

**Disasters :  
what we know and  
what we should know**

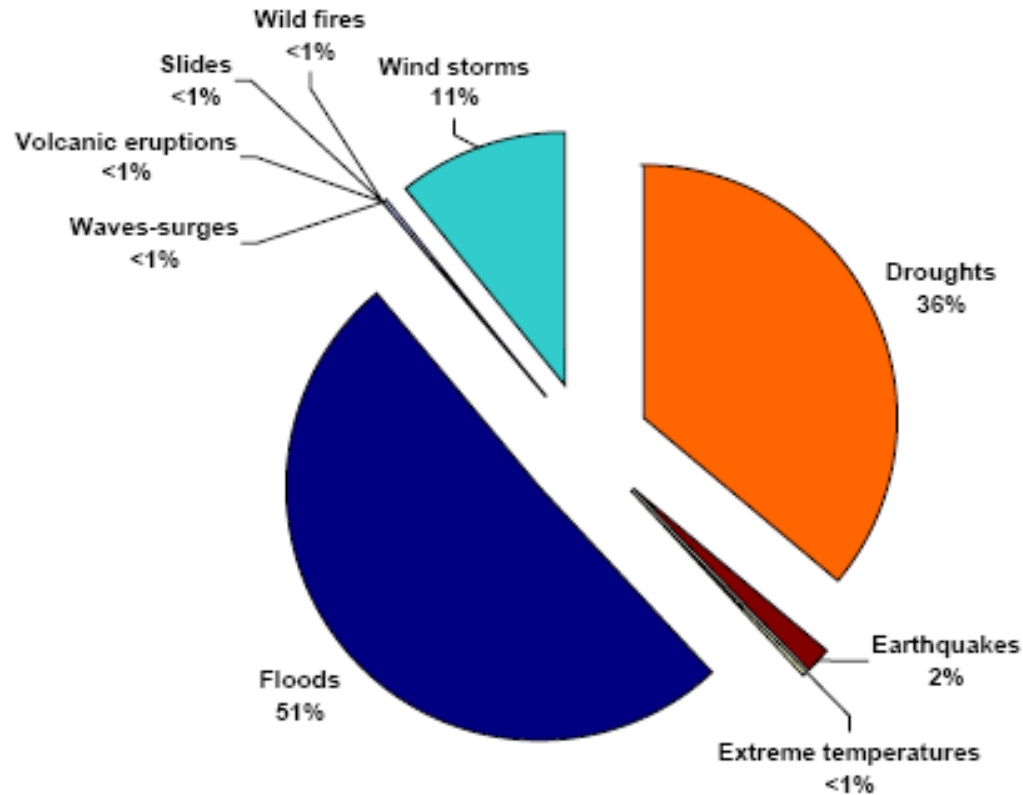
**G. Tetzlaff**

**DKKV**

## Distribution of people reported affected by natural disasters :

World 1974 – 2003; n ~ 5 000 000 000

affected :  
injured +  
homeless +  
„affected“



**~1/3**

of the world  
population is  
affected by a natural  
disasters in a  
decade,  
with ~95% weather  
induced!

www.em-dat.net, CRED 2005

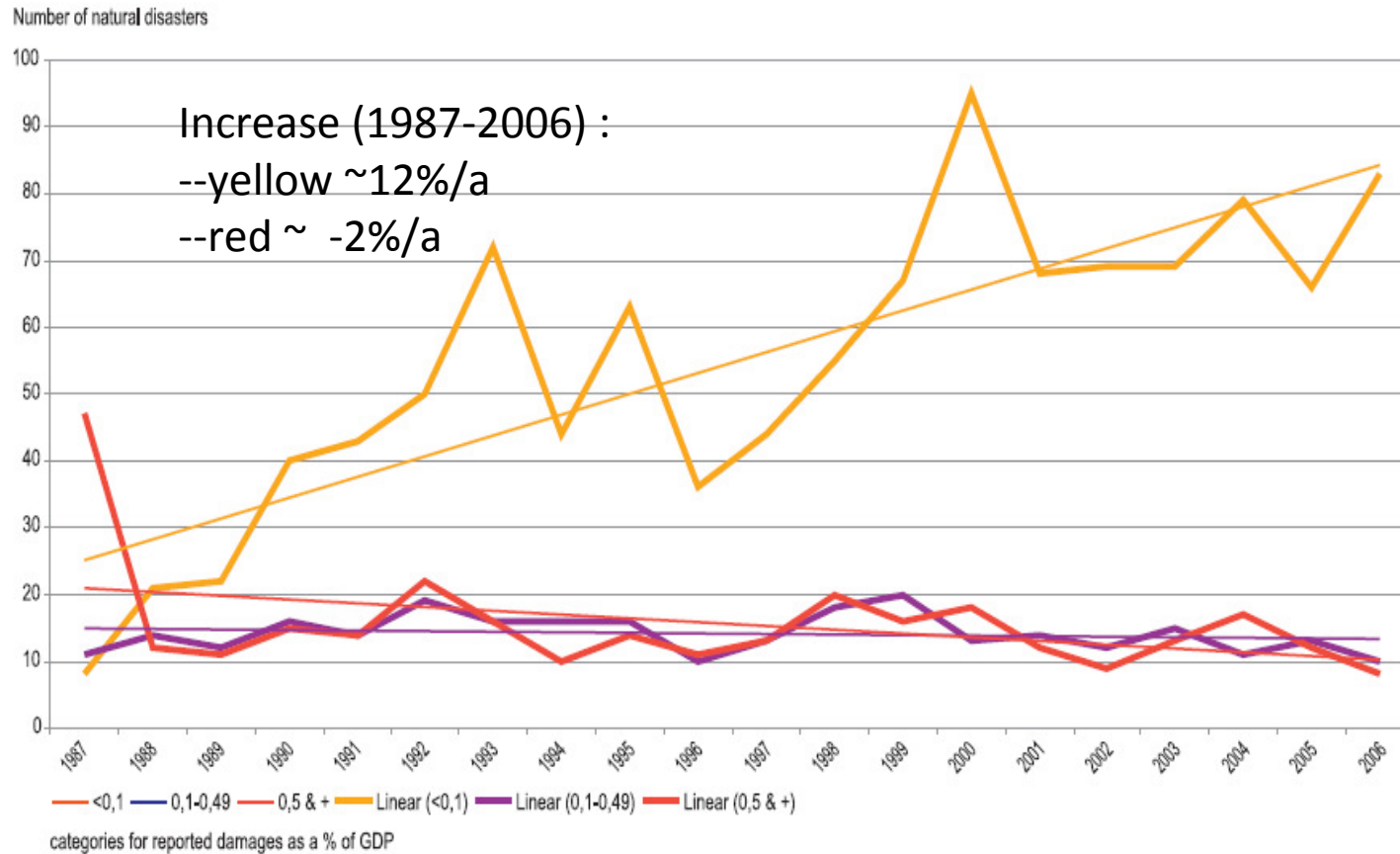
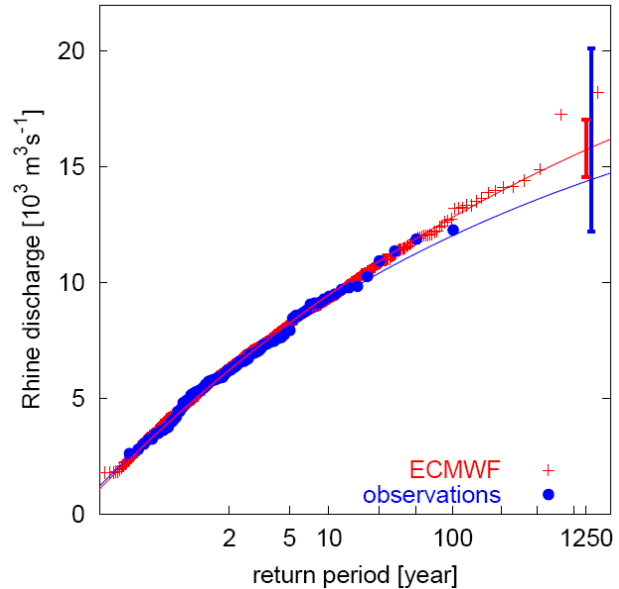


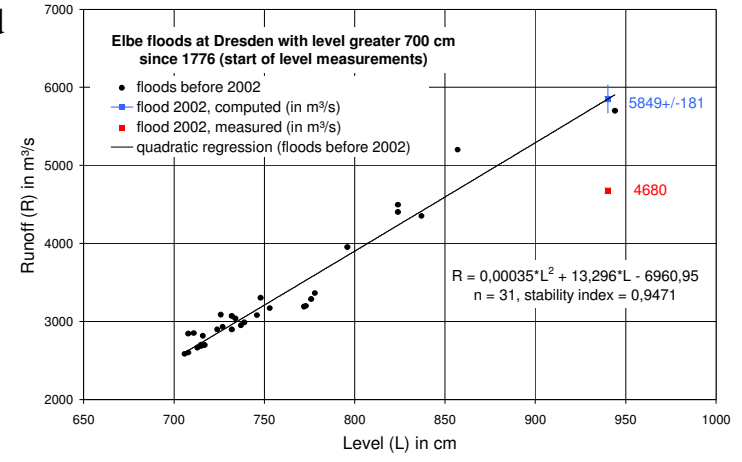
Figure 13 – Natural disasters categorized by amount of damages (in 2006 US\$ million) as a percentage of GDP – numbers and linear trends

CRED 2008

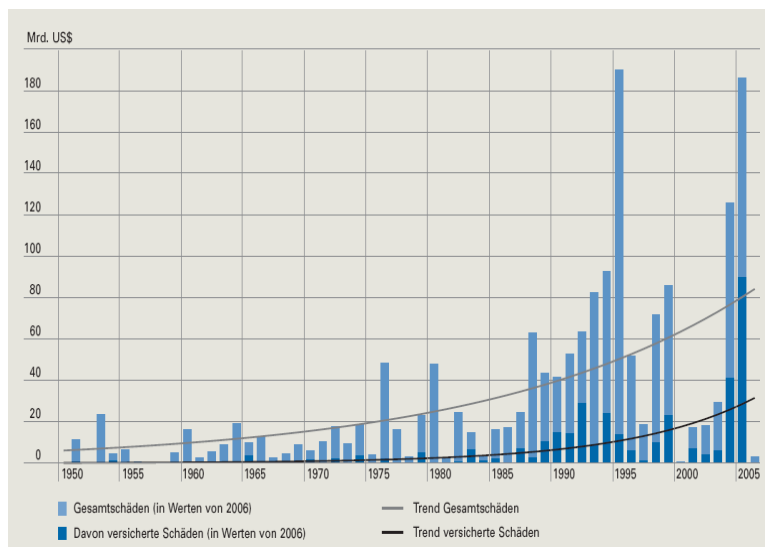
# Uncertainty of rare natural events!



Gumbel plot for the 100 observed annual maximum Rhine discharges at Lobith (1900-2000) (blue) and for the 1569 annual maxima as derived from the ECMWF data via Eq. 4 (red). Also shown are the extrapolated GEV fits to 1250-year return periods and the 95%-confidence intervals to the observations and to the ECMWF data (van den Brink et al. 2004).



# Uncertainty of disaster data



Increase (linear) from 1987 to 2006 :  
~10%/a; MunicRe 2007

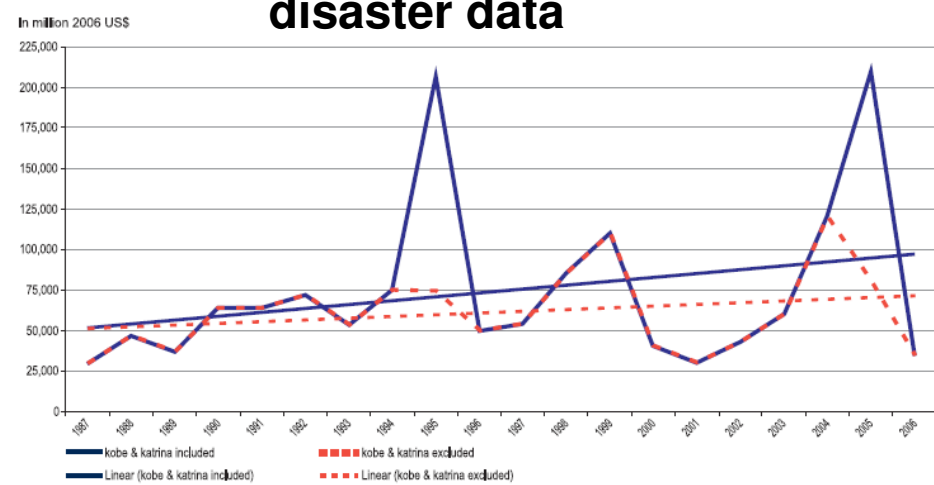
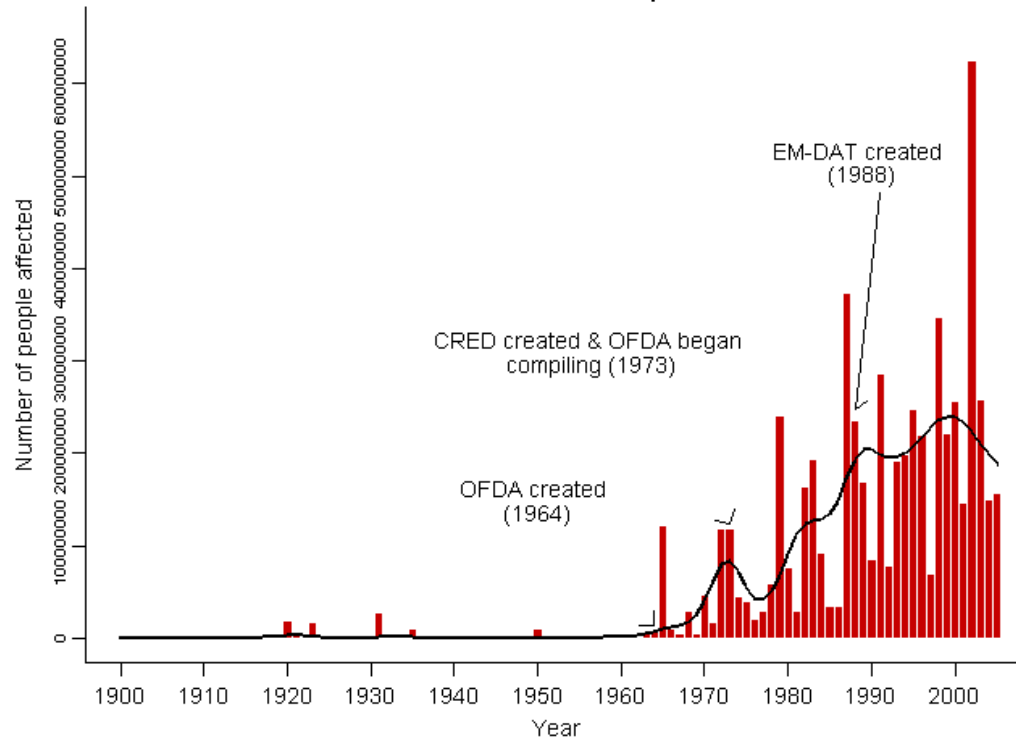


Figure 3 – Economic damages due to natural disasters (1987-2006)

Increase (linear) from 1987 to 2006 :  
~2.3%/a (resp. ~1.4%/a); CRED 2008

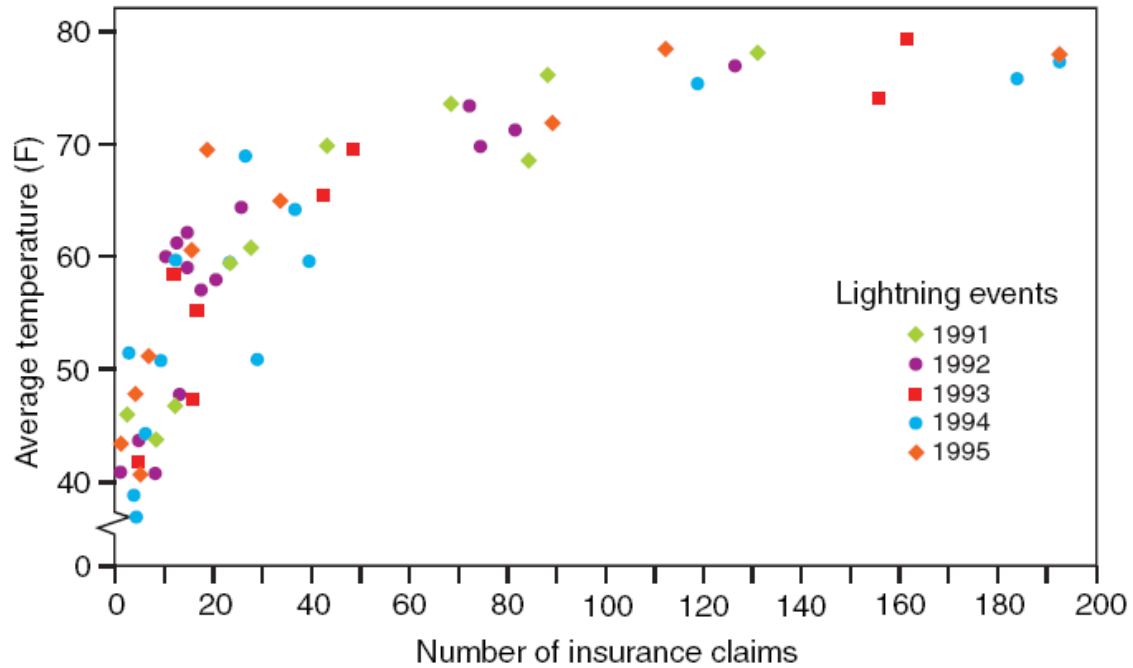
## Natural disasters reported



EM-DAT: The OFDA/CRED International Disaster Database - [www.em-dat.net](http://www.em-dat.net) - Université Catholique de Louvain, Brussels - Belgium

## CRED 2006

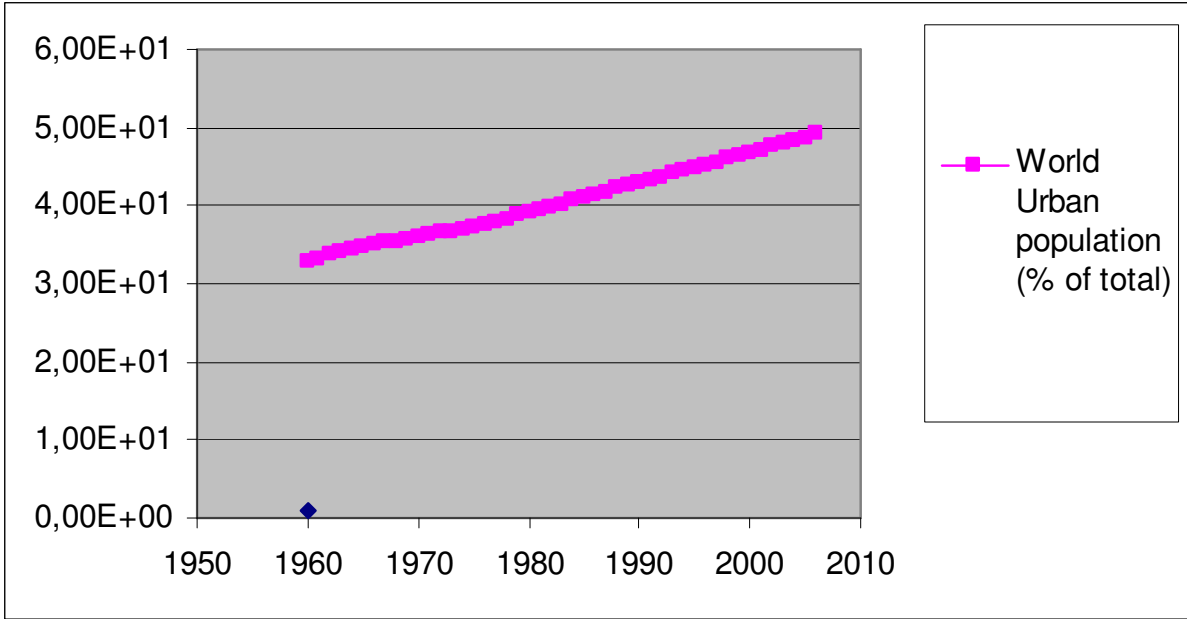
**Damage function** : non-linear and complex!  
This particularly applies to „protected“ systems  
(building codes, dikes, warning systems,...)



Mills, Science 2005

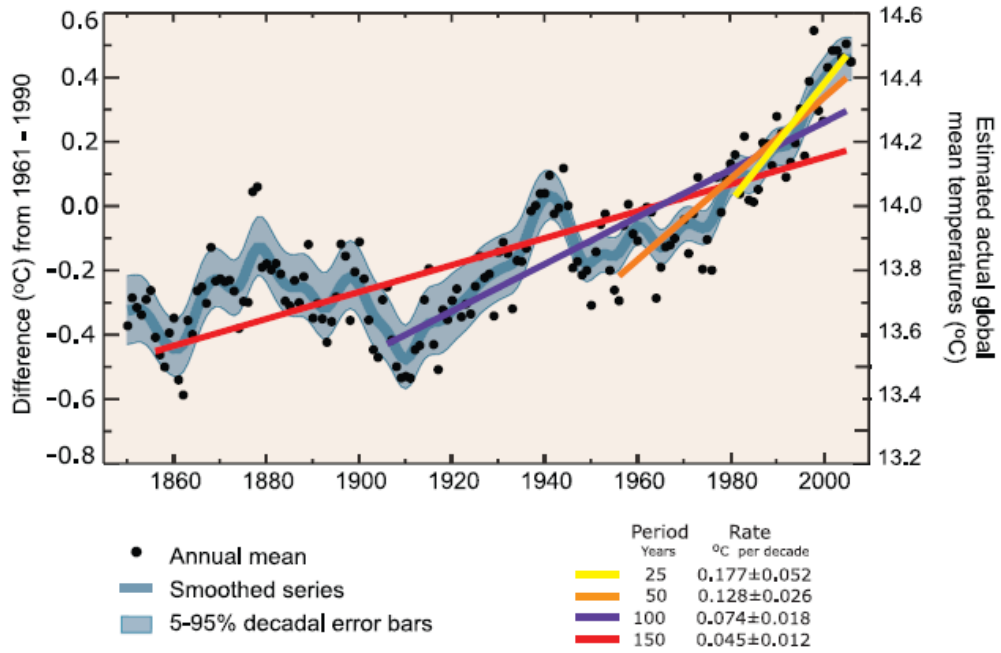
Increase of urban population 1987-2006. Urban population grows at twice the rate of the total population.

In any urban setting population and material goods are concentrated, resulting in increased vulnerability because of the loss of self-sufficiency and of complex supply systems.

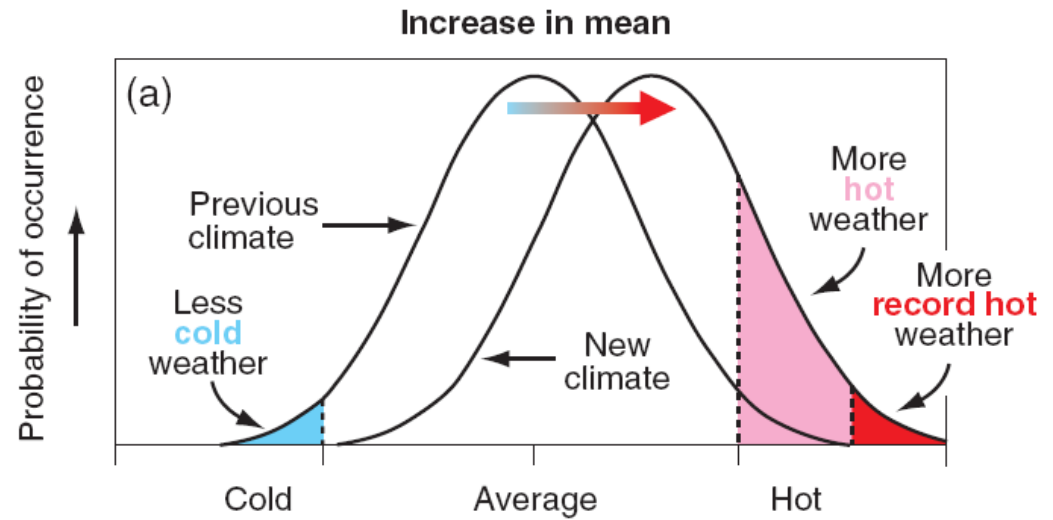


World Bank 2008

### Global Mean Temperature



### IPCC 2007





## **Global Trends: Disasters are NOT natural**

### **Natural and human-induced hazards**

Increased intensity and frequency of extreme climatic events

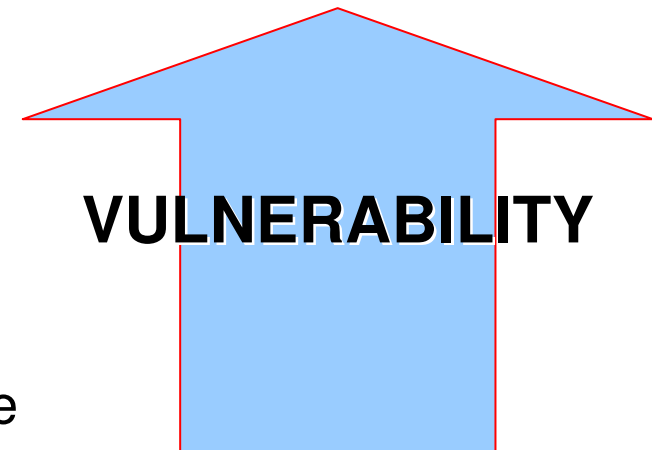


**HAZARDS +  
EXTREME EVENTS**

### **Increasing vulnerability:**

**Socio-economic:** poverty, unplanned urban growth, lack of awareness and institutional capacities...

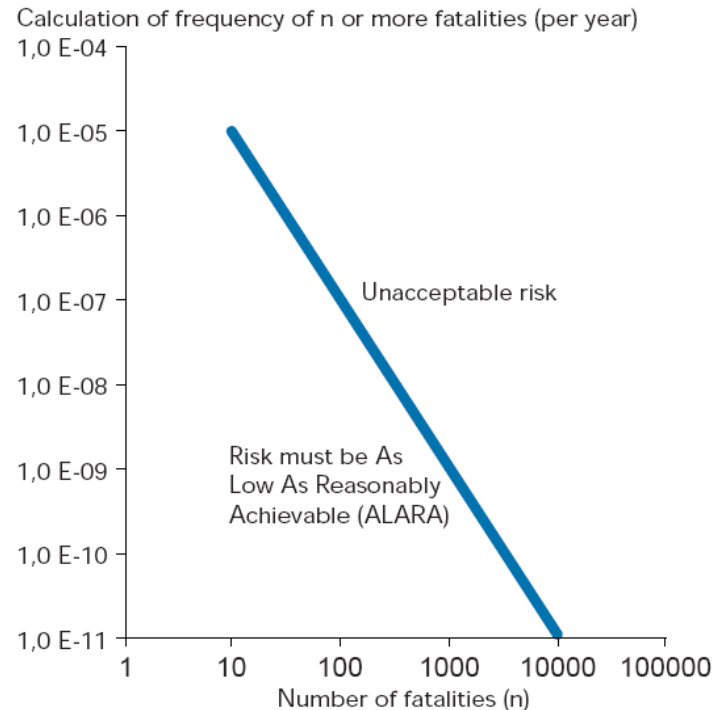
**Physical:** insufficient land use planning, housing, infrastructure located in hazard-prone areas...



**VULNERABILITY**

### **Environmental degradation:**

unsustainable management of ecosystem services, coasts, watersheds, marshlands...



What is the acceptable risk and how can it be agreed upon? Straightforward economical optimisation cannot give the answer (cost-benefit-analysis).

## HFA :Governance!

Source: VROM (the Netherlands Ministry of Housing, Spatial Planning and the Environment)

What do we need to know better :

- disasters of the past (IRDR),  
as examples and basis for understanding processes
- extreme events AND vulnerabilities,  
areal coverage
- extrapolations into the future of extremes and vulnerabilities
- disaster prevention strategies implemented into  
concrete measures and planning

**Thank you!**