EGU24-13189, updated on 23 Apr 2024
https://doi.org/10.5194/egusphere-egu24-13189
EGU General Assembly 2024

Unveiling the Interplay: Flood Impacts on Transportation, Vulnerable Communities, and Early Warning Systems

Seyedeh Negar Naghedi[1], Farzad Piadeh[2], Kourosh Behzadian[3], and Moein Hemmati[4]
[1]Department of Artchitecture, Khayyam University, Fallahi Blvd., Mashhad, Iran (negarnaghedy1368@gmail.com)
[2]Centre for Engineering research, School of Physics, Engineering and Computer Science, University of Hertfordshire, Hatfield, AL10 9AB, UK
[3]School of Computing and Engineering, University of west London, St Mary's Rd, London, W5 5RF, UK
[4]Environmental Dynamics Program, University of Arkansas, Arkansas, USA

Flooding's impact on transportation infrastructure is crucial, influencing urban mobility, economic activities, and societal resilience [1]. Disruptions in transportation networks during flood events significantly impede access to essential services, intensifying the vulnerability of communities and hindering recovery efforts. Understanding the multifaceted consequences of flooding on transportation is fundamental for fortifying these critical systems against the escalating risks posed by changing climate patterns and extreme weather events [2].

Floods, stemming from various sources like heavy rainfall, storm surges, or river overflow, profoundly affect transportation infrastructure. Bridges, roads, and rail networks face damage or complete destruction, impeding travel and access to crucial services. Moreover, inundated areas and compromised roadways exacerbate accessibility challenges for specific demographic groups [3]. Vulnerable communities, including low-income populations or geographically isolated areas, bear a disproportionate burden, experiencing limited access to jobs, healthcare, and emergency services during and after flood events.

Research exploring the nexus between early warning systems and transportation resilience remains sparse but holds significant promise. Early warnings tailored to transportation vulnerabilities could mitigate disruptions, enhancing evacuation plans and rerouting strategies. Enabling timely and targeted information dissemination to affected areas or populations, especially those with limited mobility or access, can substantially reduce the adverse impacts on their daily lives and crucial infrastructure. Understanding the gaps in the interconnection of early warning systems and transportation resilience is crucial for bolstering the adaptive capacity of transportation networks, ensuring equitable access, and minimizing the disproportionate impacts of floods on vulnerable communities.

[1] Naghedi, S., Huang, X., Gheibi, M., (2023). *A smart dashboard for forecasting disaster casualties: An investigation from sustainable development dimensions* EGU General Assembly 2023, Vienna, Austria. https://doi.org/10.5194/egusphere-egu23-17237

[2] Piadeh, F., Behzadian, K., Chen, A.S., Campos, L.C., Rizzuto, J., Kapelan, Z. (2023). Event-based decision support algorithm for real-time flood forecasting in urban drainage systems using machine learning modelling. *Environmental Modelling & Software*, 167, p.105772.

[3] Yan, J., Naghedi, R., Huang, X., Wang, S., Lu, J. and Xu, Y., 2023. Evaluating simulated visible greenness in urban landscapes: An examination of a midsize US city. *Urban Forestry & Urban Greening*, 87, p.128060.