

## Disaster Risk Reduction and Mitigation by Strategies of Regional and Town Planning

Prof. Dr.-Ing. Theo Kötter  
Institute of Urban Planning and Land Management  
University of Bonn, Germany

- Disaster risk reduction as a challenge for spatial planning
- Interaction between hazard, vulnerability and risk
- Strategies of risk reduction by spatial planning
- Recommendations

## Natural hazards



## Reconstruction and what else?

Tasks of disaster risk management:

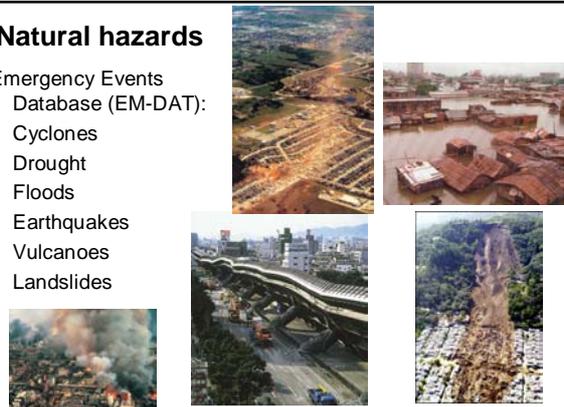
- assessment of risk
- monitoring Implementation of early warning systems
- **reduction of hazard impacts by technical measures or spatial planning**
- recovery and reconstruction



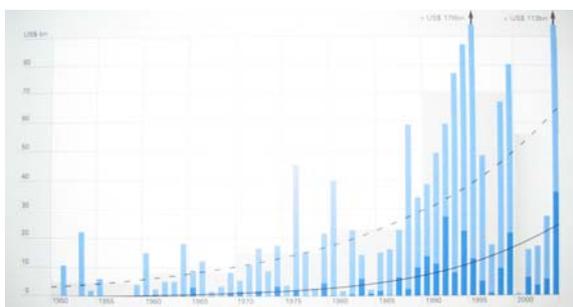
## Natural hazards

Emergency Events Database (EM-DAT):

- Cyclones
- Drought
- Floods
- Earthquakes
- Volcanoes
- Landslides

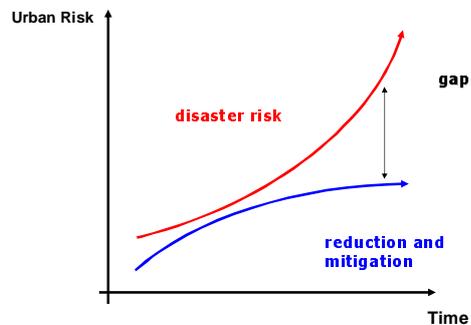


## Economic losses and insured losses

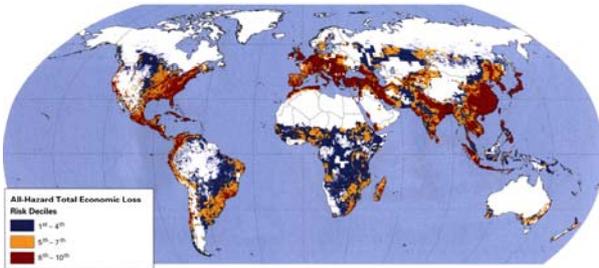


■ Economic losses  
■ of which insured losses  
- - - Trend of economic losses  
— Trend of insured losses

## Increasing gap

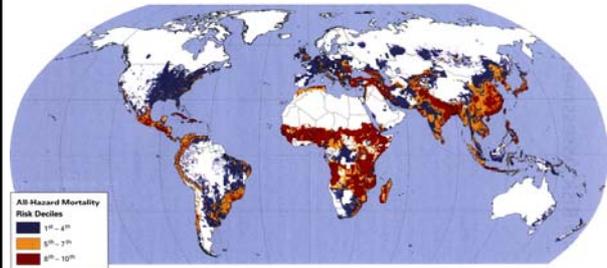


### Global distribution of disaster risk hot spots of all hazards



World Bank 2005

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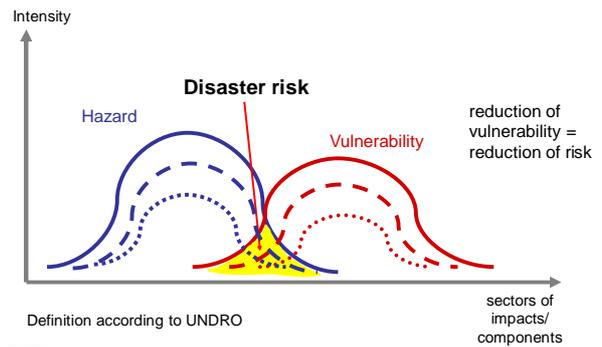
World Bank 2005

### The 30 largest urban agglomerations and urban growth of population (2003)

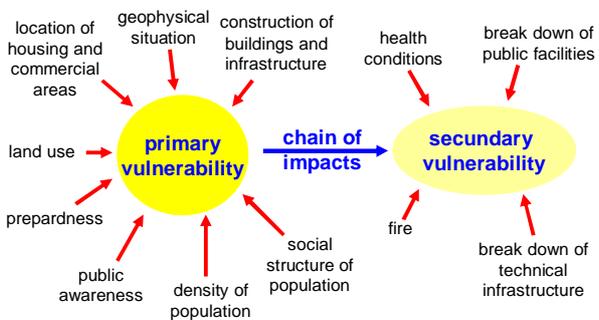


Urban Population Growth Rates by Continent

### Hazard – disaster risk – vulnerability



### Factors of vulnerability in case of earthquakes



### Challenges and contributions of spatial planning

- planning process:
- public and planners awareness concerning disaster risks
  - public preparedness
- planning concept:
- (local) database of hazard events and vulnerability in a suitable scale
  - suitable technical tools
  - proved models of urbanisation
  - strategies for urban and regional planning

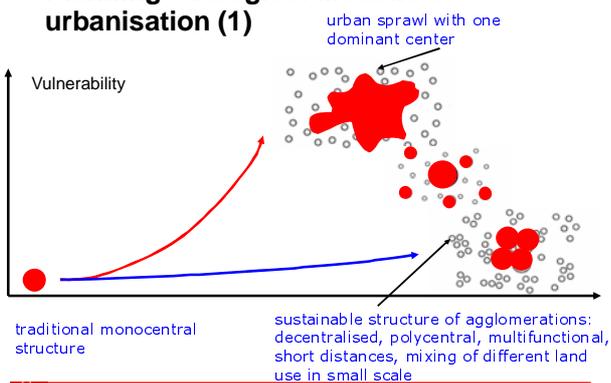
## Change in the idea of planning

- static plan as a design product
- dynamic concept
- planning as a process
  - integration of risk management and planning
  - implementation of reduction and mitigation strategies in the planning process
  - environmental impact assessment and risk assessment

## Strategies to reduce disaster risks within the process of urbanisation

1. models of sustainable urbanisation
2. zoning
3. definition of standards
4. risk assessment in the planning process
5. good governance and land policy

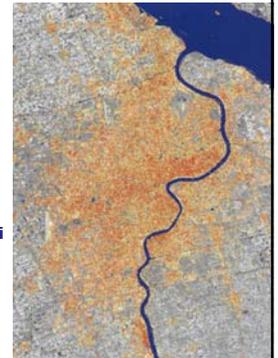
## Planning strategies: Modells of urbanisation (1)



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- Structure plan of the megacity **Shanghai**
- Density in different centers
  - mixing of different land use
  - polycentrality
  - capacity of mass transport systems
  - cooperation between agglomerations and their surroundings



## Planning strategies: Zoning (2)

Land use categories on the regional and local level considering the risk:

- regulary building zones
- open spaces/conservation zones
- no-building zones (e.g. flooding areas)

Problems:

- existing settlements:
- existing infrastructure and facilities
- coastal zones: one third of the worlds population is living within 100 km distance from the coasts
- unplanned settlements: up to 60 % in the mega cities

## Planning strategies: Zoning (2)

Spatial data as basis for multihazard disaster risk assessment (Caracas)



World Bank 2005

### Planning strategies: Standards (3)

- Definition of standards (e.g. building standards, land use standards)
- Standards are normally the result of a cost - benefit - calculation: society's value judgements and economical values
- Integration of standards of planning process and building in planning and building codes
- Implementation of local standards and regulations for new development areas in building plans
- Implementation of local standards and regulations for urban redevelopment measures

### Planning strategies: Risk assessment (4)

- Example: Munich RE risk index for megacities
- Risks of material losses
- three components: hazard, vulnerability and exposed values
- **Hazards:**
  - Earthquake, wind storms, flood, vulcanic eruption, bush fires, winter damage
  - Classification of hazards depending on the average annual losses
- **Vulnerability:**
  - Quality of construction (building classes)
  - Standard of preparedness
  - Building density

### Planning strategies: Risk assessment (4)

- **Exposed values:**
  - Residential areas: average value per household
  - Industry/commerce: gross domestic product (GDP)
- **Calculating the total risk index:**
  - Standardisation of hazards, vulnerability and values (maximum value each: 10)
  - Risk index: product of the three components

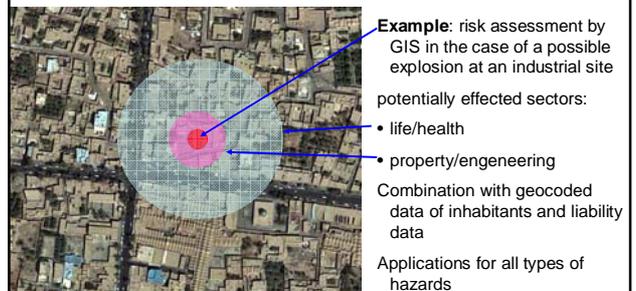
### Natural hazard risk index for megacities (4)



### Planning strategies: Risk assessment (4)

- Relevance for planning practise
  - Effective tool for quick identification and transparency of risks
  - Assessment of hazards and vulnerability have to be ojectified by specific surveys
  - Need of more detailed data
  - Modular methodology can be more detailed, expanded and applied to smaller towns and entire countries
  - Methodology is suitable for urban and regional planning

### Planning strategies: Risk assessment (4)



**Example:** risk assessment by GIS in the case of a possible explosion at an industrial site

potentially effected sectors:

- life/health
- property/engineering

Combination with geocoded data of inhabitants and liability data

Applications for all types of hazards

## Planning strategies: good governance and land policy (5)

- information of the inhabitants about the risks
- transparency in the real estate market; information of the market actors
- relocation of strategic facilities from risky areas
- building up of new facilities and infrastructure as incentives for the settlement development
- Implementation of emergency rescue strategies



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25

## Recommendations

- Disaster risks must be involved as public concerns in the weighing process of planning on all planning levels like the environmental impact assessment
- Research:
  - Framework and indicators for geocoded risk assessment
  - A definition of standards is needed, that not only embraces the aspects of the insurance industry
  - Assessment tools and standards have to be integrated in the planning process
- The ability of controlling the urbanisation process is a key competence to shape the future, that must be based on efficient disaster risk reduction by spatial planning



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26



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FIG Working Group 8.4  
„Disaster Risk Management“

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28