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

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

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

Increasing gap
Global distribution of disaster risk hot spots of all hazards

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

Factors of vulnerability in case of earthquakes

Challenges and contributions of spatial planning

1. Public and planners awareness concerning disaster risks
2. Public preparedness

3. (Local) database of hazard events and vulnerability in a suitable scale
4. Suitable technical tools
5. Proven models of urbanisation
6. 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: Models of urbanisation (1)

- traditional monocentral structure
- sustainable structure of agglomerations: decentralised, polycentral, multifunctional, short distances, mixing of different land use in small scale

Planning strategies: Zoning (2)

Land use categories on the regional and local level considering the risk:
- regularly 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 world’s population is living within 100 km distance from the coasts
- unplanned settlements: up to 60% in the mega cities
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, volcanic 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

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)

Vulnerability Exposed value Hazard

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 objectified 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

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

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