

Assessment of coastal hazards from extreme rainfall floods and sea level rise

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Coastal areas are prone to many natural hazards such as extreme rainfall floods and sea level rise (SLR). Coastal areas are home to more than one billion people across the globe and up to 310 million of those live in 100-year floodplain areas. Moreover, U.S. \$11 trillion worth of infrastructure assets were constructed below the 100-year flood mark. The natural hazards also affect coastal ecosystem. The primary objective of this presentation is to present the one-dimensional (1-D) HECRAS floodplain modeling and a CAIT methodology using high resolution laser-based digital elevation model (DEM) data of the terrain and Landsat-8 imagery to evaluate the impact of extreme rainfall floods and SLR on coastal regions. The coastal regions of Miami in the United States and Hai Phong in Vietnam were selected for this study. The key

results of the floodplain modeling for these cities indicated that 409.64 km² or 56.76% of the study area in Miami and 177.84 km² or 84.31% of the study area in Hai Phong are inundated by floodwater, respectively. The affected population due to an extreme rainfall flood is around 1.42 million in Miami and 0.62 million in Hai Phong. The results of the SLR simulation show that the submerged land due to 2 m SLR is 412.0 km² (57.1% of the study area) in Miami and 35.3 km² (16.7% of the study area) in Hai Phong. The affected population from a 2 m SLR is close to 1.43 million in Miami and 0.07 million in Hai Phong. In this study, a resilience management plan was recommended to protect people, infrastructure and ecosystem from coastal hazards.