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The Value of Drones for Bespoke Local Flood Risk Assessment in the Licungo Basin

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Floods and their impacts are highly local in nature and vulnerable population and exposed assets are most at risk in coastal monsoonal regions. This is aggravated if the region is also exposed to tropical cyclones, such as Mozambique and the Licungo basin along the eastern coastline of the country.

In order to be better prepared against future high-impact flood events, Mozambique's National Institute for Disaster Management (INGC) has mapped the watershed of the country's central Licungo River with drones to reduce flood risks and improve emergency response planning. The mapping is intended to "minimize risks" and promote timely preparation of actions when cyclones and floods are expected in the area.

In the proposed project, the acquired drone terrain model and collected field data (water levels) will be used to drive a bespoke localized 2-D flood model to accurately reproduce flood hazard and risk in the central Licungo basin for the 2013 and 2015 flood disasters. In addition, high-resolution population and exposure layers have been used to define bespoke local flood risk maps.

Accurate flood risk assessment of past events at the local scale can better inform decision support systems and facilitate the decision-making process and preparedness for future high-impact events. Knowing who is at risk where and when is vital information that is missing in many vulnerable regions and is most of the time not available at the required local level.

Moreover, global or large-scale flood prediction models do not contain the necessary detail to infer meaningful flood risk at the local level and such models are known to be inaccurate, albeit they represent best efforts at the scales they are simulating. However, to what degree these models are wrong at the local scale of impact and what is needed to improve them is not known, largely because local flood data and bespoke predictions of flood risk are missing at the local scale for many vulnerable regions. The collected high-resolution data and the local flood risk assessment this project proposes would allow the validation of large-scale modeling efforts thereby advancing our understanding of model limitations and would create opportunities to improve them at large scales.