

## Extreme Weather Events

### Flood risk management

### MIEA – Water Management

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## 1. Introduction

With each passing day, the concern about water management keeps or increases, due to climate change or due to increase of population migration to coastal cities. From now on we have a big challenge, which is guarantee the needs of the population facing the problems that are already beginning.

Due to the uncertain and variation of meteorological events, occurrence of flood events is also affected by uncertain. However, hydrological models can provide us the possibility to forecast this event, because of their uncertain they are useful in this case. For example, this hydrological model allows cities to get prepared to flood events.

## 2. Best practices

In 2020 was funded a project, the BRIGAD, this project is aimed to connect the innovators and final consumers thus allowing support for innovations for climate adaptation, for example in this case, focusing on disasters like floods.

### 2.1 Models

A well-established framework in environmental risk assessment is the Source-Pathway-Receptor (SPR) model, which is based on the source of an environmental hazard, the way it is transmitted and who is affected. In the case of flooding, the sources are the weather events or sequences of events that may result in flooding. Pathways are the mechanisms that provides flood waters a way to originate impact on the receptors. Like overland urban flows and failure of flood defence structures. Receptors are the people, structures and natural environments that may suffer from flooding. (Merz *et al*, 2010)

One way to improve the management of the extreme weather events, by dealing with the hazards of floods for example, is applying modelling flood damages under climate change (Figure 1). As we can see, the flood damage is going to increase in the future because of the climate change. (Hattermann *et al*, 2014)

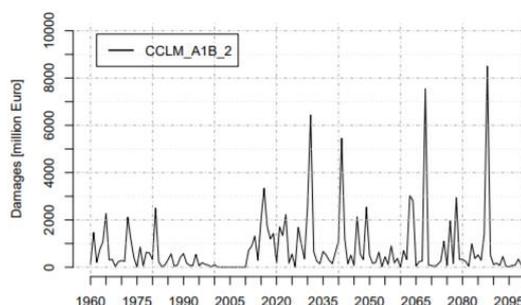


Figure 1 - Annual damages in Germany.

## **2.2 Flood control, case study**

According to this study, with the high importance of hydraulic led to the construction of dam spillways and other type of hydraulic structures, in result the flood events occurred in the future were significantly smaller. In this study were accounted for measures that are very effective in small catchments in the case of frequent floods and can moreover have positive effects for the surface water body ecologies, erosion control and the restoration of the natural water balance. (Thieken A. *et al*, 2016)

Green infrastructures (GI) are increasingly linked to urban water management, so GI are very related with the transition toward sustainability. The purpose of this study is to share best practices for the transition to sustainable urban water management with implemented GI. The GI were applied in Berlin to reduce water footprints. According to this study, Berlin has a strong top-down approach towards sustainable urban water management and a strong mindset on GI's function for future development. (Li L. *et al*, 2017)

## **3. Conclusions**

Modelling has a big importance when we talk about flood management, we cannot prevent the floods, but we can forecast them and alert the populations for them, therefore modelling is crucial in the present, especially because of the impacts of Climate Change. The best practices I mention earlier are based on models. This is, the specific location that we are going to build the green structures, for example, depends on the results of hydrological models, such as the construction of dams or dam spillways.

## **4. References**

- ❖ Thieken A. *et al*, 2016 – *Review of the flood risk management system in Germany after the major flood in 2013*. Checked in 11/26/2019;
- ❖ Li L. *et al*, 2017 – *Green infrastructure for sustainable urban water management: Practices of fice forerunner cities*. Checked in 11/24/2019;
- ❖ Hattermann F. *et al*, 2014 – *Modelling flood damages under climate change conditions- a case study for Germany*. Checked in 11/21/2019;
- ❖ Merz B. *et al*, 2010 – *Fluvial flood risk management in a changing world*. Checked in 11/21/2019.