

# integrated river basin management

## water

The waters are rising - in our seas and rivers, and on the political agenda. World-wide, sustainable water management has become a priority. WL | Delft Hydraulics is an independent research institute and specialist consultancy based in The Netherlands. The Institute has been providing clients, at home and abroad, with expert advice and technical assistance on water-related issues for over 70 years. Our staff of 350 qualified and committed professionals combine an in-depth command of critical details with an across-the-board overview.

## quality

WL | Delft Hydraulics' first objective is to serve our clients well and, wherever possible, exceed their expectations. All of the Institute's research and specialist consultancy activities are carried out under a quality system in accordance with International Standard ISO-9001. Consistent quality and continual improvement are to be expected from a GTI (an officially-recognised technological institute). WL | Delft Hydraulics is one of the largest technological institutes in The Netherlands. A knowledge centre of international standing has a responsibility to share its expertise: technology transfer is an inherent part of WL | Delft Hydraulics' approach. Related activities are carried out around the world, and include a variety of courses and seminars, and project-based, on-the-job training.

## capacity

With a sound understanding of the processes involved and the right facilities, all water systems can be simulated - numerically, experimentally, or through a combination of the two. WL | Delft Hydraulics is well-known for both its experimental facilities and its software, most of which has been developed and validated inhouse. Our software products are being used all over the world in a great variety of commercial projects and research studies.

## introduction

Research and consultancy of the Integrated River Basin Management group focuses on complex decision making in river basins. Water resources development, river and floodplain management and policy analysis projects are carried out by multi-disciplinary teams. In these teams highly specialised knowledge and expertise, available in the other, more discipline oriented sub-divisions of the Inland Water Systems Division, is brought together. Not only the natural systems, but also the related socio-economic and institutional aspects are addressed. Projects are carried out both in the Netherlands and abroad.

River Basin Management deals with technical, as well as socio-economic and ecological aspects and calls for an integrated approach. We developed such an approach during the preparation of the Netherlands' national water masterplans. This approach consists of a comprehensive set of analysis steps, supported by mathematical tools for the analysis of natural resource systems in a socio-economic context. Using this approach we support water, river and floodplain managers world-wide in structuring complex decision making processes and provide technical know-how for effective evaluation of planning alternatives. Information management systems, decision support systems and simulation models are important tools in our research and consultancy.

## our activities

### water resources development

The development and sustainable use of water and land resources requires the allocation of these scarce resources among competing human activities. This implies decisionmaking in complex situations, often with conflicting interests.



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In our approach the resources development planning aims at the generation and evaluation of strategies to meet the management and policy goals in a future situation.

Key activities related to water resources development are:

- water resources management studies
- master planning and policy development
- investment planning/feasibility studies
- soil erosion assessment and planning of soil erosion control strategies
- water supply and demand assessment
- water resources system modelling.



### river and floodplain management

A key issue in sustainable river and flood plain management is matching of divergent uses and functions with the natural capacity of the river system. Besides the primary function of discharging water and sediment, the most important roles involve navigation, the supply of water for drinking and for use in agriculture, industry and hydropower generation, fishing and providing recreational and environmental enjoyment. The management of rivers and floodplains therefore deals with technical as well as socio-economic and ecological aspects, and calls for an integrated approach. We support river and floodplain managers world-wide in structuring these complex and multi-disciplinary decision making processes and provide technical know-how for effective evaluation of planning alternatives.

Key activities related to river and floodplain management are:

- floodplain management
- integrated flood control management
- river master planning and policy development.



### environmental management

Environmental aspects have become very important in water resources and river and floodplain management. To provide adequate information on the environmental consequences of projects and policies in decision making, environmental impact assessments (EIA's) are carried out. An EIA provides designers and decision makers with information on the environmental feasibility of a project, to be used in addition to information on the technical and economical feasibility. Besides EIA's, nowadays many studies are carried out specifically to improve the environmental conditions in rivers and floodplains and to improve nature values.

Key activities related to environmental management are:

- environmental impact assessment
- river and floodplain ecology and rehabilitation.

### information systems and decision support systems

Data base management systems, mathematical models and a user interface are often combined in a Decision Support System (DSS). In such a DSS the data and modelling systems help to assess the impacts of promising scenarios and managerial policies and to evaluate them.

Such systems allow water managers and their staff to get a better picture and understanding of their system and the surrounding areas. It also helps them to present this picture and the consequences of proposed measures or strategies to others, for example government officials and the interested public.

Key activities:

- data base development
- design of Decision Support Systems.



**what we can offer**

The Integrated River Basin Management group at WL | Delft Hydraulics specialises in research and consultancy services for water resources and river and floodplain managers and planners. Multi-disciplinary expertise is coupled with state-of-the-art information technology and the capacity to develop and transfer tailor-made mathematical models to assist water managers in their day-to-day tasks or long term policy development.

Our specialists frequently co-operate in teams together with the client and local experts and consultants. Transfer of knowledge, training and institutional support are important key-words. All our projects share the objective to make operational innovative new approaches to the task of balancing water management tasks with economic and ecological sustainable development.

Applying new information technology and mathematical modelling has proven to be a cost-effective method for watermanagers in developing and optimising the rational and environmentally sound use of the natural resources.



**our clients**

Our national and international clients include government authorities, policy makers and administrators responsible for the short- and long-term management of water resources, rivers and floodplains. Our clients are also in the private sector, for example consulting engineers, and a variety of multilateral financing institutions, amongst which the Dutch Foreign Aid, the European Commission, the World Bank, the Asian Development Bank.

**research & development**

By simultaneously carrying out applied and fundamental research, we directly link the latest technological developments with practical know-how. Our position between the academic world of fundamental research and the world of pressing practical demands enables us to funnel these developments directly to our clients. Our research is often carried out in close co-operation with private companies, as well as educational and scientific institutes.

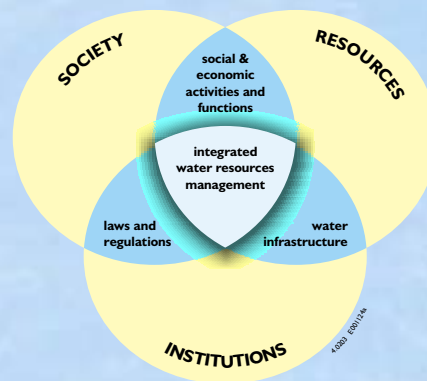
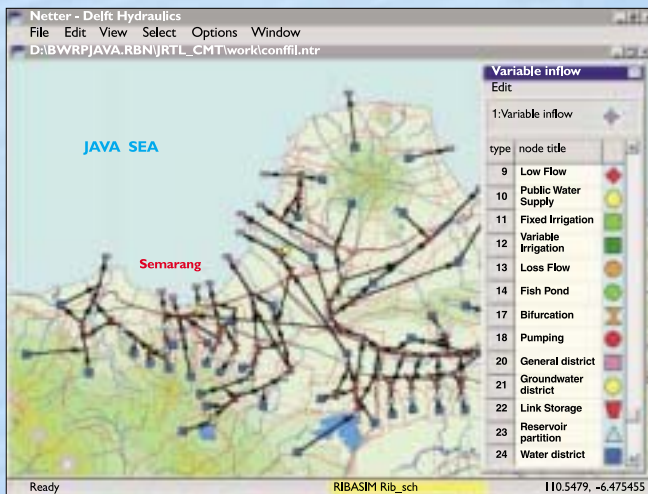
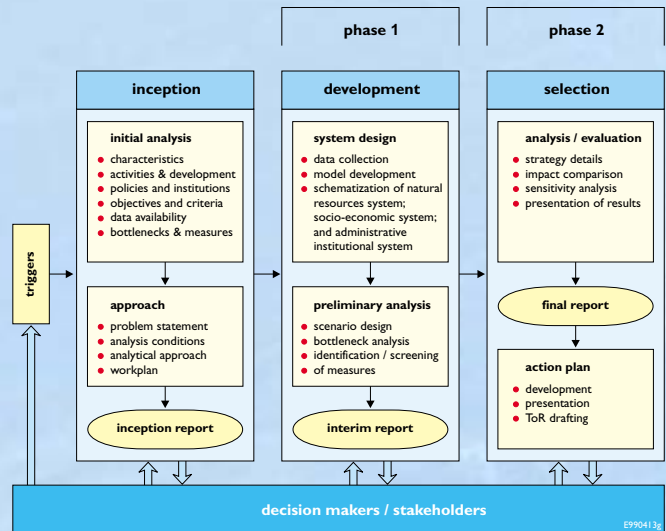


**software systems**

WL | Delft Hydraulics develops, operates and maintains a wide range of dedicated software packages, reflecting the specialist knowledge which the institute has developed over many years.

All software packages have undergone an extensive testing and validation procedure.

- Software packages used by the River Basin Management group are:
- RIBASIM, River Basin Simulation model
  - SOBEK, 1-dimensional simulation of rivers, canals and estuaries
  - DELFT-DSS, a general framework for Decision Support Systems
  - WLM, Waste Load Model
  - TOPIC, Thematic Orientation on Project Definition in an Interactive Context



**contact**

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**WL | Delft Hydraulics**

Decisive advice: from multidisciplinary policy studies to design and technical assistance on all water-related issues.

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