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Assessment of Flood Disaster Impacts in Cambodia: Implications for Rapid Disaster Response

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Disaster monitoring systems can provide near real time estimates of population and infrastructure affected by sudden onset natural hazards. This information is useful to decision makers allocating lifesaving resources following disaster events. Floods are the world's most common and devastating disasters (UN, 2004; Doocy et al., 2013), and are particularly frequent and severe in the developing countries of Southeast Asia (Long and Trong, 2001; Jonkman, 2005; Kahn, 2005; Stromberg, 2007; Kirsch et al., 2012). Climate change, a strong regional monsoon, and widespread hydropower construction contribute to a complex and unpredictable regional hydrodynamic regime. As such, there is a critical need for novel techniques to assess flood impacts to population and infrastructure with haste during and following flood events in order to enable governments and agencies to optimize response efforts following disasters. Here, we build on methods to determine regional flood extent in near real time and develop systems that automatically quantify the socioeconomic impacts of flooding in Cambodia. Software developed on cloud based, distributed processing Geographic Information Systems (GIS) is used to demonstrate spatial and numerical estimates of population, households, roadways, schools, hospitals, airports, agriculture and fish catch affected by severe monsoon flooding occurring in the Cambodian portion of Lower Mekong River Basin in 2011. Results show modest agreement with government and agency estimates. Maps and statistics generated from the system are intended to complement on the ground efforts and bridge information gaps to decision makers. The system is open source, flexible, and can be applied to other disasters (e.g. earthquakes, droughts, landslides) in various geographic regions.