



Flood risk management & adaptation to climate change

Many people all over the world are threatened by floods from rivers, estuaries and the sea. Through flood risk management we try to reduce the loss of life, distress and economic damage caused by floods. In addition, through flood risk management we try to adapt to the impacts of climate change and economic development.

Deltares specializes in research and consultancy services for integrated flood risk management. Optimal design of flood management schemes is supported by flood risk analyses using advanced tools such as our state-of-the-art inundation modeling system Delft-1D2D. Deltares also has worldwide experience in the implementation of advanced flood early warning systems for major river systems.

Integrated flood risk analysis and management

Flood risk management is comprised of pre-flood prevention, risk mitigation and flood preparedness. Pre-flood prevention includes the design of flood management schemes. Such design should be based on a risk approach taking into account both the probability and consequences of flooding. Adaptation to climate change and to economic development are important drivers in designing flood management schemes. Flood risk management is strongly related to spatial planning: the location of new developments, flood proof structures and making room for rivers. Risk communication is considered a valuable way to promote flood awareness and to improve flood preparedness of citizens. Such communication should take into account the subjective perception of flood risks. In any case flood risk management should be supported by a proper (and quantitative) understanding of the characteristics and consequences of a flood event.

Key activities:

- assessment of potential damages and flood risks.
- conceptual design of flood management schemes, both flood defense systems and plans to make room for rivers.
- inundation modeling for risk mitigation and evacuation planning.



Adaptation to impacts of climate change

Adaptation to the impacts of climate change is an important driver in flood risk management: how to deal with increasing sea levels and flood waves in rivers. The answer to this question includes the assessment of the vulnerability of areas to climate change, the design and evaluation of adaptation strategies and the advise to policy makers on how to cope with the uncertainties associated with climate change. Climate change and land use changes may have major impacts on the hydrological behaviour of water systems. With a variety of modeling techniques, Deltares is able to quantify the effect of these changes. Sustainable water management, including the design of robust flood management schemes, should be based on a sound understanding of the impacts of climate change and should take into account the demographic and socio-political context. The design of climate proof adaptation strategies may include new concepts for both flood defense (super dikes, smart dikes, terps) and infrastructure (dry- and wet-proof buildings). Decision support systems or planning kits may be developed and used to assist in the integral evaluation of large sets of possible measures. These tools are also valuable in communicating complex results and solutions to a wide audience of stakeholders. In cooperation with landscape architects, clear maps may be produced to visualize the major issues and to develop a decision framework for climate proof spatial planning.



*Deltares is the
Dutch institute
for national and
international
delta issues*

Key activities:

- climate change and land use studies
- vulnerability studies to climate change
- hydrological and water resources modeling at various scales
- design of climate proof adaptation strategies
- development of decision-support systems

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Background of the participating institutes

WL | Delft Hydraulics was actively involved with water-related issues worldwide, whilst GeoDelft focused on issues in the field of geo-engineering.

The Subsurface and Groundwater unit of TNO was active in groundwater management, subsurface/soil remediation and the management and use of the subsurface domain.

The Department of Transport, Public Works and Water Management (Rijkswaterstaat) is engaged in providing flood protection and safeguarding adequate supplies of clean water for all users. Rijkswaterstaat has transferred knowledge development for delta issues to Deltares.