

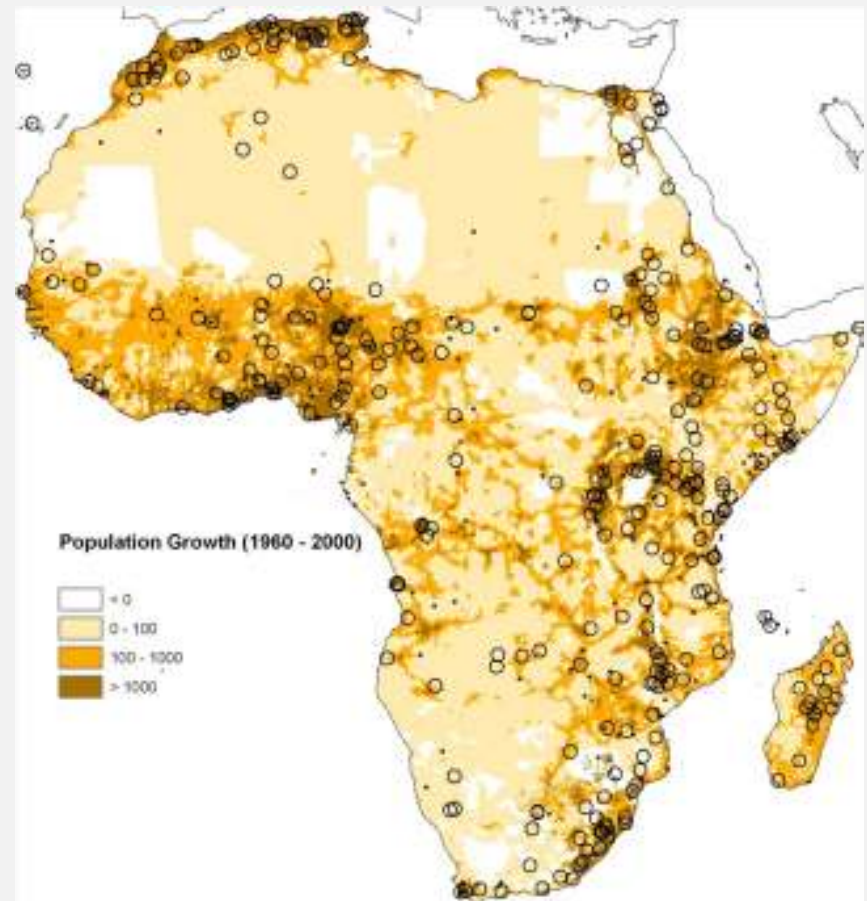
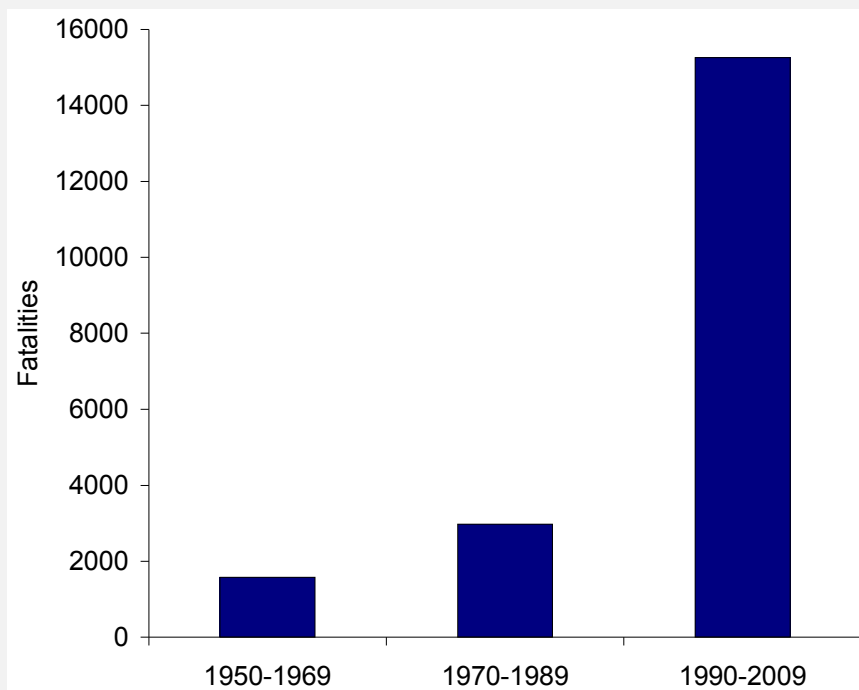


# KULTURISK RISK PREVENTION

Giuliano Di Baldassarre, UNESCO-IHE Delft

# Introduction

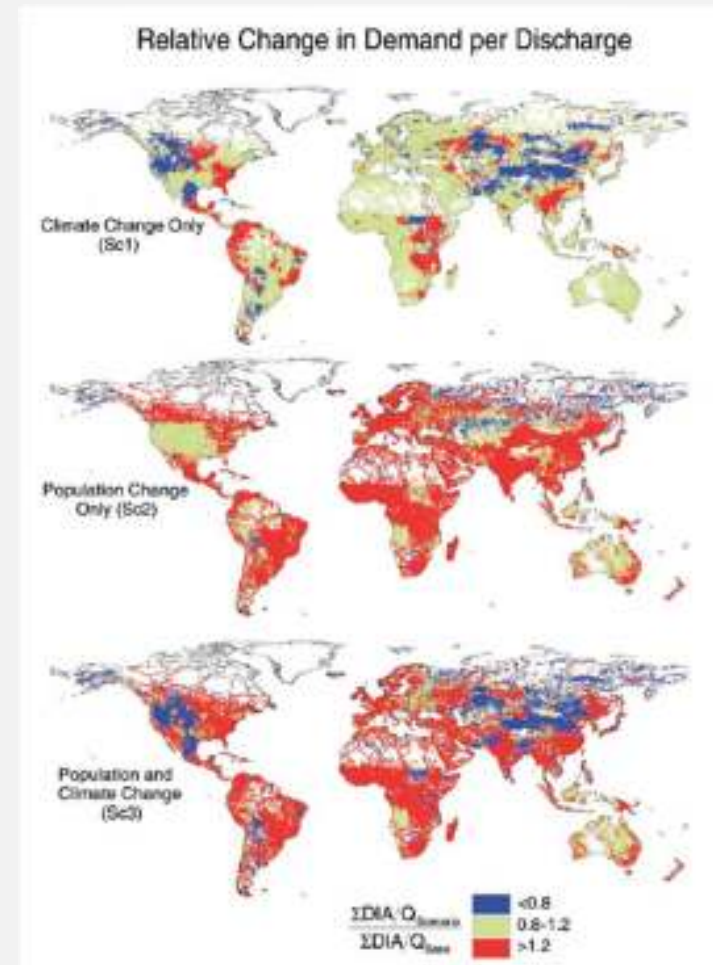
Water-related Risk has increased worldwide  
(e.g. African floods)



(Di Baldassarre et al., Geophysical Research Letters, 2010)

# Global changes

- Climate
- Population
- Land use, land cover
- De-forestation
- Urbanization
- Economic development
- Hydraulic works
- ...



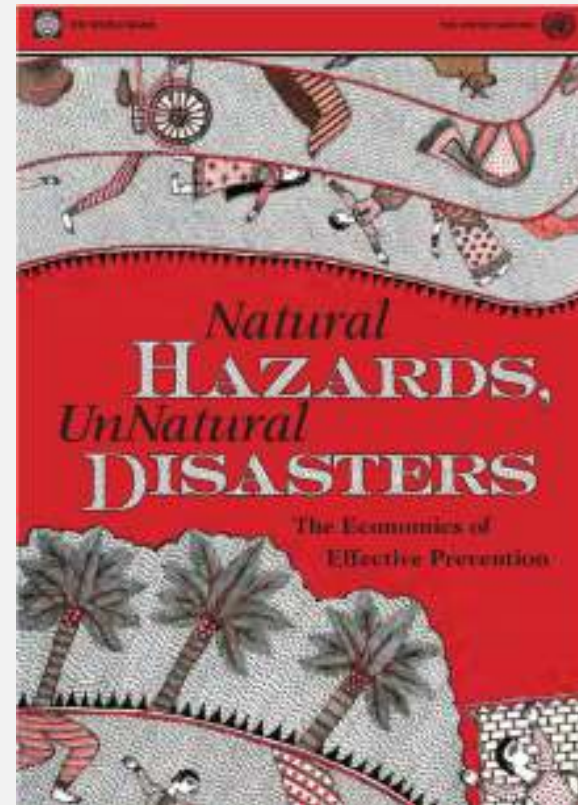
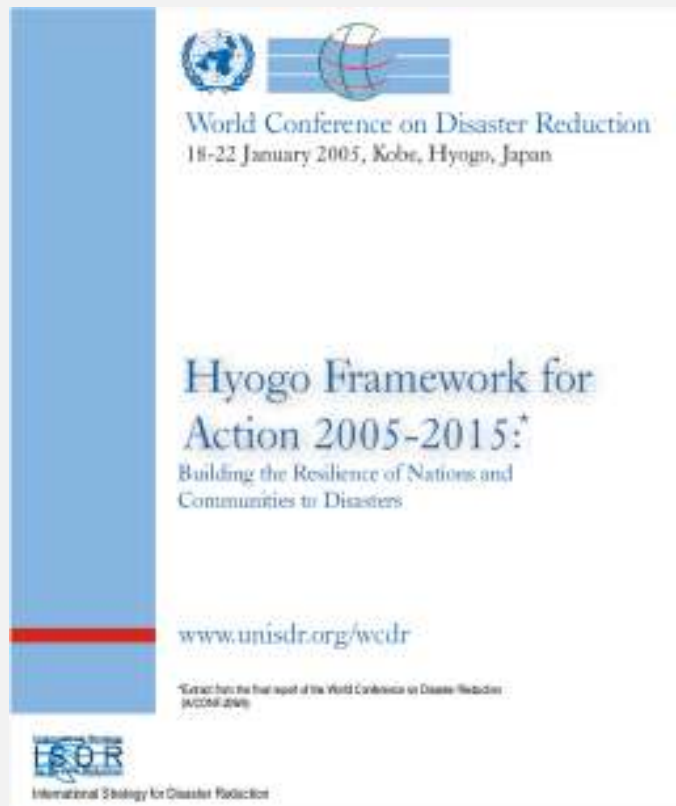
- and many interdependencies/feedbacks

(Vorosmarty et al., Science, 2000)

# Hyogo Framework (2005)

Need to reduce our vulnerability to disasters

Reducing disaster risks through science (UN-ISDR)

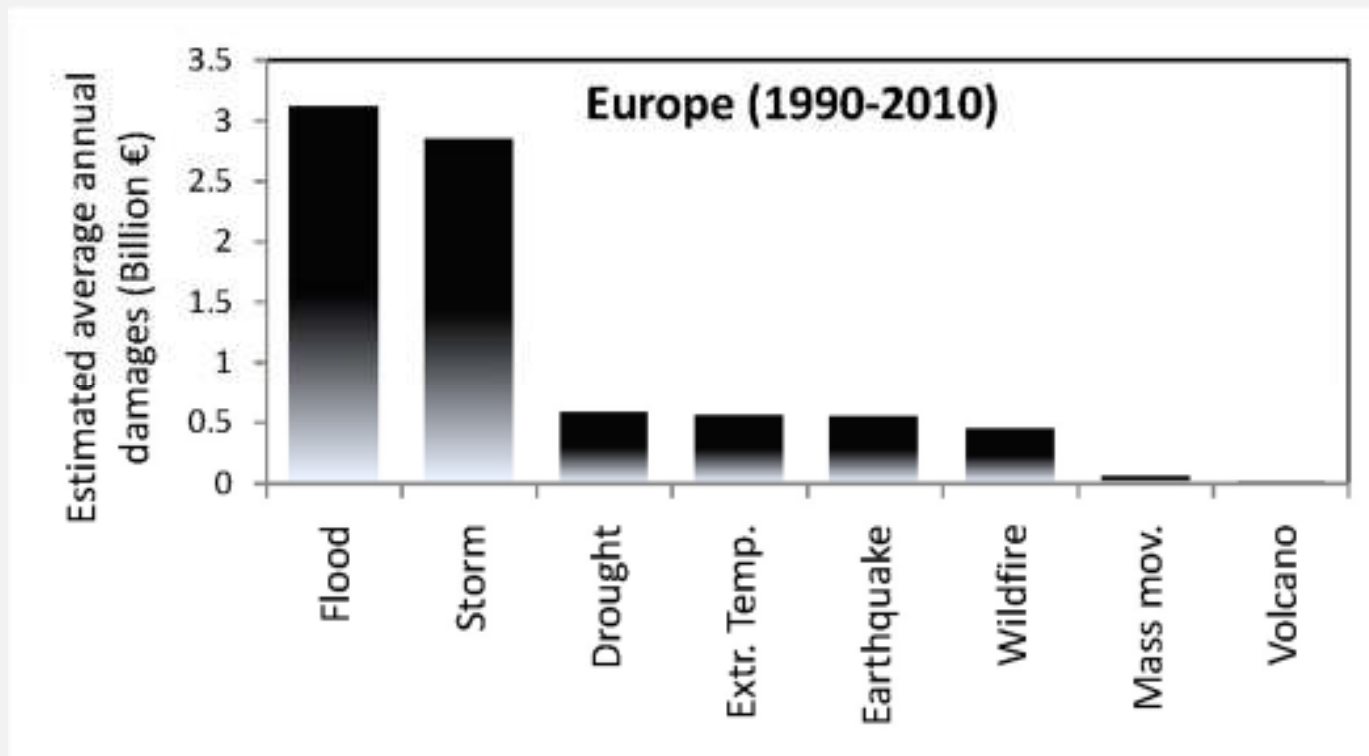


(World Bank, *The Economics of Effective Prevention*, 2010)

# Disasters in Europe

Disasters are causing more and more damages

**Water-related disasters were the most costly**



(EM-DAT, 2010; European Environment Agency, 2011)

# Disasters in Europe

## Examples of EU policies and actions

- ❑ Floods Directive
- ❑ Seveso II Directive
- ❑ Community framework in disaster prevention within EU
- ❑ Risks assessment and mapping guidelines



# KULTURisk

Developing a Culture of Risk Prevention in Europe  
Evaluating the benefits of different measures





# KULTURisk

FP7 Collaborative Project

January 2011 – December 2013

Total Budget 4.45 M€ (EC contribution 3.22 M€)

11 partners from 6 countries





# Water-related disasters

## Urban fluvial flooding

- excessive rainfall, snowmelt



## Urban pluvial floods

- excessive (local) rainfall
- impeded drainage



## Coastal floods

- high tides & surge, wave action



## Flash floods & Landslides

- high intensity rainfall
- fast responding catchments

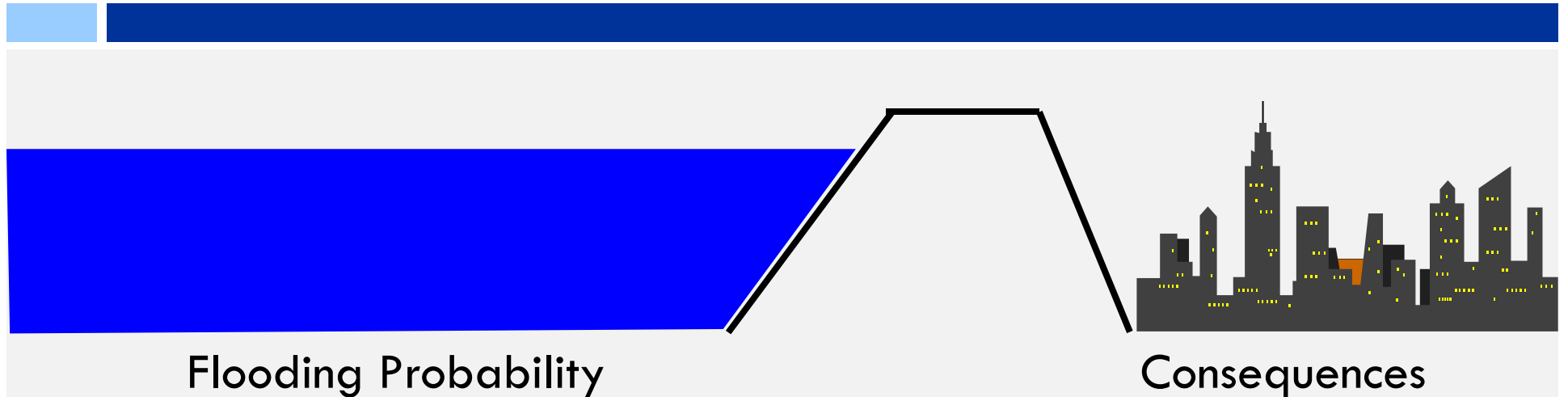


## Levee Breach

- failure or overtopping of dikes



# Traditional approach



Risk = Probability \* Consequences

> “Levee effect”

# Current approach

From *Flood Defense* to *Flood Management*  
*Living with floods* instead of *Fighting floods*



e.g. UNESCO-IFI, Flood Directive, "Room for the river", "Making Space for Water"

(Pictures sources: Pierpaolo Campostrini and Micha Werner)

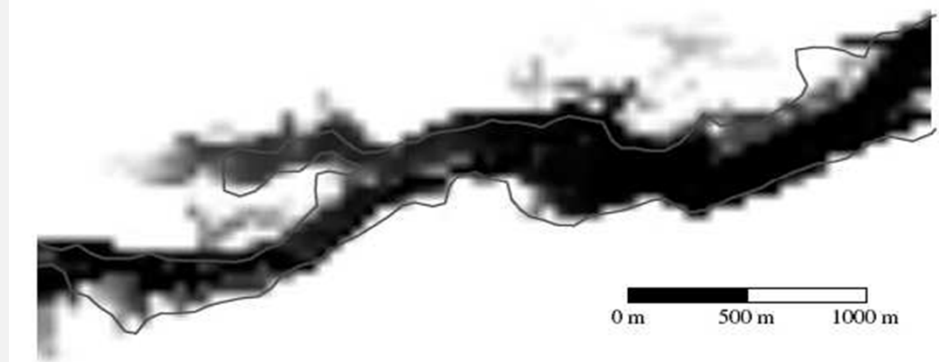
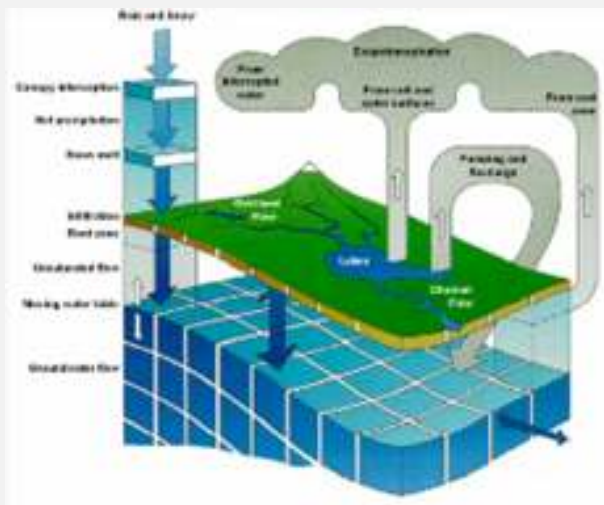
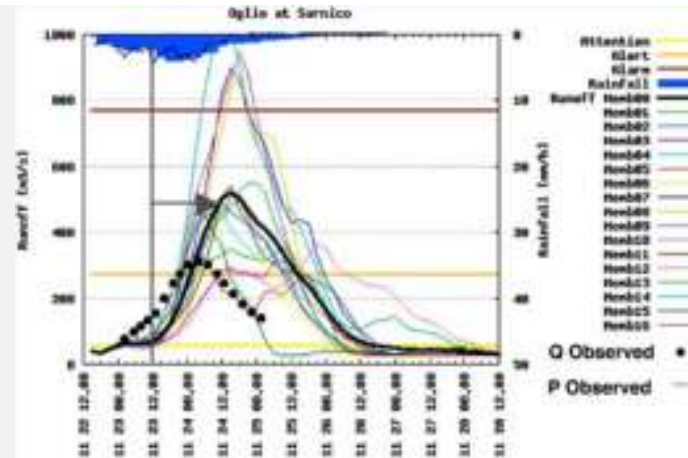
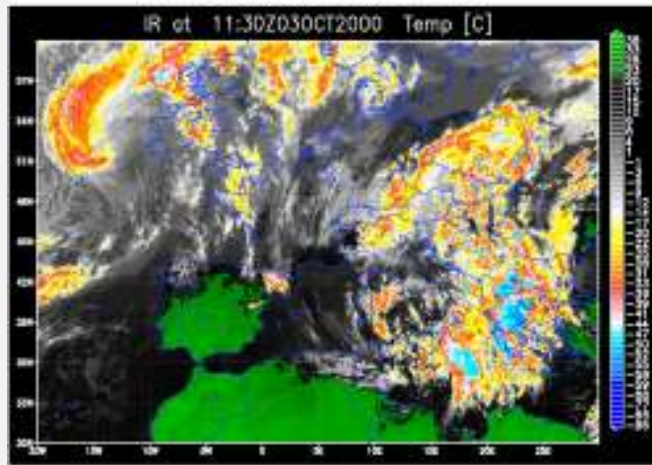
# KULTURisk

- **Prevention as sensible investment:** the costs of preventive measures are less than those of post-event recovery
- Demonstration via case studies
- Analysis of different types of preventive measures

# KULTURisk case studies

<b>Name</b>	<b>Type</b>	<b>Water-related hazards</b>
Alpine catchments	Small catchments	Floods & Landslides
Danube	Trans-boundary large river	Large-scale inundations
Barcellona	Mountainous catchment	Landslides & debris flows
Carlisle	Urban area	Urban floods
Soča-Isonzo	Trans-boundary catchment	Floods & landslides
Somerset	Coastal area	Storm surges

# Early Warning Systems



(Ranzi et al., 2009; Thielen et al., 2009; Demeritt et al., 2010)



# Risk Communication



False alarms

Missed events



(source: David Demeritt)



# Risk Preparedness

## Prague (Czech Republic)

- 2002 flood, although significantly more intense than the previous one occurred in 1997, led to a smaller number of flood-related fatalities



*(Marešová & Mareš, 2003)*

# EFAS-KULTURisk Workshop

- Large number of operational EWS
- Significant technical progress has been made so far

## **But...**

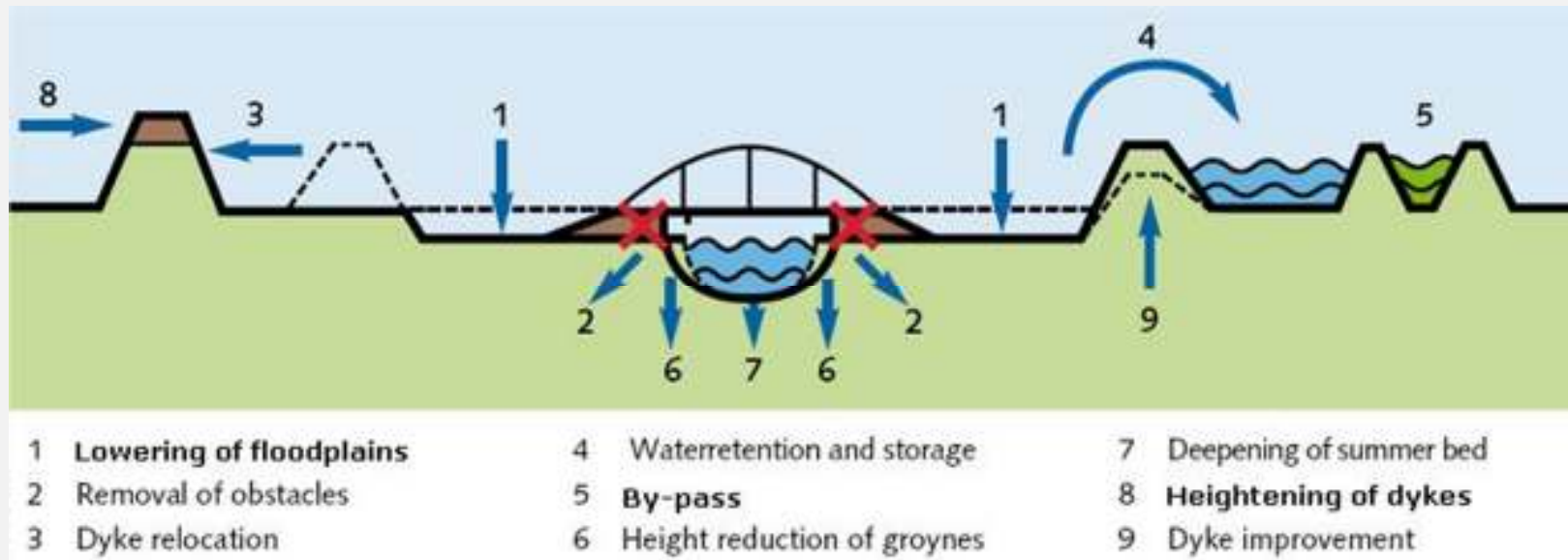
- Exploit the benefits of EWS for risk reduction
- Need for cooperation and information exchange on EWS
- Including EWS into policies and risk management plans
- Easily accessible and understandable warnings
- Appropriate training



# Structural measures

Water retention and storage (flood attenuation)

“Room for the River”

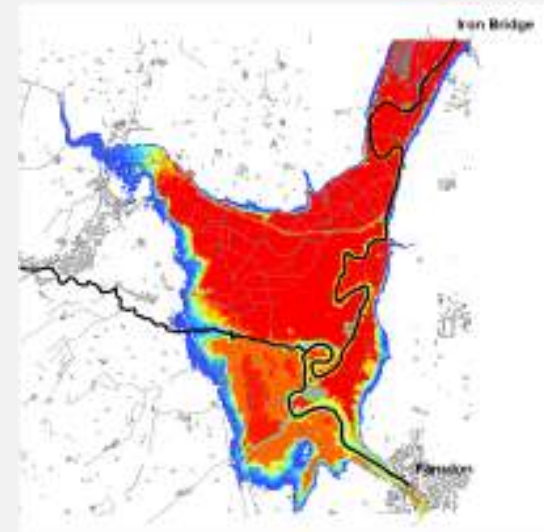
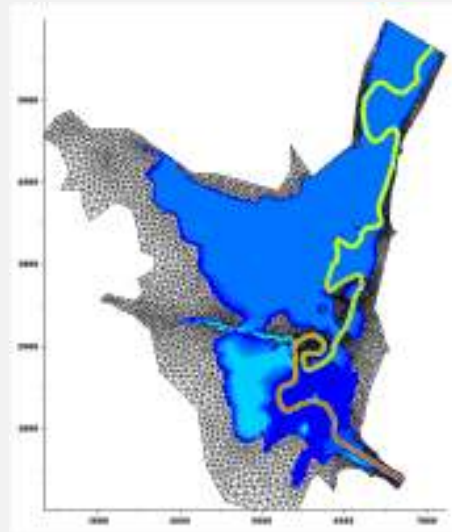


(Dutch project “Room for the River”; Brilly, 2001; Di Baldassarre et al., 2009)

# Mapping and planning

- Flood mapping > Land-use planning

Challenge: visualizing uncertainty



- Risk transfer (insurance)

Significant differences in European countries

*(Bates et al., 2005; Pappenberger et al., 2007; Di Baldassarre et al., 2010)*

# Summary

