Assessing the Increase in Exposure to Flood Hazard of Critical River Systems Due to Climate Change by Integrating Predicted Change in Rainfall Scenarios Based on Global Circulation Models

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SUMMARY

The government-funded Disaster Risk and Exposure Assessment for Mitigation (DREAM) program have proven the advantage of the use of high-resolution Light Detection And Ranging (LiDAR) digital elevation models for the production of detailed flood hazard maps for riverine-type flooding. Detailed flood hazard maps have been produced for critical river systems, for extreme rainfall events characterized by various rain intensity duration frequencies. Together with the hazard maps, an initial exposure database was also generated to be used as an invaluable tool not only for risk assessment, but also for the creation of comprehensive land use plans and master plans of local government units possibly affected by the floods in the areas mentioned.

However, for these land use plans to be effective and forward looking, not only should they address the hazards in the current setting, but also the change in the severity of future hazards due to climate change.

This research aims to integrate the output of statistically downscaled General Circulation Models (GCMs) to the production of flood hazard maps for identified critical river systems. The CCAFS project output is comprised of downscaled climate scenarios that are derived from the General Circulation Model (GCM) runs conducted under the Coupled Model Intercomparison Project Phase 5 (CMIP5) and across the four greenhouse gas emissions scenarios known as Representative Concentration Pathways (RCPs). The output is global in nature, and each of the climate projections includes maximum daily precipitation estimates for the periods from 2030 through 2080. The spatial resolution of the dataset is roughly 1 km x 1 km, which is sufficient for modelling the critical river systems mentioned above. After the production of the new hazard maps, the exposure dataset will be revisited, and the change in the number of exposed elements will be quantified and reported. This report aims to provide climate-proofed baseline information that will serve as guidance in

producing better local government master plans and land use plans in the future.