limitations or to fit the study area.

Although the research documented in this book aims to analyze the urban growth of Kolkata, the book may be referred by urban researchers worldwide, especially those using remote sensing data for their analysis. They will benefit from the critical discussions and demonstrated methods/models.

This book comprises five chapters and three appendices. Each chapter starts with a brief of the topics to be covered within the chapter. [Chapter 1](#) provides an introduction and overview. It focuses on the background, significance, objectives, and methodological overview of the research. [Chapter 2](#) discusses the review of literature. This chapter briefly documents the patterns and processes of urban growth and sprawl, and application of remote sensing data in such analysis. It also critically reviews the analytical and quantification techniques of urban growth and sprawl from remote sensing data. Finally, it progresses toward the scope of the research. [Chapter 3](#) is intended to describe the data and methodology. It describes the data and software that have been used; how the remote sensing data have been rectified and classified; how the accuracy assessment has been performed; what were the steps involved in preparing the vector maps of Kolkata; how the census data have been encoded; and how the built-up data have been extracted. Analytical steps have also been explained in this chapter. Critical comments on the analytical techniques, their evaluations, and justifications on reliance have also been discussed. [Chapter 4](#) deals with the results obtained from the analysis. This chapter presents the built-up data in terms of classified images and also of matrices. It shows the status of urban growth and sprawl for the city of Kolkata. This chapter also aims to discuss the findings, make arguments on the methodology in terms of their merits and limitations, and construct logical statements. [Chapter 5](#) draws the conclusions and highlights the future scope of research and study. Appendix A briefly describes the study area, its geographical location and properties, administrative and urban structures. Appendix B furnishes the census data for each municipal ward and borough in Kolkata Municipal Corporation. Appendix C furnishes the derived built-up data for each borough of Kolkata Municipal Corporation, as well as for each natural boundary of the city.

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