



## **Resilience indicators: a decision-support tool to assess urban floods resilience. A French case-study**

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Resilience has become a buzzword, used in many fields such as politics, economics, psychology, ecology, or more recently risk management. This overuse has made the exercise of defining the concept complex and has limited the integration of resilience into urban practices. From an abstract, imprecise concept, it has nevertheless become an imperative for cities and urban populations. The question therefore arises for urban planners and managers; how to transform this innovative but still too theoretical concept into a guideline for future urban development in order to prepare cities for the increase in natural disasters and more precisely urban floods? It is with this in mind that this research focused on the challenge of operationalizing urban resilience in the face of the growing risk of urban flooding. Based on the definition that urban resilience embodies the abilities and capacities of a city and its population to develop before, during and after a disruptive event in order to limit its negative impacts, this research attempted to identify characteristics that would be synonymous with potential resilience. This scientific positioning makes possible to analyze urban resilience as a continuum, highlighting proactive capacities that the urban system must develop in order to (re)act in the face of the disaster. Resilience is therefore no longer an ability that can be observed only after the crisis, but a concept that would rather define a learning process through a culture of risk over time, during which the shock would only be a trigger and revealing element of the system's intrinsic capacities. From this point of view, resilience and vulnerability are no longer in opposition but contribute to the definition of the inherent characteristics of the system. To do this, three indicators were co-designed with the help of local stakeholders, and more precisely the GIS department of the test-City, Avignon (France). These indicators, built mainly thanks to open data in order to promote a generic methodology, have sought to define the potential for urban (building age, economic dynamics, critical infrastructure), technical (accessibility and diversity of urban networks), and social (population structure, habits, academic level, etc.) resilience. The results made possible to analyze and map urban resilience on a local scale and thus to co-create precise, localized and joint knowledge between scientists and managers on flood and urban resilience issues.