

## POLICY BRIEF

### **Modeling Household Flood Risk Management in the Lower Mono River Basin, Togo–Benin (WEST AFRICA)** Dossoumou Ibiyèni Paula Nadège



#### Keys Facts

*Flooding represents one of the most recurrent and damaging disaster in the Lower Mono River Basin. Almost each year, the populations are affected by this phenomenon in various sectors including agriculture, health, materiel and commerce.*

*There is an urgent need of developing adaptive measures for coping with future risk of flooding in the current context of climate change, urbanization, land use change, etc.*

#### KEY MESSAGES

- 1- Climate change and management of Nangbeto dams represent the hydrological drivers of flooding, and the presence of households in low-lying areas and close to the river, having less income and a lower education level, are the social drivers of flooding;
- 2- The awareness of floods and the exposure influenced the decision-making of households on how to cope with floods;
- 3- Structural measures combine with the non-structural measures can contribute to reduce future flood risk within the catchment;
- 4- Change their way of thinking, join forces, and decide that the situation must change for their well-being and for future generations;
- 5- Develop risk prevention rather than reactivity skills.

## Introduction

Flood represents one of the most occurring and damaging hazards worldwide. One of the parts of Africa most impacted by floods is West Africa. Floods were the second-deadliest disaster type in this region after drought, making up 64% of disaster incidents between 2000 and 2019 (EM-DAT, 2019). The catchment of Lower Mono River, shared between two West African countries, Togo and Benin, is not exempt from the occurrence of this disaster. The Mono River used to overflow each year, threatening the community surrounding it. This situation is likely to increase and exacerbate the damages of climate change and urbanization without suitable adaptative strategies. In this study, we used the HEC RAS model to test structural measures that are effective from the point of view of households to cope with flood risk. To this end, a survey was conducted in twenty-four (24) villages in the basin to identify: the socio-economic causes and vulnerabilities of households in the study area, the existing adaptation and mitigation strategies developed by households, identification of factors influencing households to adapt and choose a particular measure and simulate the flood risk based on household decision making. Also, historical flood data in the area and geospatial data were collected. Using the

powerful tool HEC-RAS, helped model the potential flooding areas and test structural measures, hence, enabling to proposal of effective adaptive measures to cope with flood risk in the Lower Mono River basin. The results of the different analyses showed that climate change and bad management of Nangbeto dam represent the hydrological drivers to flooding and the presence of households in low land areas and close to the river, having less income and education level are the social drivers to flood. Households rather choose less costly measures such as having other commercial activities, modifying their agricultural calendar or diversifying their crops to cope with the flood-related impact on their agricultural land. The choice of the household to adapt and choose a specific adaptive measure is positively influenced by their experience of past flood events and the exposure of their agricultural plot. The results of the HEC-RAS model confirm that this model is capable of modeling potential flooding areas and also allows testing structural measures. Indeed, the effectiveness of the drainage system and the water retention basins were tested with the HEC-RAS model. The results show that these measures can reduce the risk of flooding in the basin. It can be used by decision-makers in the implementation of suitable adaptive strategies for the well-being of the population. A combination of

structural measures (drainage systems and retention basins) and structural measures (capacity building, awareness raising) can significantly reduce the impact of flooding in the study area.

This policy brief provides key messages that emerged from the modelling of household flood risk management in the Lower Mono River Basin in the Lacs District in Togo, West Africa.

## KEY MESSAGES

**1-Climate change and management of Nangbeto dams represent the hydrological drivers of flooding, and the presence of households in low-lying areas and close to the river, having less income and a lower education level, are the social drivers of flooding:** We recommend the reinforcement of the alert system by ANPC and Red Cross through informing communities within the catchment especially the ones at the down part of the basin with the advancement of technologies, set up a mobile application that can inform focal points and at least village chiefs or households' headers about climate forecasts as well as the consequences of these on their various activities and the precautions to be taken. To this end, it is necessary to improve the level of education and literacy in these

villages. Similarly, capacity building of agents responsible for climate forecasts (meteorologists from National Meteorological Agencies) and an increase in field agents are required.

### **2-The awareness of floods and the exposure influenced the decision-making of households on how to cope with floods:**

decision is made by households when they are informed and conscient of the risk in their place of residence. Households when experiencing flood choose to have other activities, it is important to support alternative financial activities (e.g., non-farm activities) to increase income and reduce poverty. Also, the promotion of capacity building and reinforcement of community awareness through training (agricultural technique for crop diversification, new crop varieties, tolerant to flood, fishing technic, etc.) and donation of needed materials such as pirogue, tolerant seed to flood, etc. is needed;

### **3-Structural measures combine with the non-structural measures can contribute to reduce future flood risk within the catchment:**

In the current context, where most communities do not want to leave their villages for other places, it would be important to think about the reinforcement or construction of flood-resilient houses and the installation of hydro-agricultural (drainage system, retention basin, etc.)

facilities to considerably reduce future impacts of flooding.

**4-Communities must change their way of thinking, join forces, and decide that the situation must change for their well-being and for future generations:**

population think that help need to always come from the government or communities need to be conscient on the fact that the solution is coming from their obedience to the decision-maker. They can contribute to the reduction of flood risk by following the recommendations which include for instance prohibition of the house's settlement in potential flood zones.

**5-Develop risk prevention rather than reactivity skills:** keep abreast of climate forecasts and combining this with their knowledge of local warning indicators to take appropriate measures so as not to be surprised by flooding, which happens every year.

**Conclusion:**

Effective measures to cope with future flood risks need preliminary studies including socio-economic, topographic, and engineering for more insight. It requires the participation and integration of populations for their implementation and the maintenance to guarantee their durability.

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USE**

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