Adaptive Riverside Urbanity: Rethinking Urban Design Principles under Climate Uncertainty

Traditional urban design approaches typically estimate the flow of rivers traversing urban areas using historical data, which forms the basis for developing spatial proposals. However, climate change's observable and escalating impacts have profoundly challenged and reshaped these conventional methodologies. Rising temperatures, changing precipitation patterns, and the increasing frequency of extreme weather events have introduced uncertainties in river behaviors, ranging from floods to droughts. In response to these uncertainties and changing conditions, recent innovations in hydrological modeling methods have begun incorporating multiple possible scenarios. Nevertheless, studies that prioritize these new scenarios and propose spatial solutions within the field of urban design remain quite limited. This study addresses this gap by discussing how new urban design approaches and principles can be shaped for rivers and their surroundings in urban areas under potential scenarios resulting from climate change. It emphasizes the need to shift from static planning methods to more dynamic, adaptive strategies that embrace flexibility and resilience in the face of environmental uncertainties. The study also highlights the importance of integrating ecological preservation, public accessibility, and social interaction in riverfront spaces to create vibrant, multifunctional, and sustainable urban environments.

In this context, the study draws on the concept of riverside urbanity, first examining the dimensions of waterfront spaces and spatial design approaches and principles. Then it explores the effects of climate change on water resources specifically rivers running through the cities, the traditional and new methods for estimating the flows, and possible scenarios based on these calculations. In the third part, the study focuses on how the relationship between the river and the city can be preserved and strengthened under the various scenarios that climate change brings, revisiting the concept of adaptability. Examining different case studies worldwide, the study draws a framework for adaptive riverside urbanity and puts forth the indicators and design approaches. Ultimately, this research aims to guide urban planners and designers seeking to address the challenges posed by climate change while fostering sustainable and vibrant riverside urban spaces.