

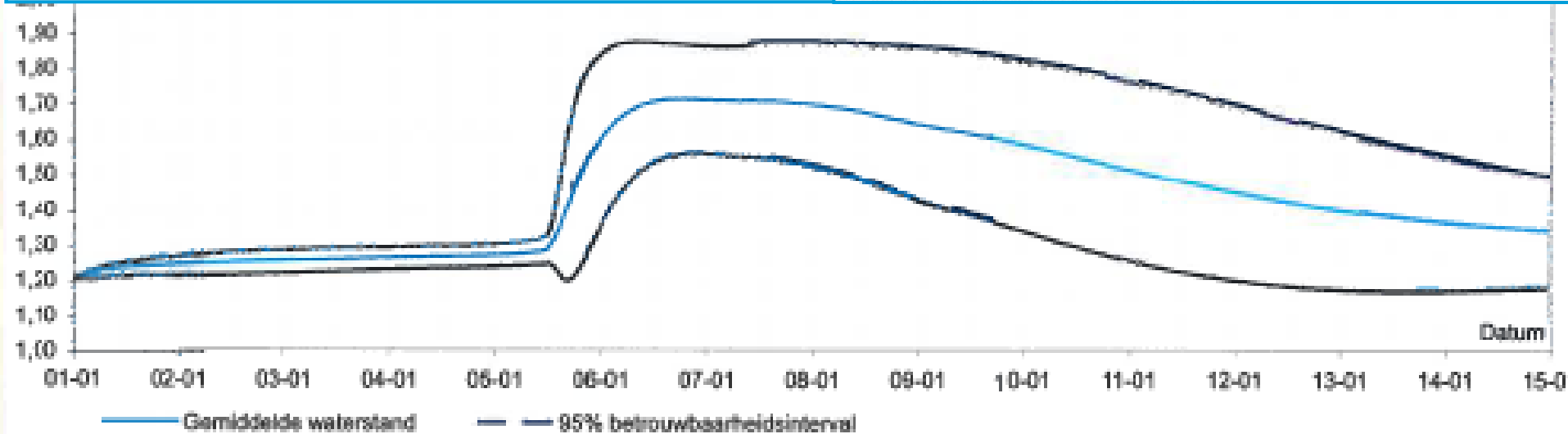
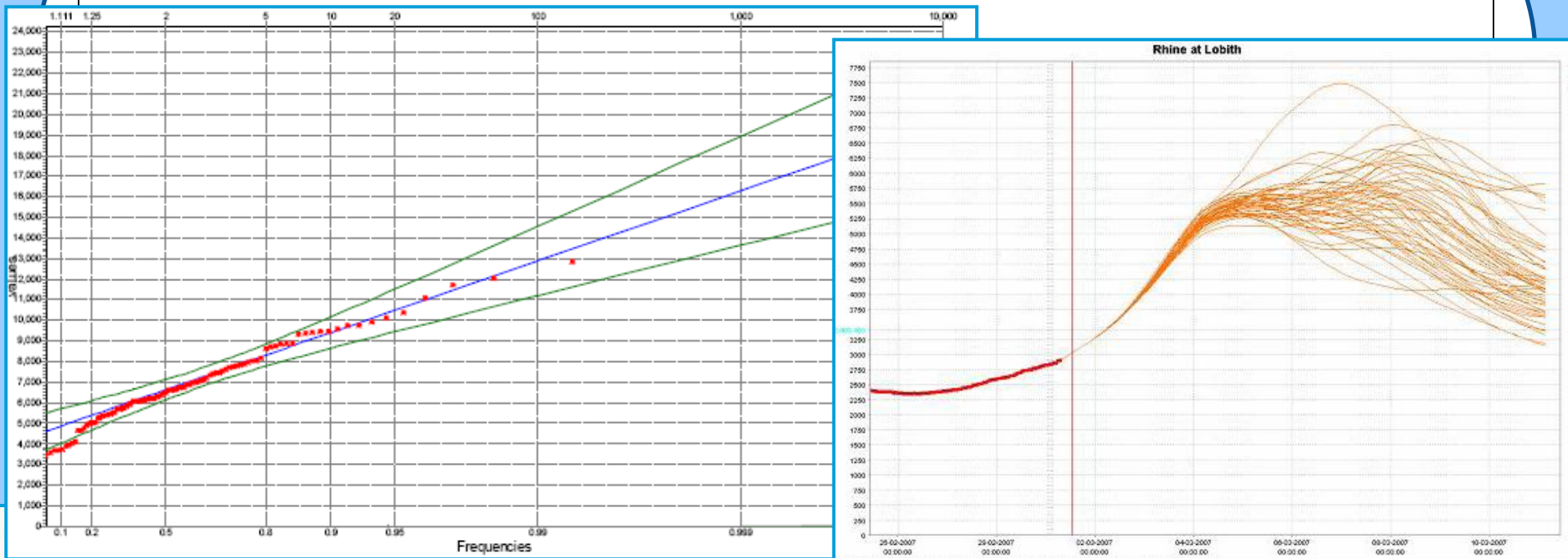


## **How policy makers and researchers deal with uncertainties in flood risk management**

**Marjolein MENS**

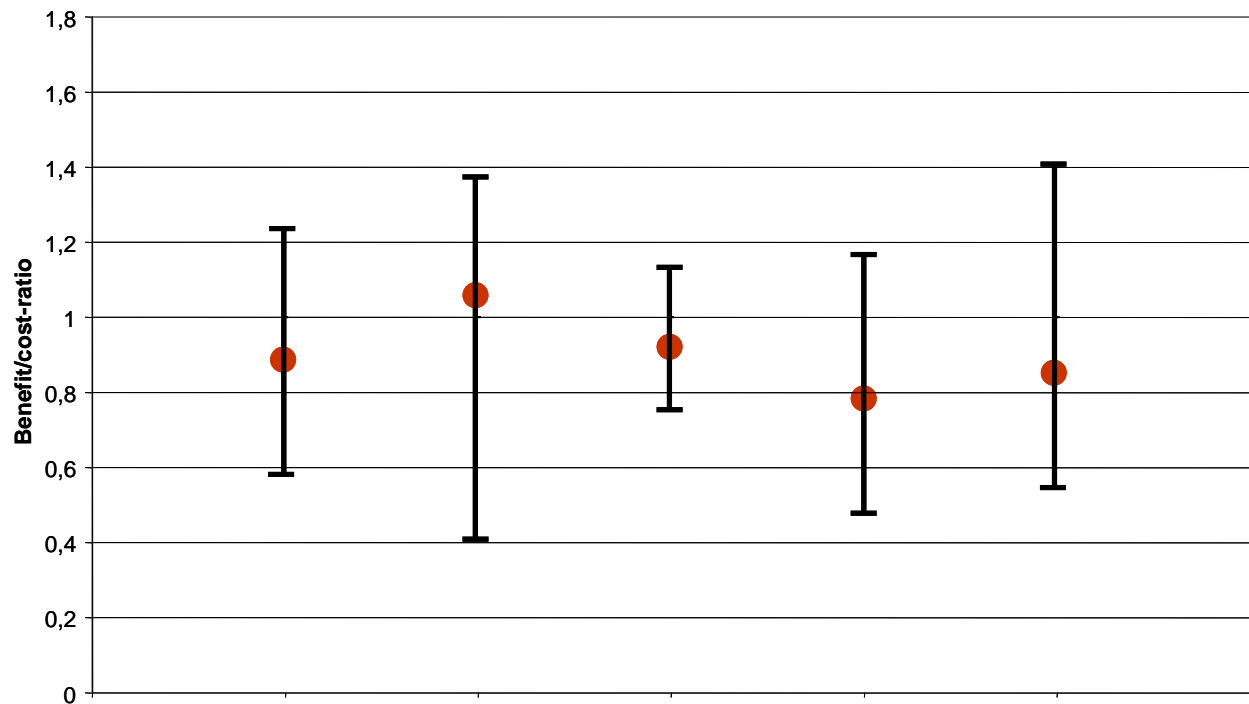
**Deltares, the Netherlands**

# Uncertainty communication



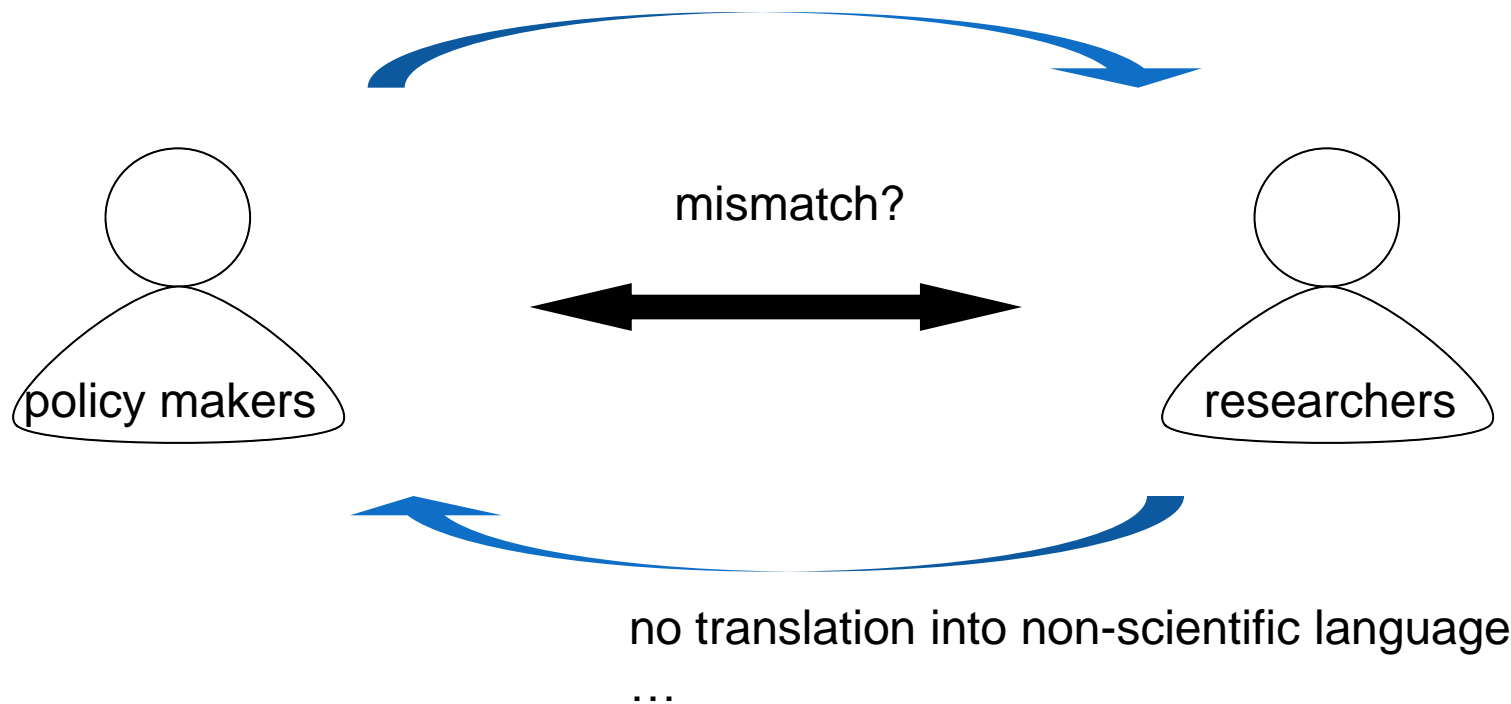
# Why is uncertainty information so important?

- Transparency
- It could influence the decision



# Uncertainty communication

request for single-value model outcomes

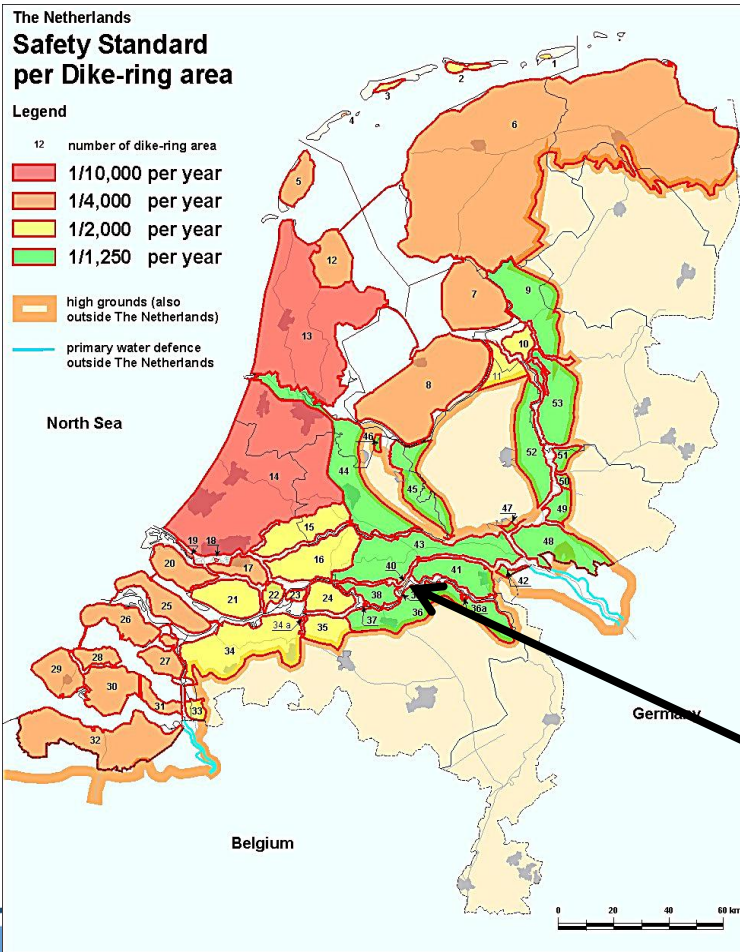


# Content

- Flood risk management in the Netherlands
- Compartmentalization study
- Set-up of the investigation
- Observations
- Keys to effective uncertainty communication
- Discussion: Do you recognize this ?



# Dike ring areas in the Netherlands



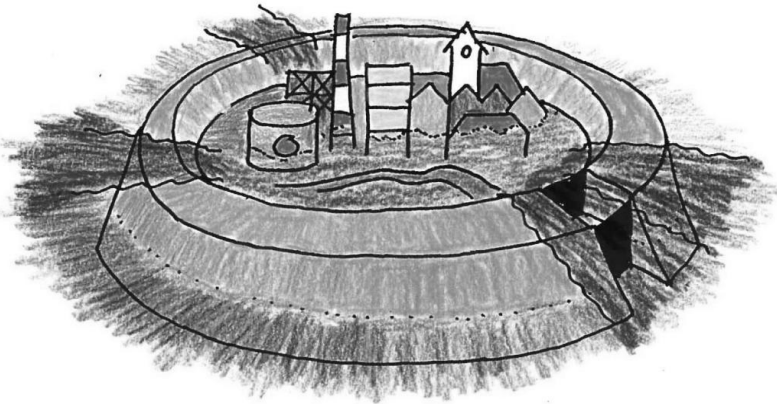
Dike ring is a closed system of dikes, dunes and structures that prevents an area against flooding from the sea, lakes or rivers



# flood risk management

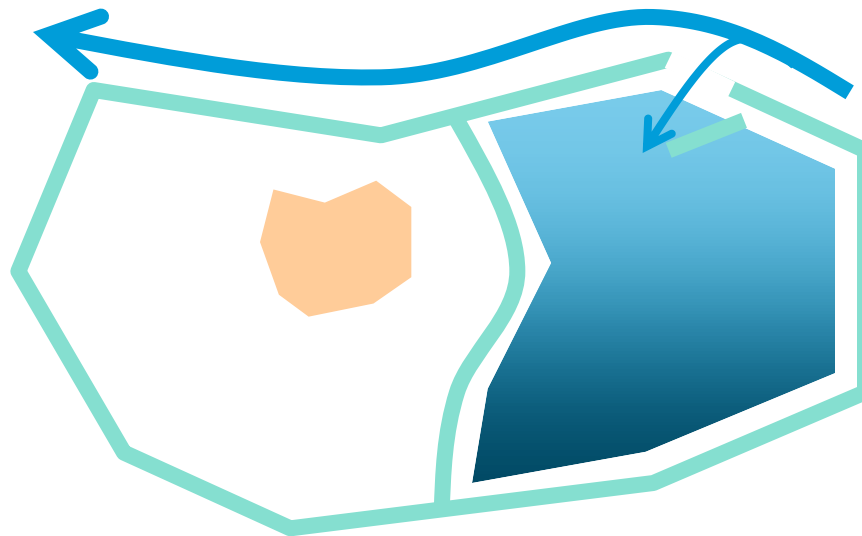
flood probability AND consequence

per dike ring area



# Compartmentalization

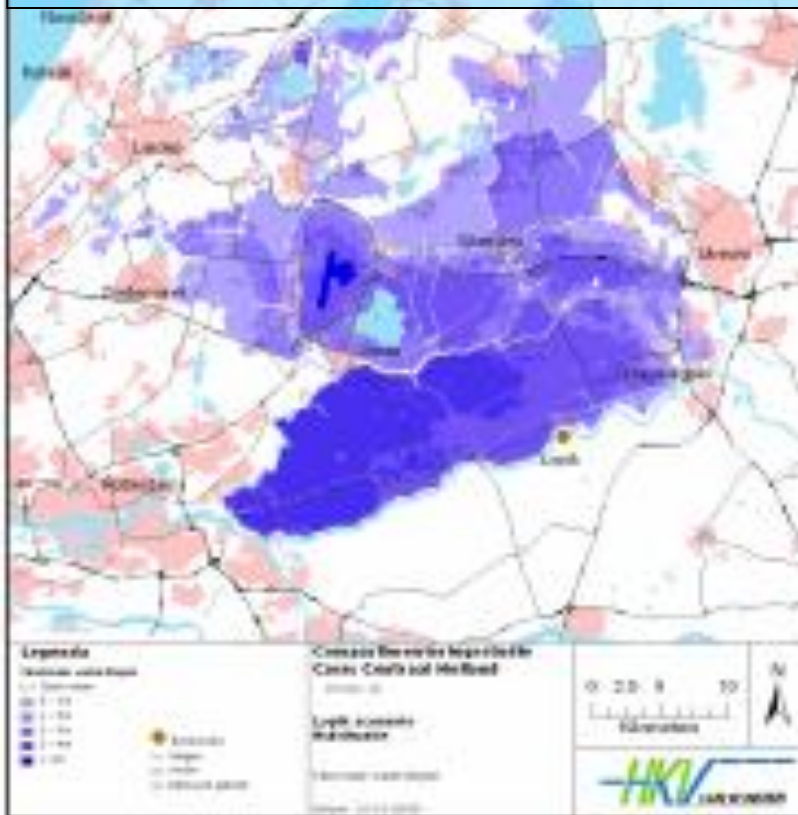
- 'secondary dikes'
- 'protecting air against air'



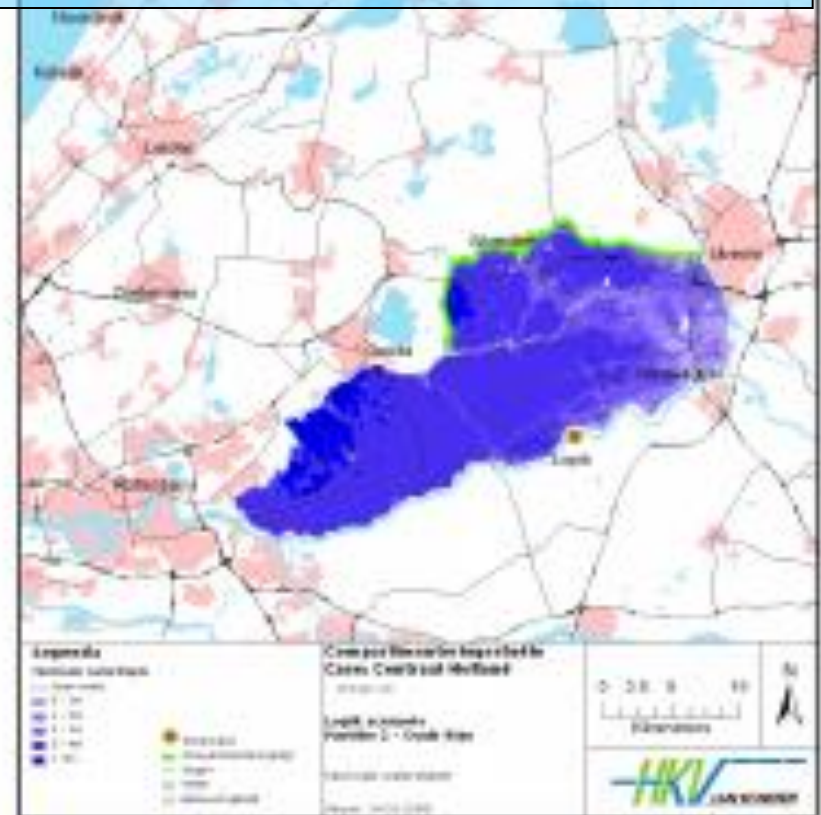


# Compartmentalization study

- Exploratory study; no decision to be made
- Mainly interested in absolute benefit/cost-ratio



a



b

# Research set-up

- Interviews with policy makers and researchers:
  1. Sources of uncertainty
  2. Level and impact of uncertainty
  3. Uncertainty presentation

And: scan of study reports

# Observation 1

*policy makers*

*researchers*

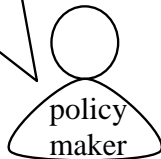
- Sources of uncertainty are discussed at a higher level of abstraction

Element	Source of uncertainty
Flood probability	Failure mechanisms
	Natural surprises
	Stability of structures
	Whether the standard of protection is met
	Strength of grass layer
	Overflow discharge
Damage	Indirect damages
	Damage curves
	Strength of regional embankments
	River discharge
	Shape of flood wave
	Breach location

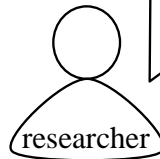
# Observation 2

- flood probability is considered the most important uncertain element

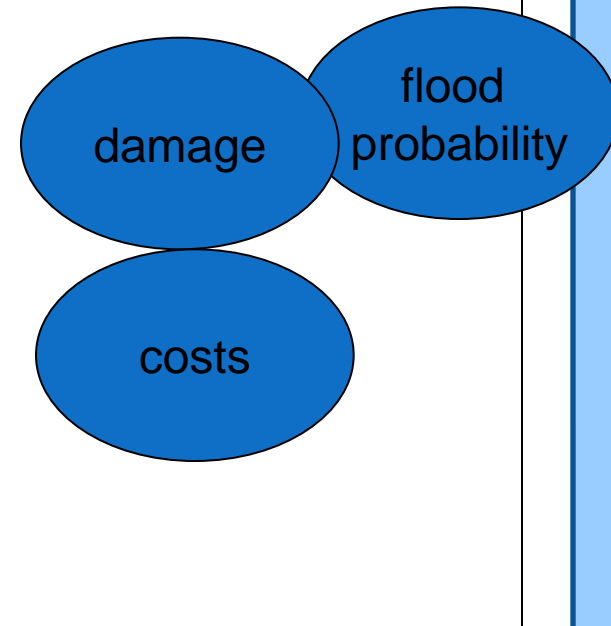
“The flood probability is more uncertain than damage and cost estimations.”



“The flood probability is very uncertain. We don't know exactly how stable grass layers are. This uncertainty could be reduced by field experiments.”



impact of uncertainty



level of uncertainty

# Observation 3

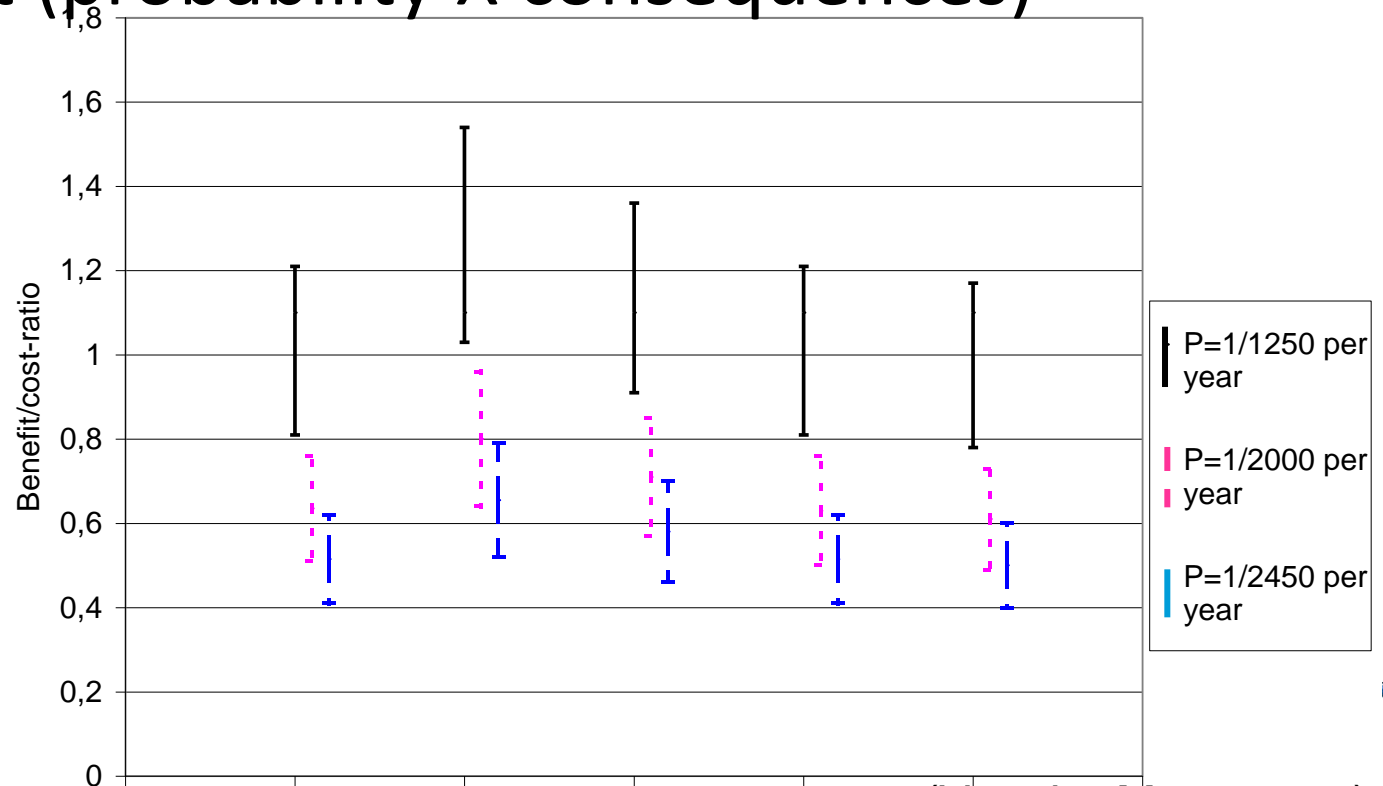
- Effect of uncertainty in flood probability was presented,
- other elements are less relevant

Alternative location	Costs	benefit/cost-ratio	
		1/1250 per year	1/2000 per year
1	2,8	2,6	1,6
2	5,1	0,8	0,5
3	3	4,3	2,7
4	3	5,0	3,1



# Observation 4

- explicit presentation of uncertainty information gave insight in the flood risk concept (probability X consequences)



(Van der Most, 2008)

# Keys to effective communication

## 1. Aggregate sources of uncertainty

to the main uncertain elements. This makes it possible for policy makers to participate in the discussion with researchers;

## 2. Listen to policy makers

to discover which decision criterion is most important to policy makers;

# Keys to effective communication

## 3. Restrict presentation of uncertainty information

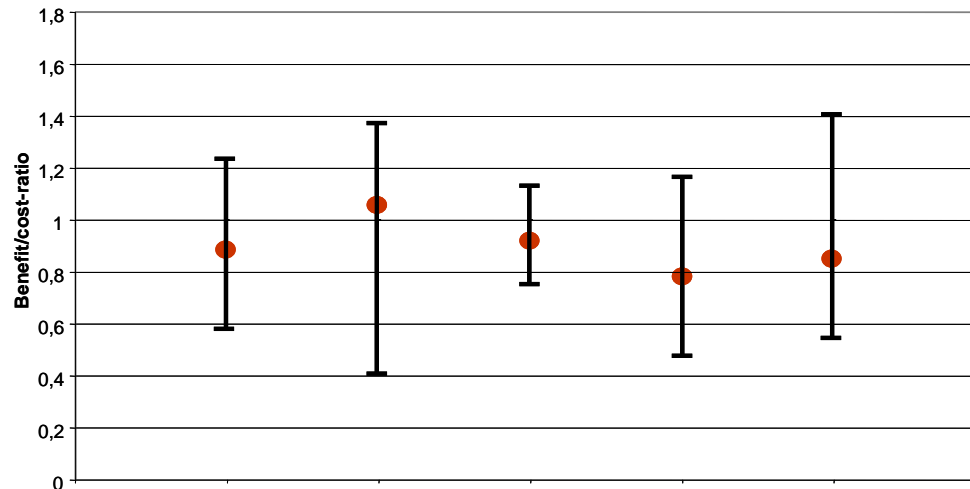
to the element with the highest uncertainty and the largest impact, and to the decision criterion that the policy makers consider most important.

# Questions

- *I am interested to learn about your own experience*

# Further (PhD-)research

- Develop method to make 'good' decisions under uncertainty:





# Robustness

- System should be robust to natural variability
  - Decision should be robust to uncertainties
- how to operationalise this??