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Towards improving a national flood early warning system with global ensemble flood predictions and local knowledge; a case study on the Lower Shire Valley in Malawi.

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Flood risk, a function of hazard, exposure, and vulnerability, is increasing globally and has led to more and more disastrous flood events. Previous research has shown that taking early action is much more cost-effective than responding once the flood occurs. Such an anticipatory approach requires flood early warning systems (EWS) that provide ample lead time and that have sufficient spatial resolution. However, in developing countries, often the skill of available forecasts is insufficient to create a more effective triggering mechanism as part of a flood EWS.

This research presents an assessment of two methods to improve an existing flood EWS using a case study of the most flood-prone area of Malawi, i.e. the Lower Shire Valley. First, the forecast skill and trigger levels of the medium-term Global Flood Awareness System (GloFAS) model are determined for four gauge locations to assess how they can improve the national EWS. Secondly, an assessment is done on how the process of integrating flood forecasts based on local knowledge with official forecasts, can help to improve the EWS. This is done by semi-structured interviews at the national level and focus group discussions at the community level. The study shows that GloFAS does not predict absolute discharge values precisely, but can be used to predict floods if the correct trigger levels are set per location. The integration of multiple forecast sources is found to be useful at both national and community levels. An integration process is proposed where village stakeholders should take the leading role by using existing disaster management and civil protection coordination mechanisms. Overall, both methods can contribute to improving the flood EWS and decreasing the flood risk in the Lower Shire Valley in Malawi.