

Introduction

Heterogeneous Perspectives of Urban Resilience – Dealing with Flood and Heat Events in European Cities

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Numerous threats, stresses and shocks occurring from both natural hazards and human-made events are not only put on our ecosystems but further concern our urban and regional systems. Global warming has reached European cities and city-regions with its alarming impacts such as enduring heat waves and heavy flash floods. To react to these challenges and to reduce vulnerabilities in response to rapidly changing climatic conditions and growing urban complexities, various planning concepts have been introduced to urban and regional development.

Responding to climate change challenges

This contribution deals with the issue of making our cities and city-regions resilient. The scientist Crawford S. Holling has been shaping the resilience research by having defined resilience as “[...] [determining] the persistence of relationships within a system and is a measure of the ability of these systems to absorb changes of state variables, driving variables, and parameters, and still persist.” (HOLLING 1973: 17). Until today, his ecosystem approach has been further developed and translated into the field of urban and regional planning by becoming a holistic approach to problem-solving (SCHARTE & THOMA 2016: 127ff). Yet, the concepts’ multiple facets and characteristics comprising economic, social and ecological aspects, challenge spatial planners and actors to successfully respond to uncertain conditions to serve for equal living conditions of citizens and to create attractive urban agglomerations. Being considered as a crucial step towards achieving sustainability, the notion of developing

resilient urban landscapes has been becoming increasingly popular (see BRAND et al. 2011; BÜRKNER 2010; SCHARTE & THOMA 2016).

**European
Perspectives for
Resilient Cities**

This publication offers heterogeneous perspectives and several solutions for tackling the challenges by thematically focusing on urban resilience research towards climate change. The following contributions specifically address threats from flooding events and the occurrence of urban heat islands. Crucial capacity-building actions and measures to cope, adapt and transform are demonstrated in six contributions to give valuable insights for shaping resilient European cities and city-regions.

Dirk Schmidt from the Climate Control Department of the city of Hanover introduces into the climate change adaptation strategy established for the City of Hanover. With his contribution “**The City under Climate Change: The Adaptation Strategy for the City of Hanover**”, he emphasises Hanover’s increasing threats and consequences to climate-related stress such as the occurrence of urban heat islands and heavy rainfall events. For Hanover, aspects concerning town planning, water management and landscape planning are taken into consideration for a local climate adaption strategy plan that includes eight further pillars. Dirk Schmidt presents local planning examples focusing on flood protection, rainwater management, de-sealing, preventive soil and ground water protection and further measures. He stresses the importance of public awareness to build resilience within the city.

The following paper “**Urban vulnerability analysis towards heat - based on the example of the city Hanover**” written by Julia Michalczyk well-explains a research method to analyse heat vulnerability for evaluating capacities of heat avoidance and reduction in urban quarters. Affected areas in Hanover city are presented by mapping out areas, finding, that by 2050 the entire Hanover urban area will be vulnerable to heat. Simple measures of improvement dedicated to the functions of respective areas are proposed. Additionally, the role of vulnerability assessments for the maintenance of high quality of life and support decision-making in the context for climate adaption is emphasised.

Prof. Dr. Lutz Katzschner from Kassel university enlightens the topic of **“Urban climate evaluation for urban development and urban design”**. This third contribution gives ample explanation on designing climate-responsive as well as sustainable and energy-efficient inner-city settlement developments in the city of Frankfurt. By using urban climate maps, the case study provides detailed analysis and recommendation maps which are being used to vividly highlight the usage and importance of climate models for resilient urban planning.

The geographic location of the city-region Hanover has always been prone to flooding. Dr. Frank Scholles from the Institute of Environmental Planning approaches this issue for Hanover and its region by pointing out how good governance and urban planning support enabling flood resilience. The paper **“Governance of Flooding Risks in the Region and the City of Hanover”** offers valuable examples for experts and practitioners how successful flood prevention can be established by land-use planning.

The last two contributions are written by the professors Thanos Pagonis and Riva Lava from the National Technical University of Athens, Schools of Architecture who contribute with practical implications from Greek contexts.

Prof. Dr. Thanos Pagonis discusses **“The regeneration of Lycabettus hill as example of resilient planning”** in Athens. He links the resilience concept with an urbanism that he highlights as being a crucial factor for urban resilience. The author presents recent challenges of Athenian urbanism in the city before referring to the Lycabettus programme to explain the regeneration of the hill in relation to urban governance structures. Approaches towards urban resilience are elaborated.

Prof. Dr. Riva Lava's research is located at the Greek island Santorini in the 21st century by exploring the island's role in tourism, resilience, identity and the future. Graphically, she outlines Santorini's natural and societal challenges of dealing with local challenges. In **“21st century Santorini - tourism, resilience, identity and the future. Public awareness as the focus of NTUA pedagogics”** Prof. Dr. Riva Lava exemplary

presents ways of resilience-building in Santorini by focusing on the topics of modern heritage, traditional settlements, landform and inhabitation as well as the cultural carrying capacity.

These excellent contributions enrich resilience research by providing theoretical input and practical frameworks, guidelines and examples for expert, scientists and practitioners for coping with climate change and building urban resilience.

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