•WMO

Training Workshop on Integrated Flood Management for the Nile Basin Countries

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Integrated Flood Management as a development policy

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Flood 2005 in Bern, Switzerland

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Settling on floodplains has enormous advantages

www.gaestehaus-loreley.de

SPIEGEL ONLINE 2004

and at the same time poses great risks

Integrated Flood Management

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Integrated Flood Management (IFM) refers to the integration of land and water management in a river basin using a combination of measures that focus on coping with floods within a framework of IWRM and adopting risk management principles while recognizing that floods have beneficial impacts and can never be fully controlled.

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Integrated Flood Management:
Objectives

–**Sustainable development:** balancing development needs and flood risks

–**Maximizing net benefits:** ensure livelihood security, poverty alleviation and managing vulnerability

–**Minimizing loss of life**

–**Environmental preservation**

Sustainable Development "meets the needs of the present without compromising the ability of future generations to meet their own needs."

In IFM reference is mainly the use of flood plains

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Challenges of Flood Management

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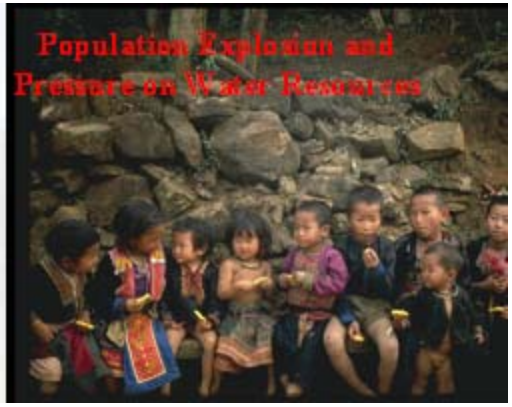

Population increase

Securing livelihoods

Save lives

Ecosystem Conservation

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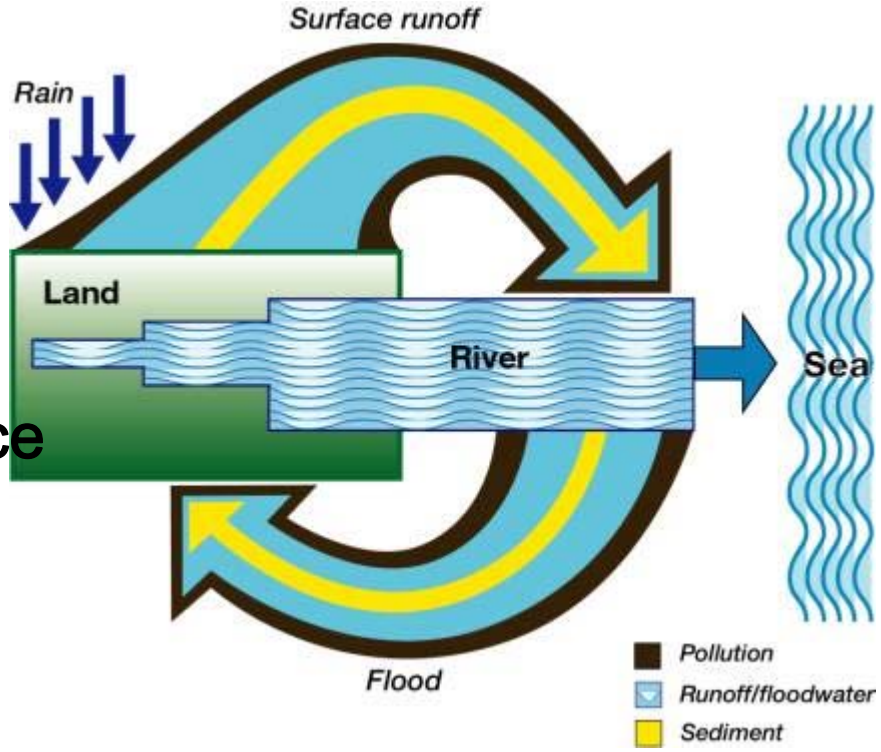
Characteristics of IFM

Recognition that a river basin is a dynamic system with many interactions/fluxes between land and water bodies

- Flood and drought management
- Effective use of flood waters
- Ground water and surface water interaction in flood plains



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IFM: Principles

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Risk Management

Water Cycle as a whole

Multi-hazard approach

- Particularly within a basin where there is interaction between various hazard development mechanisms
- Cross-sectoral integration of disaster management strategies
- Disaster risk assessment
- Early warning and forecasts

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Requirements of IFM

Clear and objective policies

- Comprehensive assessment and understanding of development opportunities and flood risks;
- Multi-sectoral approach to reach the objectives;
- Appropriate legislation and regulations; and
- Innovative economic instruments.

with a multidisciplinary approach

- Appropriate Institutional structures for proper coordination and linkages;
- Enabling participatory processes; and
- Information management and exchange mechanisms.

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IFM: Integrates……?

- Land and Water Management
- Upstream and Downstream
- Structural and Non-structural
- Short term and Long-term
- Local and basin level measures
- Top down and Bottom up decision making
- Development needs with ecologic and economic concerns
- Stakeholder participation

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What is risk?

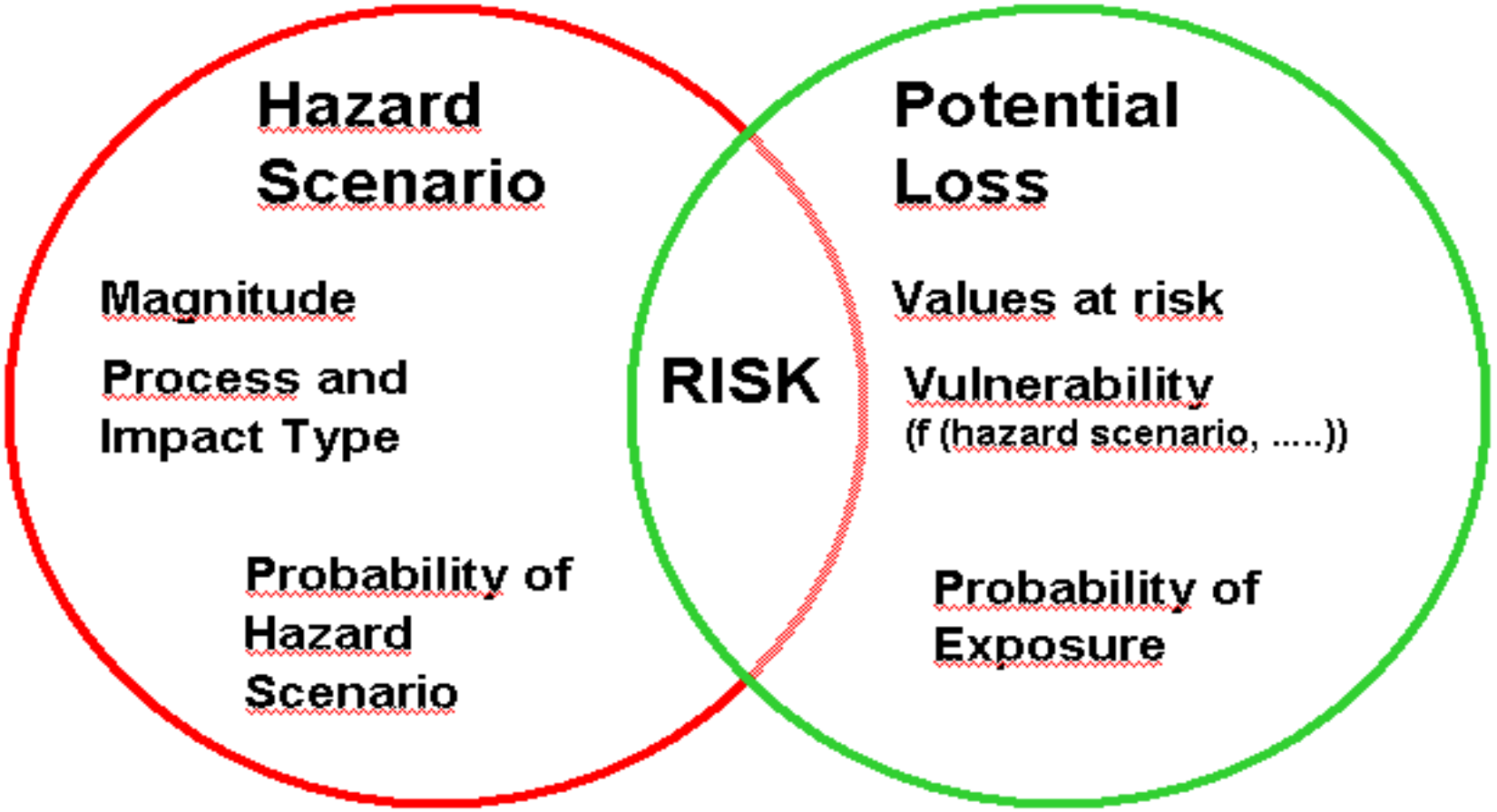
Probability x Consequence
Hazard x Exposure x Vulnerability

What is the hazard ?

Knowledge: Expert
Mitigation public domain

What are the consequences ?

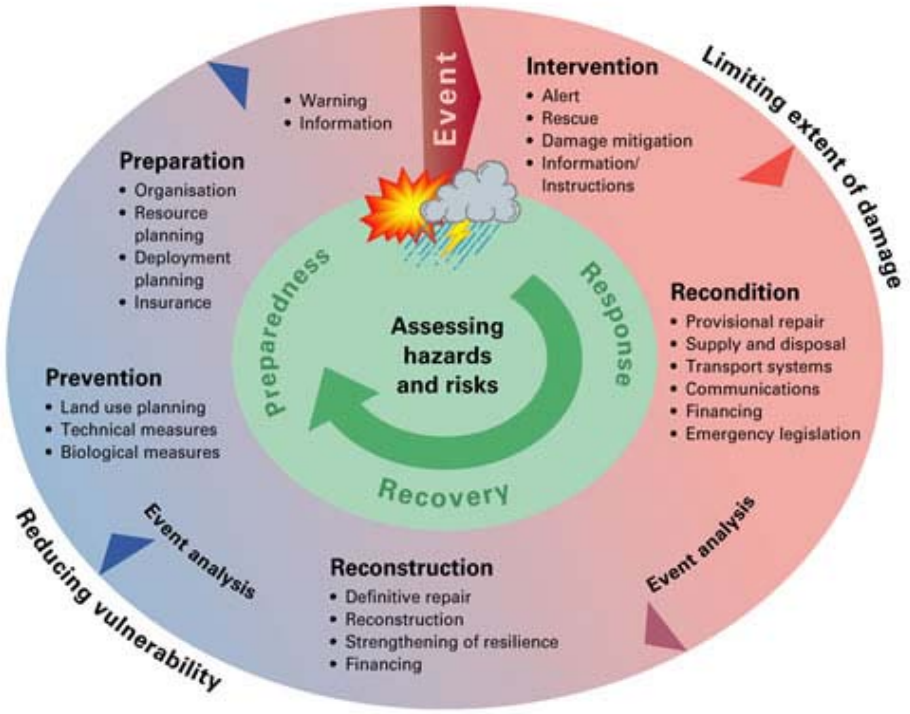
Knowledge: Stakeholder
Mitigation. Everyone



IFM: Principles

Risk Management

- Mitigation and Preparedness
- Response
- Recovery and rehabilitation
- Residual risks



→ Risk assessment indispensable (first step: hazard maps)

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Framework for Risk Management

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Governance and Organizational Coordination and Cooperation

Risk Identification and Assessment	Risk Reduction (Prevention & Mitigation)	Risk Transfer
Historical hazard data, analysis and changing hazard trends	Sectoral planning	Catastrophe insurance/ bond markets
Exposed assets & vulnerability	Early warning systems	Alternative risk transfer
Risk quantification	Emergency preparedness & planning	

Information and Knowledge Sharing
Education and training

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Priority actions (Swiss rules)

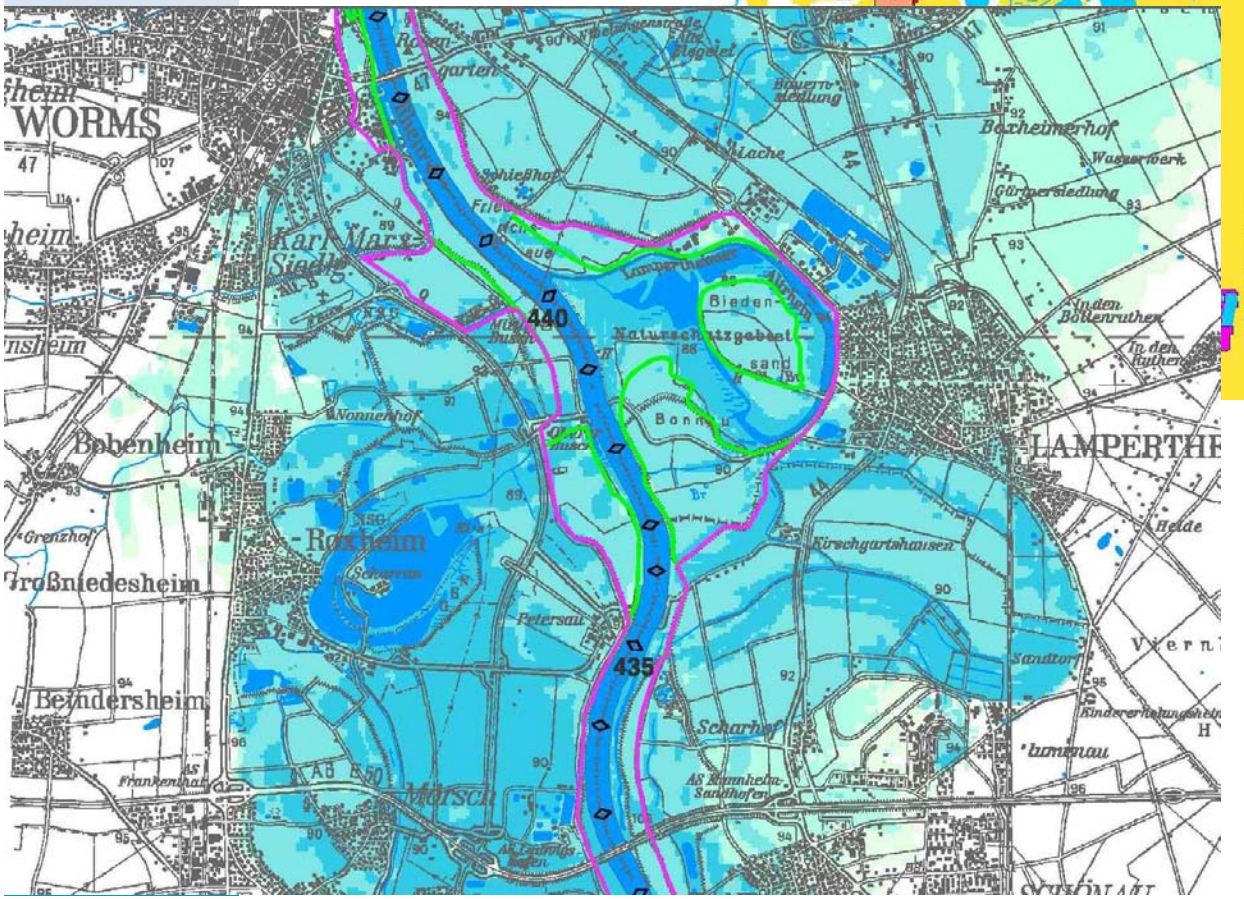
1. Hazard assessment
2. Information, Education
3. Warning and alert
4. Emergency planning
5. Master planning
6. Structural and non structural measures (overload)
7. Organizing necessary resources

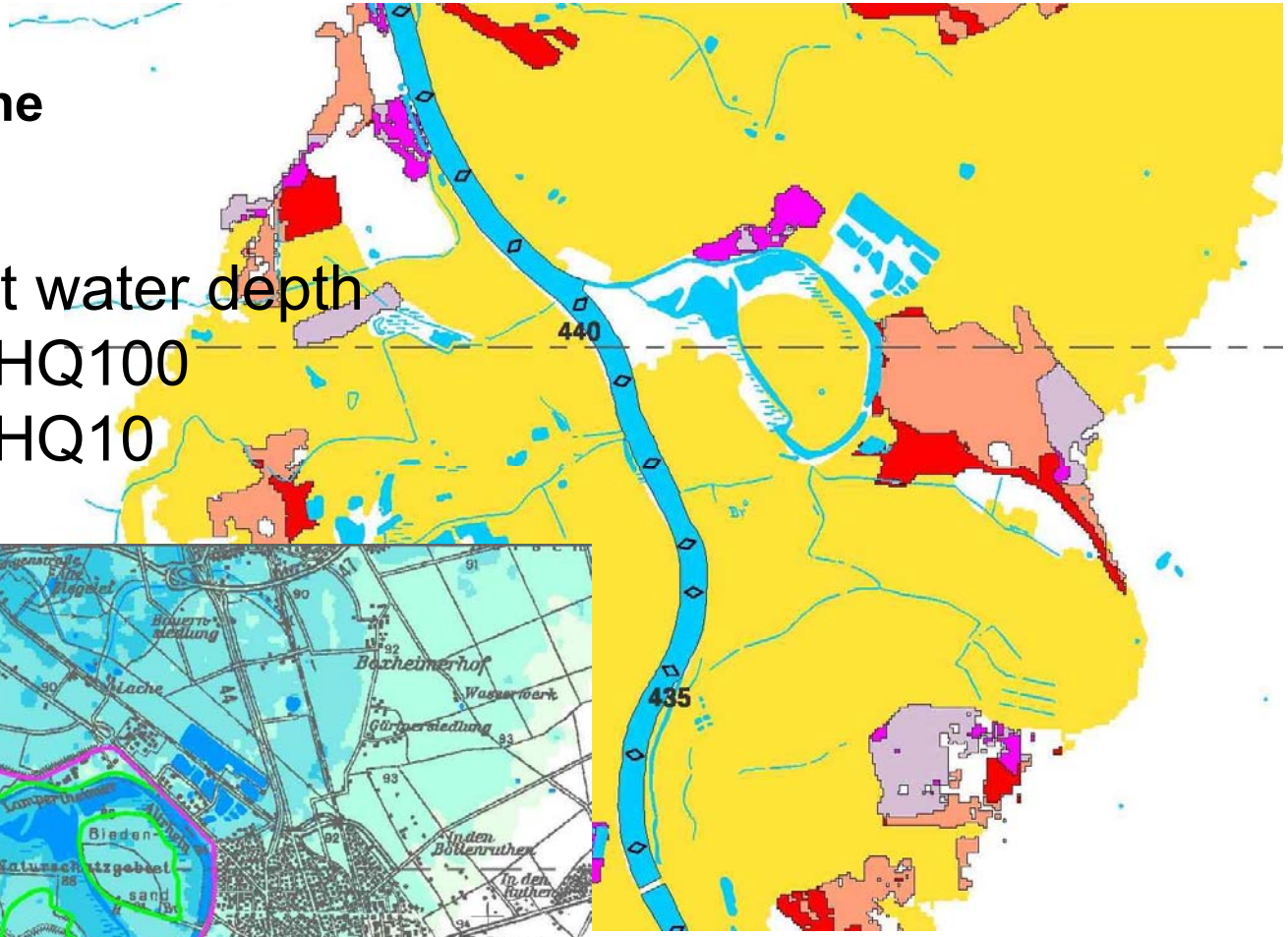
Understand the type of the event, only then you can react properly

Flood is not flood

Hazard map of the Rhine

Blue different water depth
Red line limit of HQ100
Green line limit of HQ10





Damage potential
Yellow Agriculture
Red Settlements
Cyan Industries

Protection Objectives:

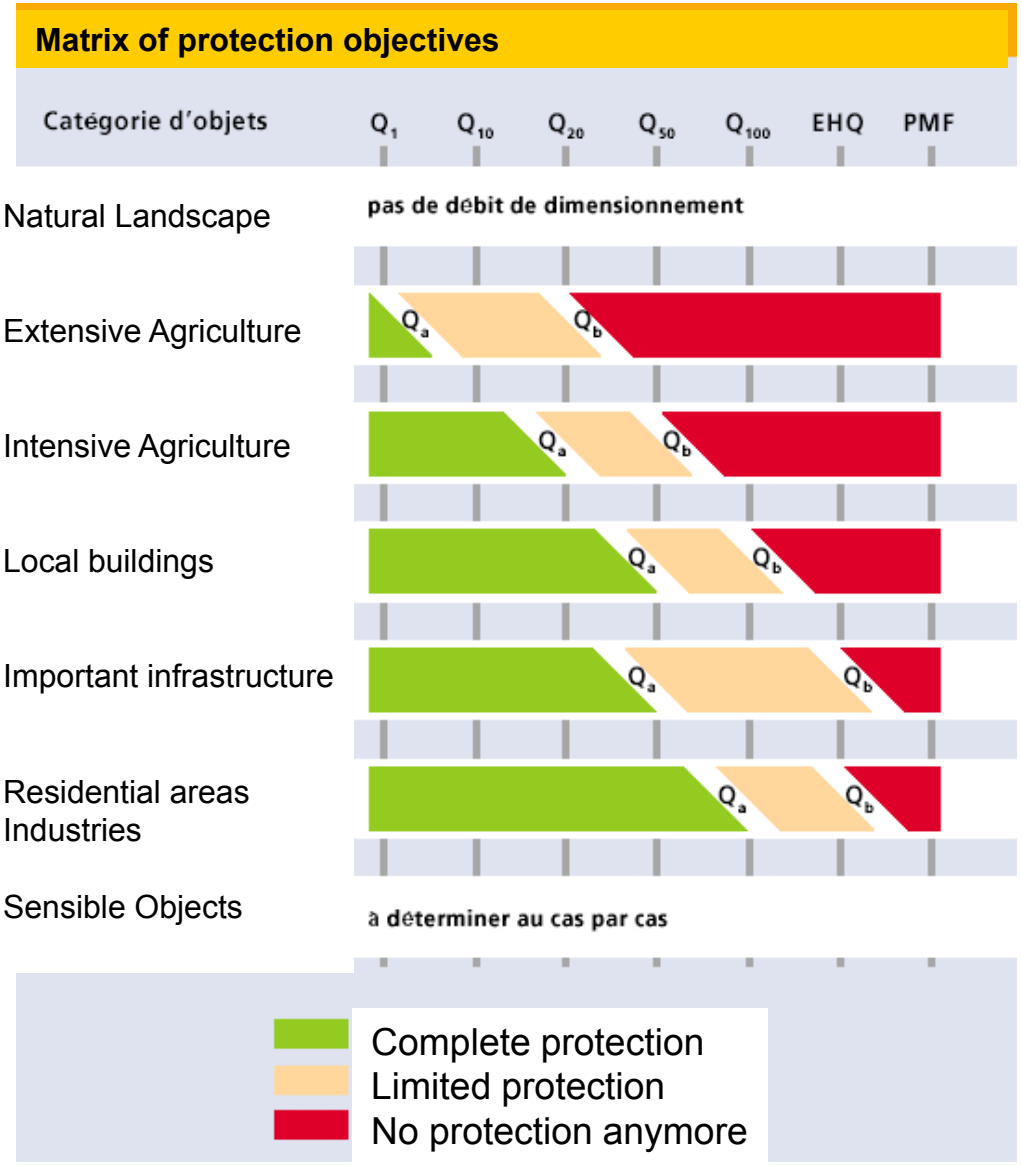
Example Switzerland

The higher the value the higher the degree of protection

The matrix reflects the protection possibilities for different floods

- *Until a certain recurrence interval inundation can be eliminated (green areas).*
- *If the flood is larger it may be transformed from deep flooding to shallow flooding.*
- *But there are large floods where technical protection is no more effective (red area)*

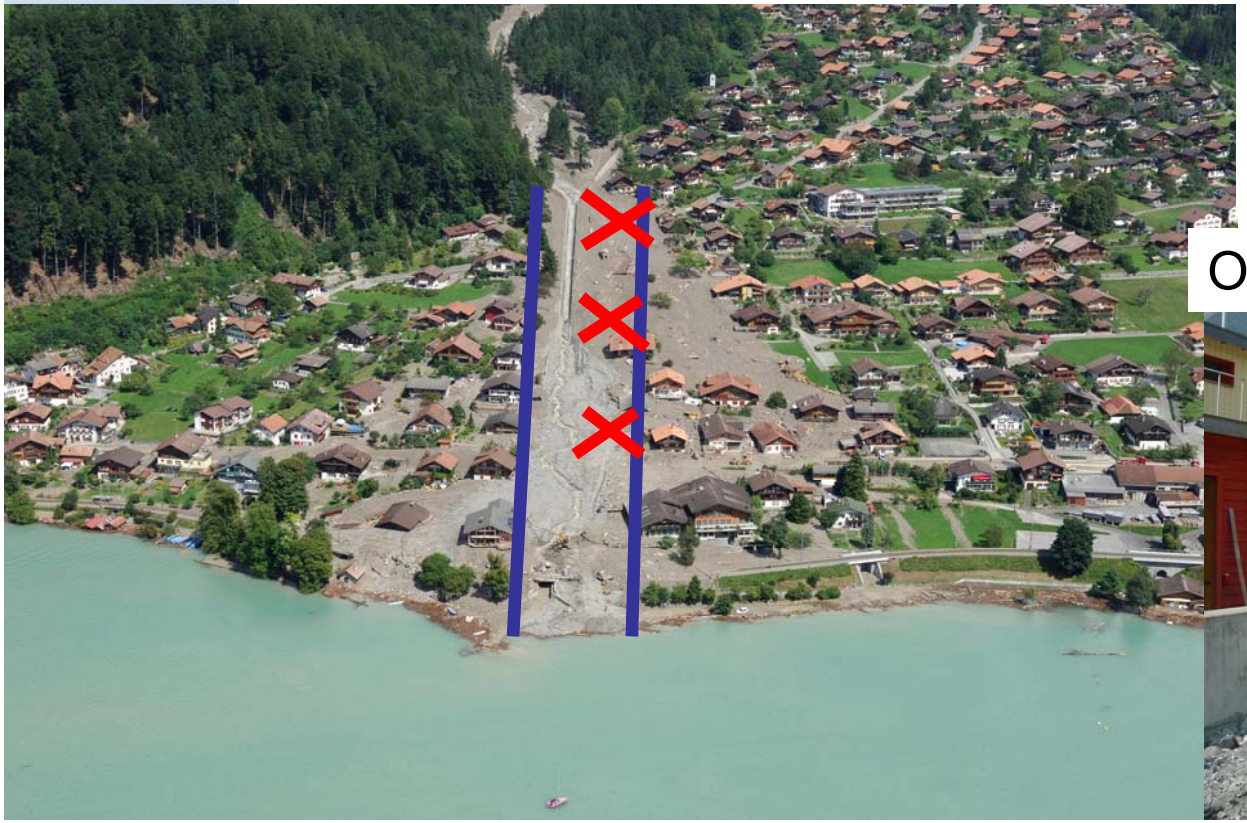
Source: FOEN



Debris Flow has a high imact

Values change with the society

In the 19th century settlements have been in the hazard zones of torrents and agricultural land on safe places, because in the house one had a change to survive without a harvest none.



Today we want to keep space for the torrent and there is no reconstruction of destroyed buildings

Or built strong retaining walls

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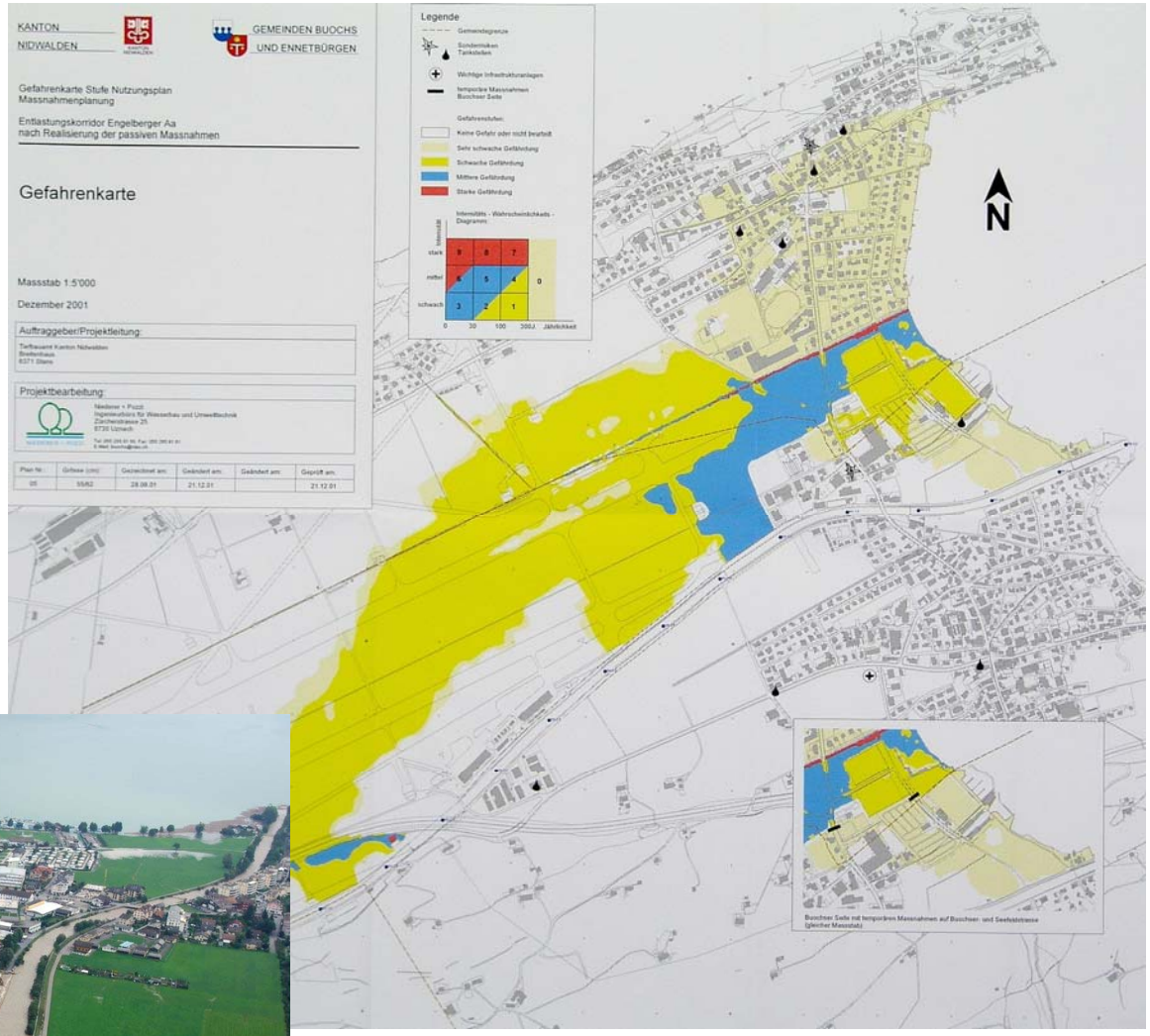
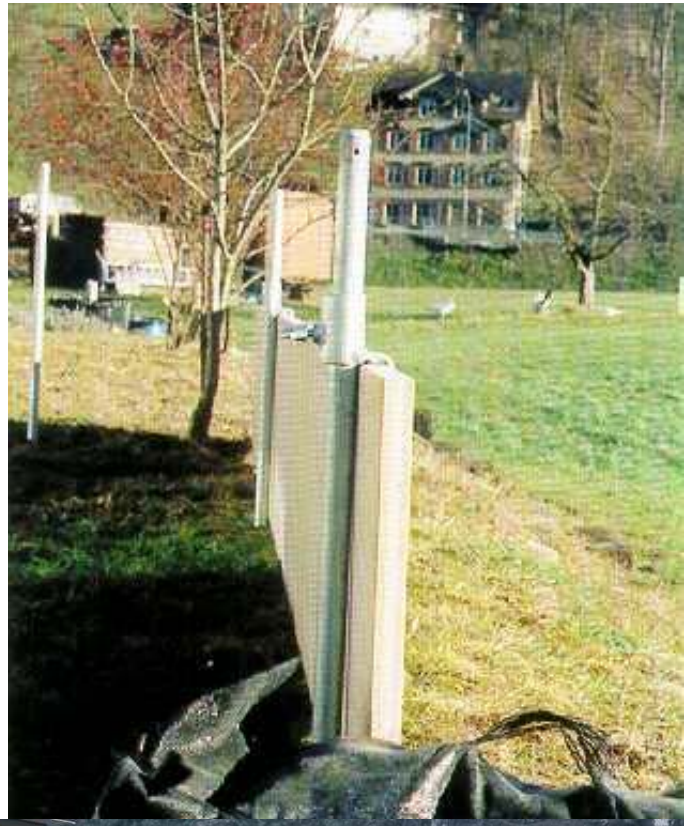
Protection measures

consider extreme events

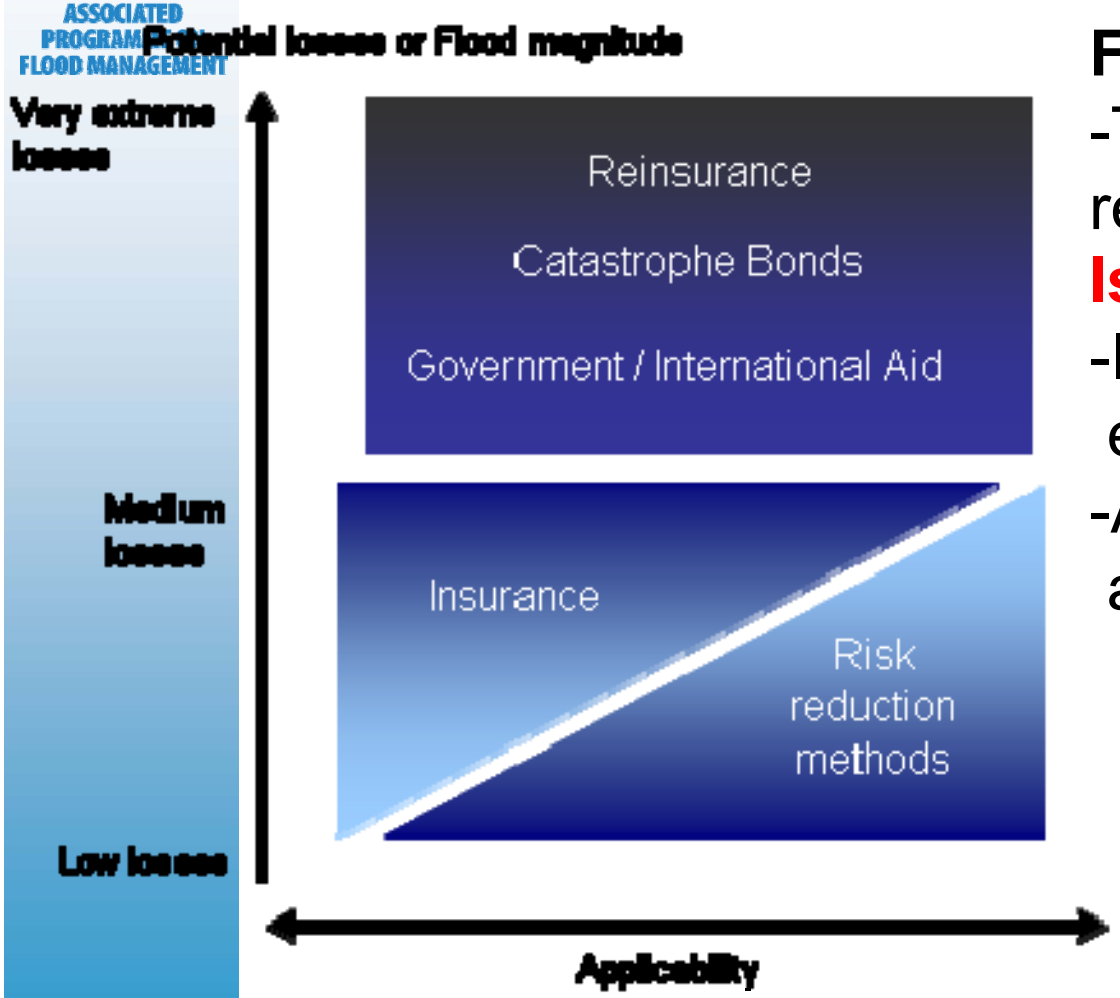


Emergency Planning



Be prepared for the unexpected

Flood risk sharing mechanisms



Functions

-Transferring or sharing residual risk

Issues

-Ineffective against very extreme flood

-Attracting local levels and individuals

Flood Plain Management

Shift in the objective.

- **Risk management** tries to avoid large damages
  (secure physical and economic survival)
  focus on rare events
- **Flood plain management** tries to maximize net benefits
  (securing livelihood)
  Frequent events likewise important

Principles of risk management also apply but:
- Soft non structural measures very important
- ecological aspects more important
- intensifying the use of flood plans will lead to sociological changes
- Maximizing benefits can lead to financial risks

Flood Plain Managment strongly related to National Development Policy

- **Natural resources management (including water resources for domestic, agriculture, fishery, and industry**
- **Land use management (agriculture, industry, dwelling, urban development, etc)**
- **Environmental management (conservation and modification)**
- **Risk management policies, and**
- **Social development issues (living conditions, level of poverty, equity and fairness principles)**

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How vulnerability and flood risk increases

Changes in socio-economic systems	**Land-use change, increasing exposure and damage potential – floodplain development, growing wealth in flood-prone areas**
Changes in terrestrial systems	**Land-cover change - urbanization, deforestation, elimination of wetlands and floodplains, river regulation**
Changes in climate and atmospheric system	**Holding capacity of the atmosphere, intense precipitation, seasonality, circulation patterns**

Source: Kundzewicz & Schellnhuber, 2004

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Best Mix of Strategies

Strategy	*Options*
Reducing Flooding	Dams and reservoirs
	Dikes, levees, and flood embankments
	High flow diversions
	Catchment management
	Channel improvements
Reducing Susceptibility to Damage	Flood plain regulation
	Development and redevelopment policies
	Design and location of facilities
	Housing and building codes
	Flood-proofing
	Flood forecasting and warning
Mitigating the Impacts of Flooding	Information and education
	Disaster preparedness
	Post flood recovery
	Flood insurance
Preserving the Natural Resources of Flood Plains	Flood plain zoning and regulation

Forestation

Additional aspects

-Supporting environmental recovery

-Better landscape

Issues

-Requiring a lot of time to grow enough

Functions

-Reducing runoff

-Capturing sediment

-Soil stabilization

(various other functions outside the direct flood context)

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Permeable surfaces

Functions

-Reducing runoff

Issues

-Clogging

-Apropriate crop selection

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Small Structures

Function:
Preventing inundation

Issues:
Limited protection
(only frequent events)

Flood proofing

Functions

Loss reduction

Structural integrity

Continuous functioning of facility

Additional aspects

-Possibilities of wet and dry proofing

-Regulation through building codes/practices

Issues

-Burden on individuals

-estetiques

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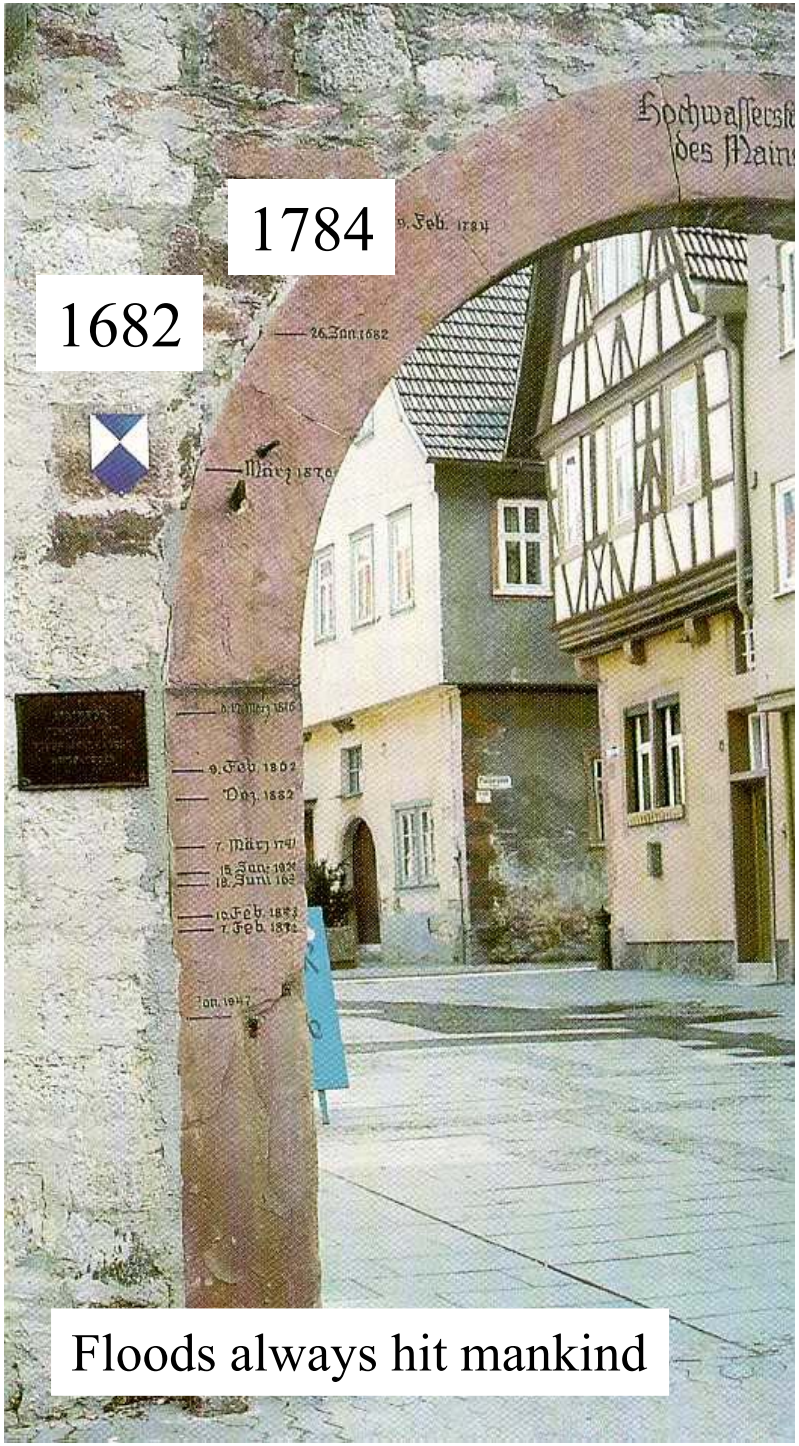

Waterproofing of houses is very traditional method, which was neglected for a long time

Conclusions

The main objective is living this requires:

- health and survival of disasters
- a certain economic safety
- ethical standards
- a desirable economic standard

To enable these standards it is necessary to justify protection works also economically.

Conclusions

- Floods cannot be fully controlled, it should be accepted as a permanent fact of life;
- it is a perfectly natural phenomenon in terms of probability of occurrence and should be approached following a risk management process;
- Floods is not necessarily a problem as such and do not always lead to situations which require development of capital-intensive flood protection infrastructure;
- A Flood protection effort: attempt to mitigate flood damage.
- Disasters from flooding are the result of a random act of nature combined with poor risk management, uncontrolled development and mis-management of natural resources.


Let us learn from nature:
Nature does nothing to prevent extreme events, but nature prepares everything that life continues after the event.
Thank you for your attention

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For more information please visit

http://www.apfm.info

Thank you !