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Intersecting economic and disease burden of flooding in Can Tho, Vietnam

Flood risks pose increasing threats to societal every-day life resulting in cascading impacts on the economy and burden on health and wellbeing of flood-affected populations. In growing urban areas, flooding contributes to increased disease burden through exposure to microbial pathogens. Risk assessments focusing exclusively on economic costs overlook these complex and interconnected impacts resulting in a biased picture of the risk. Our study aims to address this shortcoming by quantifying spatial and distributional disparities in flood risks with a focus on direct economic consequences and disease-burden in Can Tho City, a flood-prone urban area in Vietnam's Mekong Delta. In this respect, we aim to 1) Advance state-of-the-art economic loss models by introducing probabilistic modelling approaches enhancing prediction reliability and ability to capture the uncertainties inherent in flood risk assessment. 2) Develop probabilistic models to predict disease burden corresponding to exposure to E. coli and Rotavirus A. 3) Quantify economic risk metrics –Value at Risk (VaR) and Expected Annual Damage (EAD), and health burden metrics –Population Health at Risk (PHaR) and Expected Annual Cases (EAC), based on probabilistic fluvial-pluvial flood hazard simulations. Our economic loss models are calibrated and validated based on quantitative survey data obtained from residential-use (n = 480) in Can Tho city after the severe flooding in 2011. Additionally, we used pathogen concentrations (E. coli and Rotavirus A, measured in CFU/mL and gc/mL, respectively) obtained from floodwater samples (n = 30) collected after the 2016 flood to estimate the risk of illnesses through quantitative microbial risk assessment (QMRA). Results from the impact models along with the spatial distribution of the multisectoral risk will be presented along with critical insights for equitable adaptation and risk management practices.

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