The synergistic model: A comprehensive way to understand the real cost of disasters

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Recent catastrophic and costly weather-related events have provided a convincing argument to prevent and take actions for risk reduction in a cost-effective manner. Accepting the present trend that there will be continued significant direct and indirect damage and disruption through disasters in the future highlights the need for efficient methodological approaches for assessing the geographically and institutionally distributed cost data for actionable risk management strategies. Despite the differences in accessibility and technological development between developing and developed nations, it becomes imperative to advance knowledge towards better management of available data in both societal and hydrological context. Researchers have repeatedly highlighted that the real cost of disaster contains both direct and indirect costs, however the challenge remains to integrate the two data types especially when it involved costs of intangible nature ranging from costs of additional staff timing for local public bodies to, traffic disturbance, service facility disruption to impact on mental health. Understanding relationship between the dynamic social structure and actors interacting with natural and built environment generate data types of varied nature. The narrow focus of formalized practice of data collection and data management often lead to underestimation of the real disaster costs and remain a fundamental research challenge. The focus of this research is therefore to contribute towards an efficient way of interweaving the varied available data by use of a synergistic model in one of the most vulnerable areas affected by water extremes in Brazil. For emerging economies such as Brazil, lack of data (or contradicting data sources), duplication of effort, and lack of coordination between data holding institutions are among few challenges that need immediate attention. Therefore, taking the Brazilian context, this research proposes an integrated collaborative interdisciplinary framework for combination of data for both direct and indirect losses to understand the actual cost of damage. In this synergistic model data is directly collected from the flood affected areas of Sao Carlos, Brazil using traditional damage assessment techniques, while a Citizen Science Observatory is used where human knowledge in real time is incorporated using techniques such as ICT's, citizen science, crowd sourcing and volunteered information system. Uncertainties in the use of such data sources are acknowledged and will be reduced by incorporating focus group discussions, interviews with the affected actors filling up the data gaps for both direct and indirect costs. This knowledge evidence base when integrated with existing frameworks of participatory methodology S.H.O.W.S (de Souza et al, 2018) allows reaching the broadest audience providing the richest and varied dataset. The synergistic approach in data collection which is to elicit the importance of effective engagement and social learning complementing the other primary and secondary sources of disaster cost data is expected to attain the objective of enhancing data quality by increasing the range of details, comprehensiveness, cross dataset harmonization and interoperability.