Pilot Study and Workshop for Enhancing Rural-to-Urban Disaster Resilience by Integrating Social, Spatial and Digital Networks

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CONNECTED COMMUNITIES FOR DISASTER RESILIENCE
www.disaster-resilience.k-state.edu

Abstract The project will target rural-to-urban communities located within three Midwest US watershed regions, which have been frequently affected by natural disasters in Kansas, Missouri and Nebraska. The specific aims of the project are: (1) to study statistical models that capture the dissemination of information in multiple online social networks, and the roles of geographical connectedness of the communities during the information dissemination; (2) to learn the structure of traditional community-based social networks, along with statistical models for information propagation in these networks; and, (3) to investigate how different types of networks compose for different community-disaster related scenarios.

Question

- With the rapid transformation of social networks challenging traditional notions of community, how might new social networks augment and enhance more community based networks' response to disasters?
- Will people and households utilize their traditional community, geographical-based, or online social networks in disaster contexts? And, to what extent do these networks overlap and reinforce each other?

Intellectual Merit

- To identify barriers and enablers for composability of online and offline social networks bound to a geographical area.
- To understand, and model as a stochastic hybrid system (SHS) on a graph, the interactions between multiple networks and the disaster-related impact on individuals.
- To help increase the robustness of online and physical infrastructure systems for disaster resilience across a wide range of community structures.

Project Activities

- **Pilot Study:** Conducting an investigation into multi-layer social networking patterns for information dissemination in disaster situations by overlaying social, geographical and digital networks.
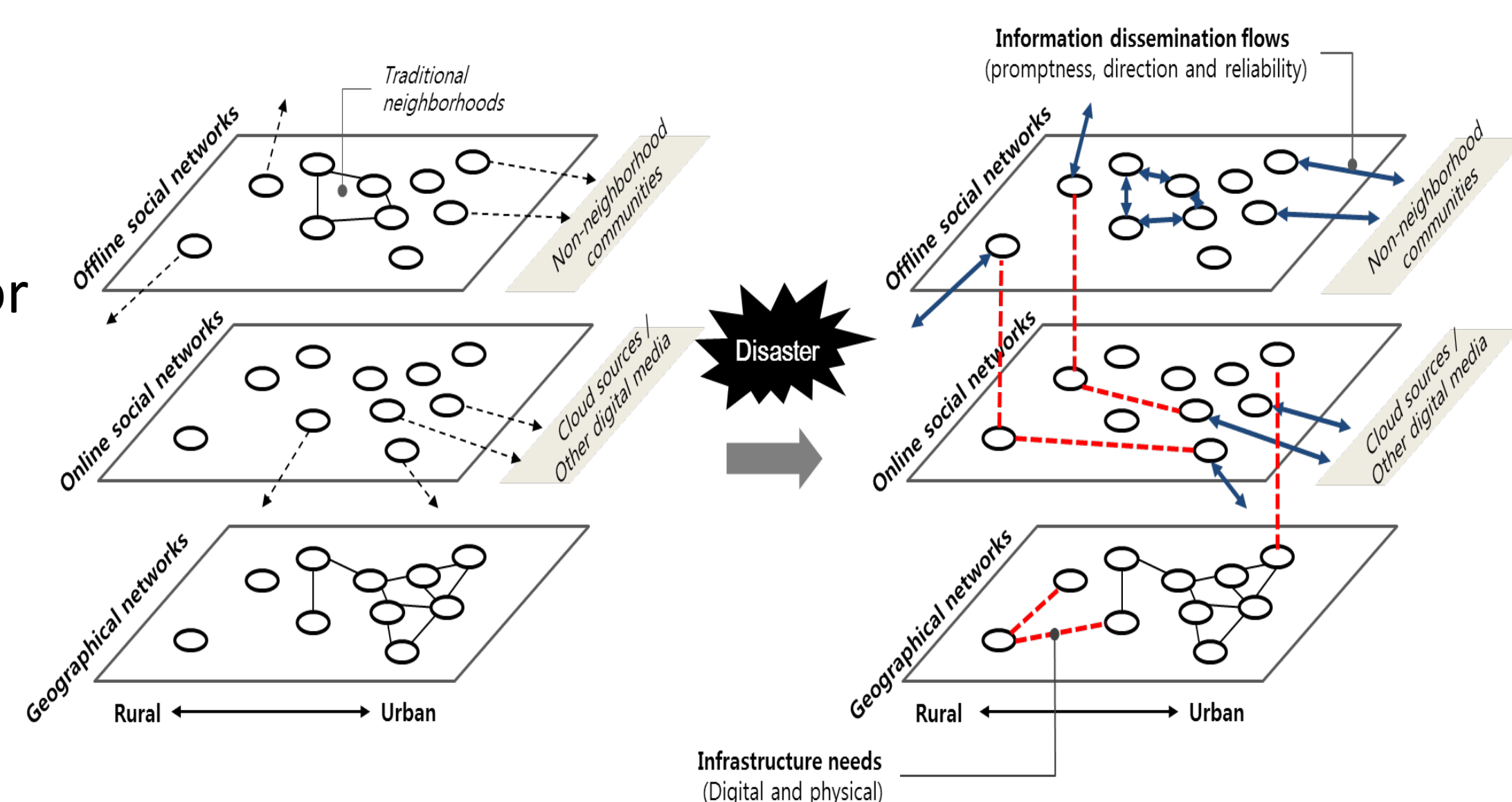
Activities to Date

- Data collection: "Community Social Networks Survey for Disaster Resilience" (March--April, 2021)
- Target: urban, suburban and rural residents in Riley County (KS), Buchanan County (MO), and Platte County (NE), situated in flood zones.
- Stratified cluster sampling: Total 2,736 samples
- Project website (disaster-resilience.ksu.edu) launched for community feedback.
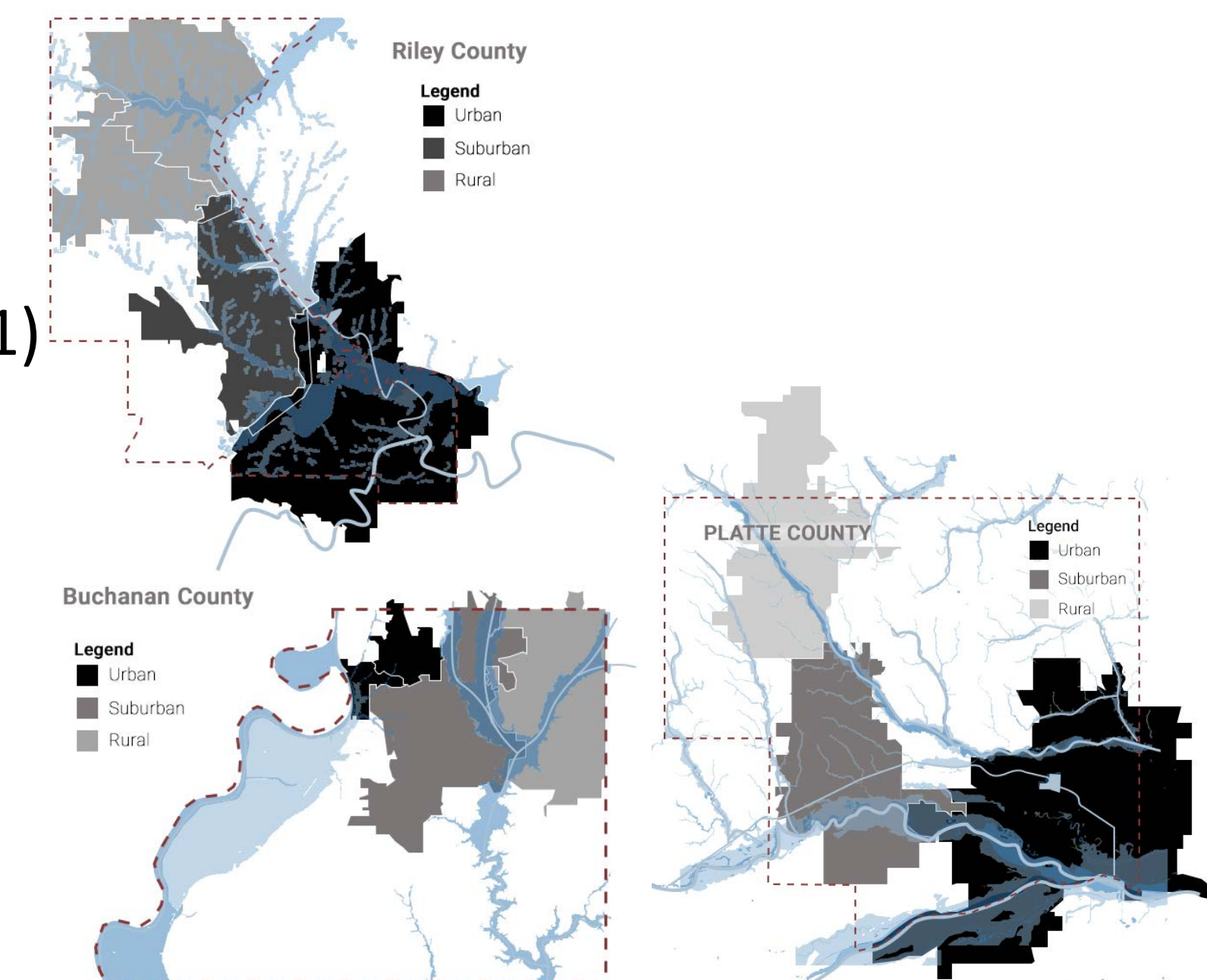
Broader Impact (Immediate impact on society)

- Impact on disadvantaged communities and opportunity zones: Benefits for the current and projected vulnerable population in high-risk Midwest watershed areas (Riley County KS, Buchanan County MO, and Platte County NE),and other disaster-prone communities in the U.S.
- The results of the pilot study will be shared with communities through website, community workshop and direct research engagements.

Broader Impact (Sustainability)

- Dissemination of research findings from testing theories and modeling about multi-layered social networks in disaster situations.
- Building relationships with communities and interdisciplinary scholars for a full-scale, longitudinal research with a broader community context.
- Participation and Training: 3 graduate students and 1 undergraduate student participated in research.

Next Steps

- **Pilot Modeling** for: (a) dissemination of information in multiple online social networks; (b) the roles of geographical/social connectedness of the communities; and (c) different types of networks compose for different disaster-related scenarios.
- **Community Workshop for:** understanding the infrastructure gap/needs of augmented social networking for digitally and geographically disconnected communities.