

Design of Strategies for Integrated Flood Management to guide implementation in policy and practice

Guidance document within the APFM-programme

A guidance document has been developed to support the design of well-balanced strategies for Integrated Flood Management. It serves as the operational link between the policy and tool papers previously published by the Associated Programme on Flood Management (APFM). The guidance document reflects experiences on how risk-informed decision-making and preventive measures pay off compared to a reactive, event-driven disaster response: more lives saved and fewer assets damaged at less costs. As such it, contributes to the implementation of the objectives of the Sendai Framework on Disaster Risk Reduction.

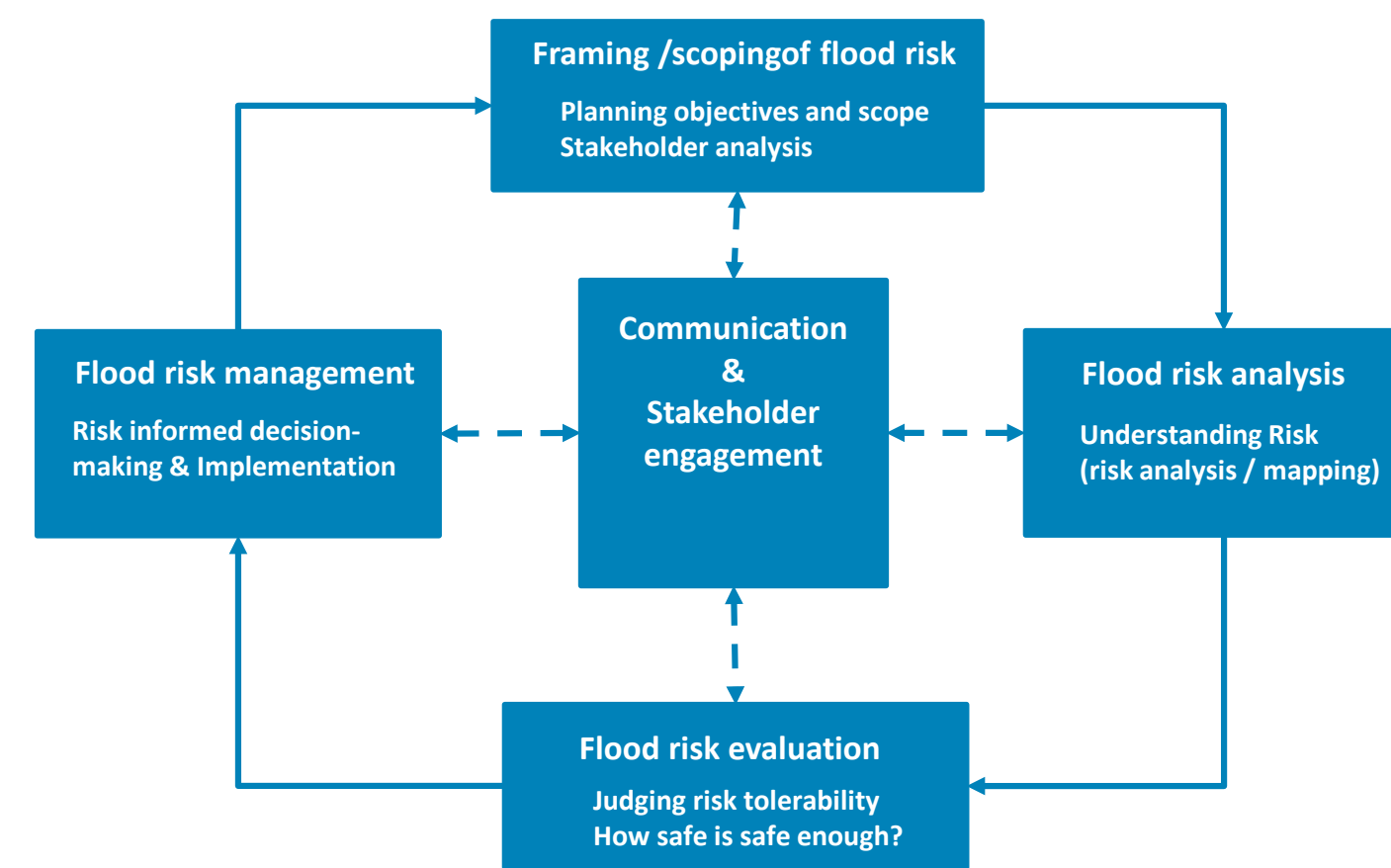


The guidance document was developed by the APFM Technical Support Unit in close cooperation with Deltares, with the support of the Swiss Federal Office for the Environment and the Netherlands' Ministry of Infrastructure and Environment. The guidance document is available at <http://www.floodmanagement.info/guidance-document/>

Interactive planning of Integrated Flood Management

Framework for policy analysis and planning

Planning of Integrated Flood management (IFM) is approached as an iterative process towards risk informed decision making. To guide the steps of IFM a framework for policy analysis and planning has been set-up. The framework reflects the policy cycle and has stakeholder engagement and communication at its core. The framework basically consists of four steps, which are to be followed in an iterative way; not only within one planning cycle, but also over the years as flood management plans need regular updating.



Framework for policy analysis and planning (adapted from International Risk Governance Council)

Communication and stakeholder engagement

Obtaining agreement on problem assessment and policy objectives is the basis for successful development and implementation of strategies. A process of joint fact finding with frequent interactions will help to create a common knowledge base. Perceptions of stakeholders may be altered or refined when new knowledge becomes available. Stakeholder engagement will help to develop a shared perception of problems and potential solutions and promote ownership of the (redefined) problems and their solutions.

Framing/scoping of flood risk

A planning process generally starts with an inception phase in which scope and objectives of the planning process are defined. Relevant stakeholders will be identified through a stakeholder analysis. Also starting-points will be defined for the next steps in the cycle. This includes the system description: what aspects and dimensions are to be considered in the flood risk analysis and the definition of scenarios of plausible future situations. Having multiple scenarios helps to explicitly take into account various uncertainties, including the possible impacts of climate change.

Flood risk analysis

Flood risk analysis includes the identification of flood hazards and the assessment of flood probabilities and impacts for both the current and future situations. Modelling is often part of the analysis to quantify hazard and exposure, including the probability of different extents of flooding. A flood risk analysis looks into the different types of impacts of floods, including the functioning of critical infrastructure. Through flood risk mapping a comprehensive overview can be compiled of hazards, impacts and risks in the project area, which serves as input to flood risk evaluation and management.

Flood risk evaluation

Flood risk evaluation is essentially a societal and policy process which should answer the question: what flood risk is acceptable or how safe is safe enough? The inputs to this discussion are the flood risk maps, the potential measures to reduce the risk and their costs. It includes stakeholder views, local risk perceptions as well as economic considerations regarding the cost-effectiveness of risk reducing measures. The recommended set of risk or safety level(s) guides the further planning and design of measures and strategies.

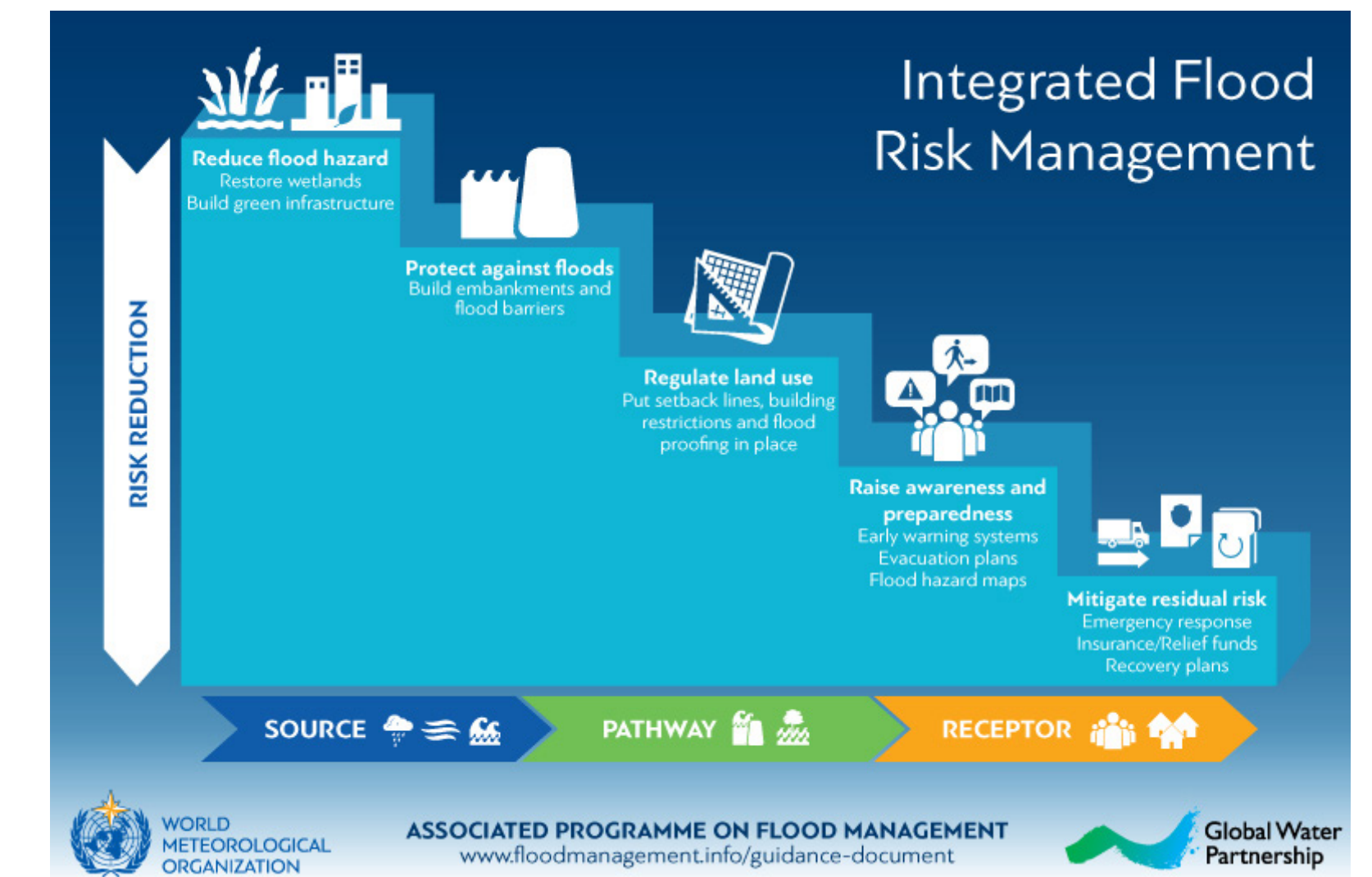
Flood risk management

Strategies to be developed should comprise a well-balanced mix of both structural and non- structural measures, including measures which can be implemented on the short term. The development of strategies in an interactive setting may be supported with decision support systems or planning kits. The strategies will be assessed on economic feasibility, social and cultural aspects, and environmental considerations. Good governance should create the conditions for effective enforcement of regulations and public awareness campaigns.

Design of coherent, alternative strategies

Overview of measures for IFM

The guidance document includes a comprehensive overview and assessment of structural and non-structural measures, arranged in the chain from flood hazard to flood impact. These measures are the building blocks for designing well-balanced strategies aimed at reducing flood risk.



Cascade with potential measures for Integrated Flood Management

Development of a well-balanced strategy should always start with a proper understanding of the flood risk. Successful implementation of IFM looks at the flood risk situation as a whole, compares the available options, and selects a strategy that is most appropriate to a particular situation. Often it would be best to reduce the peak magnitude and duration of a flood. More or less traditional flood control measures, such as dikes or embankments may provide reduction of the probability of flooding below the design level. Zoning measures help to reduce the potential impact should a flood nevertheless occur. Early warning systems and emergency measures can reduce damage or casualties when flooding cannot be avoided. Finally there is the residual risk when all measures taken, were not sufficient to prevent damages such as when their design capacity is exceeded.

Approach to design of strategies

The design of coherent and well-balanced strategies for Integrated Flood Management, should include a thorough examination of all relevant options and a search for an optimal balance of structural and non-structural measures, including both long-term and short-term interventions. Flood management measures cannot be planned in isolation. The development of strategies should look into the opportunities for integration with socio- economic developments through land use planning.

To promote a coherent strategy, a 'top-down' approach is needed, to produce a strategic framework which can be further elaborated through a bottom-up approach. A top-down approach will look for coherent strategies; whereas a bottom-up approach will enhance stakeholder engagement and ownership and promote local linkages to other policy domains, such as urban development, nature restoration, etc.

Assessment of feasibility of measures and strategies

Many societies can't afford the cost of reducing flood risk through the adoption of high-cost structural measures or through policies which relocate vulnerable land use at high risk of flooding. In such cases an appropriate strategy might be to reduce vulnerability through flood proofing, disaster preparedness and flood emergency responses and to avoid future developments that are not flood proofed or protected.

Loss of life and some property damage can be reduced through appropriate disaster response plans. Disaster response should be supported by reasonably accurate and reliable forecasts and flood hazard maps. By showing information on likely hazardous areas, flood hazard maps should also help society to decide on how best to invest in flood prone areas. Floodplain zoning and land-use planning are critical to reversing the trend of escalating economic losses.

Although the flood risk at hand determines what measures will be appropriate, some types of measures can be generally qualified as 'low regret'. These include:

- Establishing early warning systems and risk management plans;
- Identifying and mapping 'hot spots' for flash flooding;
- Restoring and maintaining the functionality of natural retention areas ;
- Safeguarding retention areas in local and regional spatial planning;
- Limiting "inappropriate" development of land-use in flood prone areas;



The Associated Programme on Flood Management (APFM) is a joint initiative of the World Meteorological Organization (WMO) and the Global Water Partnership (GWP). It promotes the concept of Integrated Flood Management (IFM).



The Global Water Partnership (GWP) is an international network open to all organizations involved in water resources management. It was created in 1996 to foster Integrated Water Resources Management (IWRM).



The World Meteorological Organization (WMO) is a specialized agency of the United Nations. It coordinates the activities of the National Meteorological and Hydrological Services of 191 Member States and Territories and is the authoritative voice on weather, climate and water.



Deltares is an independent research institute from The Netherlands working in the field of water, soil and infrastructure. Flood risk is a major theme in research and consultancy. Deltares is a Support Base Partner of the Associated Programme on Flood Management