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Utilising Indigenous Knowledge to Design Dykes in Malawi

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Abstract : Malawi is one of the world's poorest nations and consequently, the design of flood risk management infrastructure comes with a different set of challenges. There is a lack of good quality hydromet data, both in spatial terms and in the quality thereof and the challenge in the design of flood risk management infrastructure is compounded by the fact that maintenance is almost completely non-existent and that solutions have to be simple to be effective. Solutions should not require any further resources to remain functional after completion, and they should be resilient. They also have to be cost effective. The Lower Shire Valley of Malawi suffers from frequent flood events. Various flood risk management interventions have been designed across the valley during the course of the Shire River Basin Management Project – Phase I, and due to the data poor environment, indigenous knowledge was relied upon to a great extent for hydrological and hydraulic model calibration and verification. However, indigenous knowledge comes with the caveat that it is 'fuzzy' and that it can be manipulated for political reasons. The experience in the Lower Shire valley suggests that indigenous knowledge is unlikely to invent a problem where none exists, but that flood depths and extents may be exaggerated to secure prioritization of the intervention. Indigenous knowledge relies on the memory of a community and cannot foresee events that exceed past experience, that could occur differently to those that have occurred in the past, or where flood management interventions change the flow regime. This complicates communication of planned interventions to local inhabitants. Indigenous knowledge is, for the most part, intuitive, but flooding can sometimes be counter intuitive, and the rural poor may have a lower trust of technology. Due to a near complete lack of maintenance of infrastructure, infrastructure has to be designed with no moving parts and no requirement for energy inputs. This precludes pumps, valves, flap gates and sophisticated warning systems. Designs of dykes during this project included 'flood warning spillways', that double up as pedestrian and animal crossing points, which provide warning of impending dangerous water levels behind dykes to residents before water levels that could cause a possible dyke failure are reached. Locally available materials and erosion protection using vegetation were used wherever possible to keep costs down.

Keywords : design of dykes in low-income countries, flood warning spillways, indigenous knowledge, Malawi
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