

# Preface

This book is about urban resilience—how a city survives shocks, such as natural disasters, economic downturns, infrastructure failure, and even complexity overloads. Resilience is not just about recovery. It is also about transformation—the city can redefine itself as a new entity, one which emerges better and stronger after the shock. This book is a unique collection of contributions from mathematical scientists who study general theories of resilient systems and social scientists who try to come up with better urban design in real-world situations. Both approaches are equally important, and they need to be integrated to create resilient urban systems.

Part I of the book gives an overview of the landscape of resilience in general. Resilience has been discussed in various fields such as psychology, ecology, biology, engineering systems, and organizations, to name a few. Resilience is also discussed from many different aspects, including the type of shock, the system which has to be resilient, the phase of concern, and the type of recovery. Part I gives an overview of the field of general resilience and then discusses how these aspects are translated into the urban context.

Resilience is not a static state of a system. It is a process. A city is dynamic and is always changing. Thus, it is natural to organize our book by the phases of this process. Following the well-known plan–do–check cycle in the management literature, the next three parts of the book are organized based on the three major phases of urban resilience: (1) planning, (2) responding, and (3) measuring performance and competency. Each part consists of chapters on theoretical accounts of resilience of a particular phase, followed by chapters on empirical studies on how the phase is executed in real cities.

Part II is concerned with the urban planning phase. Chapter “[Urban Economics Model for Land-Use Planning](#)” describes an urban economics model for land-use planning, which can be used for assessing the implications of different scenarios of future urban form. The remaining chapters in this part deal with cities facing specific threats.

Part III discusses the operational aspects of resilience. In particular, what are the possible strategies for responding to a shock when it happens?

Part IV deals with the issue of measuring resilience. Resilience is transformative, and in each transformation, we try to create a stronger, improved city. But first, we have to be able to measure resilience because, as Peter Drucker often quotes, “if you can’t measure it, you can’t improve it.”

This book concludes with Part V, consisting of arguments that cities are dynamic complex urban and regional systems and possible transformations codesigned through an emergent dialog approach would be essential to their sustainability, which can be defined as the capacity to solve problems they face.

The chapters are basically constructed from the papers that were presented at the Global Carbon Project (GCP) workshop held in Okinawa in 2014. Most chapters, especially in Parts II, IV, and V, have been created based on the continuing GCP discussions on the Urban and Regional Carbon Management (URCM) initiative. URCM is a place-based and policy-relevant initiative aimed at promoting sustainable, low-carbon, and climate-resilient urban development (<http://www.cger.nies.go.jp/gcp/>).

The other project from which this volume has arisen, *Systems Resilience*, is a multi-year, multi-disciplinary project of The Research Organization of Information and Systems, a subsidiary of the Ministry of Education, Culture, Sports, Science, and Technology of the Japanese government. The project was conceived immediately after the Great East Japan Earthquake in 2011. Its mission is to shed a scientific light on the fundamental nature of *resilience*, which can be commonly observed in many different domains such as biological, ecological, engineering and urban systems, as well as economics, and organizations. The team consists of about 20 researchers from diverse fields from biology, mathematics, computer science, cognitive science, and social science.

This book is intended for researchers and students who want to study resilience in the urban context. It is by no means comprehensive, but we tried to convey the sense of the depth and the breadth of the field. This book should also be beneficial to practitioners who want to study the latest developments in the theory and practice of urban resilience. We hope this volume stimulates discussions among people in various disciplines who are interested in making our society a better, more resilient place.

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