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Measuring Urban Disaster Resilience: The Context of Flood Hazard in City of Tehran

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While there is currently a trend of attention on the measurement of urban disaster resilience, endeavors are in their infancy and much more efforts are needed to transit from merely conceptual frameworks to empirical assessments. Resilience, especially the concept of urban resilience encompasses the way in which cities face changes and includes capacity of individuals, communities, institutions, businesses, and systems within a city to respond, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience. Therefore, understanding characteristics that contribute to resilience is a major milestone toward enhancing resilience and predisposes decision-makers, stakeholders, and other end-users to prioritize the necessitate actions that are needed to build and enhance it. Addressing this fundamental issue was the main purpose of this study.

It is often discussed that understanding and enhancing of urban disaster resilience is intrinsically linked to the ability to measure levels of disaster resilience. Developing composite measure of resilience-also called composite indicators-has often been taken up by hazard scholars to perform this process that would permit an examination or comparison among places as to their present levels of resilience communities. Hence, using the methodology of composite indices building, this study intends to provide a sound, valid, and practical tool for better understanding urban disaster resilience level that can influence strategies, policies, and actions that are needed to be considered for better perception, managing, and governing complex socio- ecological systems such as cities.

The primary step of the applied methodology began by doing a systematic literature review to provide a comprehensive list of theoretical frameworks as well as conceptualizing and formulation of the term disaster resilience. A valid theoretical framework provides a clear understanding of the subject (disaster resilience) to be measured and aggregates underlying sub variables into a significant composite measure. This study views urban disaster resilience in six main characteristics including social, economic, institutional, infrastructural, community capital and environmental and considers them as the proxies for selecting primary indicators. After data collection and data reduction, the finalized indicators (33 variables) were first weighted using an equal importance method (Min-Max), then aggregated via a summation method (linear additive). The obtained results then were clustered using the standard deviations from the mean (Z score) and also visualized via Arc-GIS techniques.

The 22 urban regions of Tehran City were utilized as the study unit and validation tool for better understanding of the inherent resilience in the context of flood hazard as well as the adaptive resilience. This helps to increase the awareness of stakeholders in order for deciding what measures should have been taking into account for not only the flood safety of individual citizens but also the improvement of the current identity of the city.