

Climate Change and Urban Flooding: The Need to Rethinking Urban Flood Management through Resilience

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Abstract : The ever changing and expanding urban landscape increases the stress on urban systems to support and maintain safe and functional living spaces. Flooding presents one of the more serious threats to this safety, putting a larger number of people in harm's way in congested urban settings. Climate change is adding to this stress by creating a dichotomy in the urban flood response. On the one hand, climate change is causing storms to intensify, resulting in more destructive, rarer floods, while on the other hand, longer dry periods are decreasing the severity of more frequent, less intense floods. This variability is creating a need to be more agile and innovative in how we design for and manage urban flooding. Here, we argue that to cope with this challenge climate change brings, we need to move towards urban flood management through resilience rather than flood prevention. We also argue that dealing with the larger variation in flood response to climate change means that we need to look at flooding from all aspects rather than the single-dimensional focus of flood depths and extents. In essence, we need to rethink how we manage flooding in the urban space. This change in our thought process and approach to flood management requires a practical way to assess and quantify resilience that is built into the urban landscape so that informed decision-making can support the required changes in planning and infrastructure design. Towards that end, we propose a Simple Urban Flood Resilience Index (SUFRI) based on a robust definition of resilience as a tool to assess flood resilience. The application of a simple resilience index such as the SUFRI can provide a practical tool that considers urban flood management in a multi-dimensional way and can present solutions that were not previously considered. When such an index is grounded on a clear and relevant definition of resilience, it can be a reliable and defensible way to assess and assist the process of adapting to the increasing challenges in urban flood management with climate change.

Keywords : urban flood resilience, climate change, flood management, flood modelling

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