

# Climate adaptation in the IJsseldelta

Province of Overijssel  
The Netherlands



project — **ijsseldelta** —



# Climate change in the IJsseldelta

The river IJssel in the Netherlands is a major branch of the river Rhine, the 3rd largest river of Europe. It discharges its flows to the Lake IJsselmeer, which was a former sea (Zuiderzee) that was closed off in 1932 by a big dam (Afsluitdijk). The IJsseldelta is a low-lying area that is threatened by floods from both the river IJssel and from the Lake IJsselmeer (figure 1).

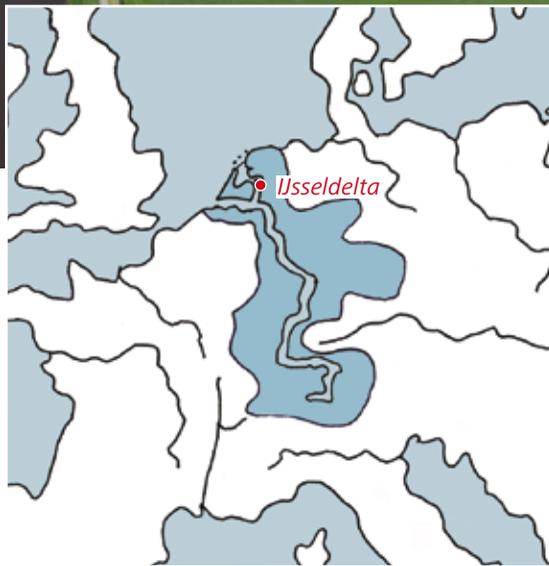


Figure 1: IJsseldelta in a transboundary perspective of the river Rhine in Europe.

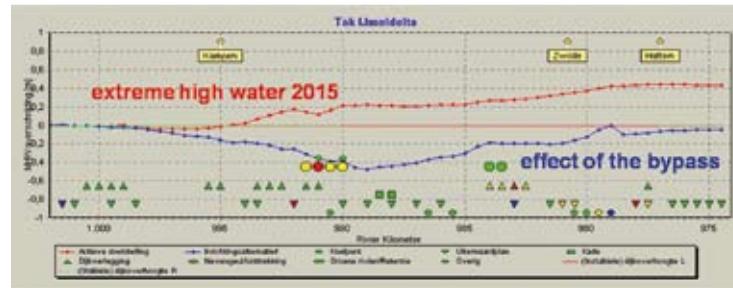


Figure 2: Extreme high water in the IJsseldelta in 2015 (red graph) and effect of the bypass on the water level (blue graph).

Although the delta and its major cities Zwolle and Kampen are protected from flooding by dikes, the safety standards can't be guaranteed in the near future because of the effects of climate change. Predictions of climate models indicate that the extreme high water levels of the river IJssel will rise with

up to 40 cm in 2015 (figure 2) and up to 1 m in the long term (2050-2100). Further knowledge about the effects of climate change is generated within the national research programme 'Knowledge for Climate', in which IJsseldelta is participating.



**Spatial challenges**

Several major spatial developments are planned in the IJsseldelta in the coming decades. The municipality of Kampen has planned some 4000 houses, a new railway line (the Hanzelijn) is being constructed at the moment and two highways (N50 and N23) will be reconstructed in the area. Furthermore, a river bypass is foreseen as one of the international measures to increase safety against flooding along the river Rhine system. All these separate, potentially conflicting spatial developments are coordinated in Project IJsseldelta. In 2005 the Province of Overijssel initiated the process of drawing a sustainable development plan for

the IJsseldelta area, with a strong focus on climate adaptation. The challenge was to combine and integrate several spatial developments (housing, infrastructure, leisure, nature, agriculture), together with the construction of a so-called bypass of the river IJssel (figure 3).

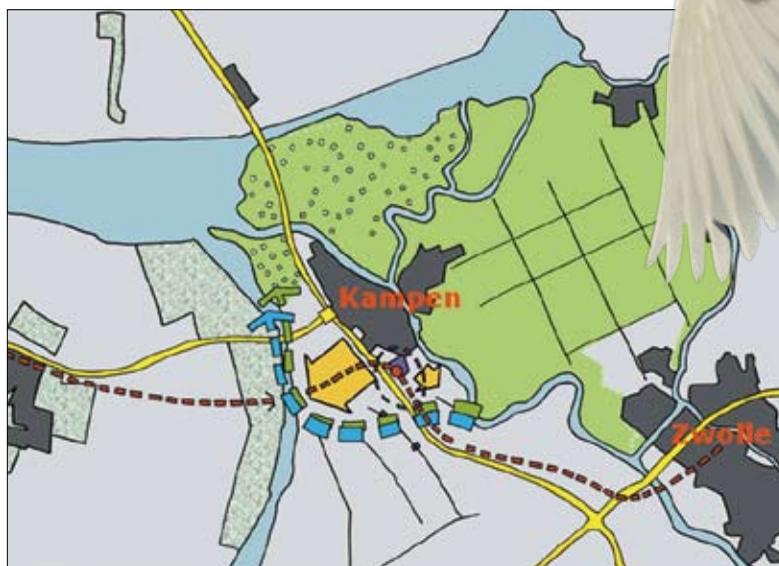


Figure 3:

The spatial challenge of Project IJsseldelta:

- to combine and integrate developments together with the river bypass in the southwest (the arrows on the map);
- to prevent large scale developments in the northeast of the delta, which will also preserve the resilience of this area to adapt to climate change in the future (the green area on the map).

**Room for the River**

The bypass is one of the international measures along the river Rhine system to increase safety against flooding. Instead of building higher and stronger dikes a new strategy has been chosen: to add space to the floodplains of the rivers. This strategy - a small revolution and a real 'paradigm shift' in water management - is being adopted within the Dutch programme 'Room for the River'. Instead of a foe, water is becoming more and more a friend for the planners and water managers nowadays. Project IJsseldelta is a good exponent of this new philosophy in water management. With the construction of

the bypass some 350 hectares will be added to the floodplains of the delta of the river IJssel. This means a break with the past, because for centuries space has been taken from the river. For example, in 1850 the floodplains of the big rivers in the Netherlands had about 3 times more space compared with the situation at the moment. The effect of the restoration of the floodplains in the IJsseldelta is that the water levels of the river IJssel will decrease substantially during situations of high river discharges. This contributes to the safety and resilience of the area.



### Sustainable development planning

Although the Province of Overijssel plays a major role in the project as a director of the planning process, it is very much dependent upon others. As a matter of fact, the plan for the IJsseldelta is made in close cooperation with the stakeholders such as the municipalities, neighbour provinces, the water boards and many non-governmental organizations in the region. The municipality of Kampen, water board Groot Salland and the Province of Flevoland are the most important partners in the region. But the national Government has an decisive position in the project too.

The national ministries involved are the Ministry of Housing, Spatial Planning and the Environment, the Ministry of Agriculture, Nature and Food Quality and the Ministry of Transport, Public Works and Water Management. And last but not least, the public is mobilized to participate (figure 4).



Figure 4: Broad and intense public participation during the phase of the Masterplan. The participation process started with 5 different, initial scenarios for the future of IJsseldelta. During the process a 6th scenario, developed by the public, was added. This scenario became an essential building block for the Masterplan.

The collaborative approach as applied in Project IJsseldelta has proven to be a successful recipe for sustainable development planning. The Ministry of Housing, Spatial Planning and the Environment awarded Project IJsseldelta as a “best practice”. The project has received a lot of attention in the media and many members of the national parliament and government have already visited the delta, including Prime Minister Balkenende. In spring 2006 the Prince of the Netherlands, who has a special interest in water management, came to see the area (figure 5).



Figure 5: Visit of Prince Willem Alexander to the IJsseldelta.

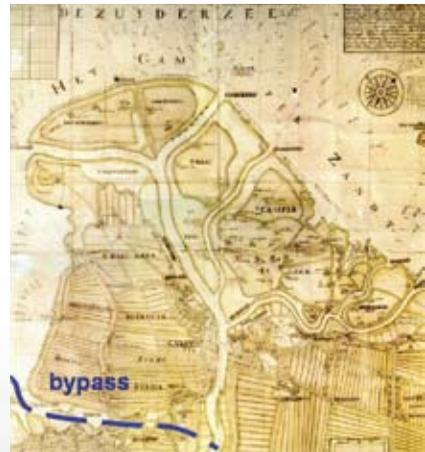


Figure 6: Map of the IJsseldelta in 1724, with the path of the bypass.

**The Overijssel approach:**

**spatial integration and public participation**

In 2006 the Masterplan IJsseldelta came out. Within the Masterplan the 6 spatial challenges in the area (housing, infrastructure, leisure, nature, agriculture and river bypass) are combined and integrated. One could say, that the result has become more than the sum of its parts. The Masterplan is broadly supported by the public, because it is based upon a draft of the bypass (the 6th scenario, see figure 4) that was made by the public (mostly farmers, assisted by planners and professionals). A vital element in the process of gaining public support for the plan were the face-to-face meetings with the people at 'the kitchen table'. Worth mentioning is that the bypass follows the alignment of an old sea arm that still can be seen on an historical map of the IJsseldelta area of 1724 (figure 6).

In 2007 a gentlemen's agreement was signed by 11 governmental organizations, with the intention to work together to implement the Masterplan. Another 11 non-governmental organizations supported the plan. Recently, the spatial plans of the Provinces of Overijssel and Flevoland have been reviewed. A strategic environmental (impact) assessment (SEA) was part of this review. Within this SEA several alternatives for the Masterplan were studied. Also a so-called most environmentally friendly alternative. The decision making process has led to several modifications of the Masterplan. The current plan resembles in almost every aspect the most environmentally friendly alternative of the SEA. The figure below gives an impression of the current plan (figure 7).

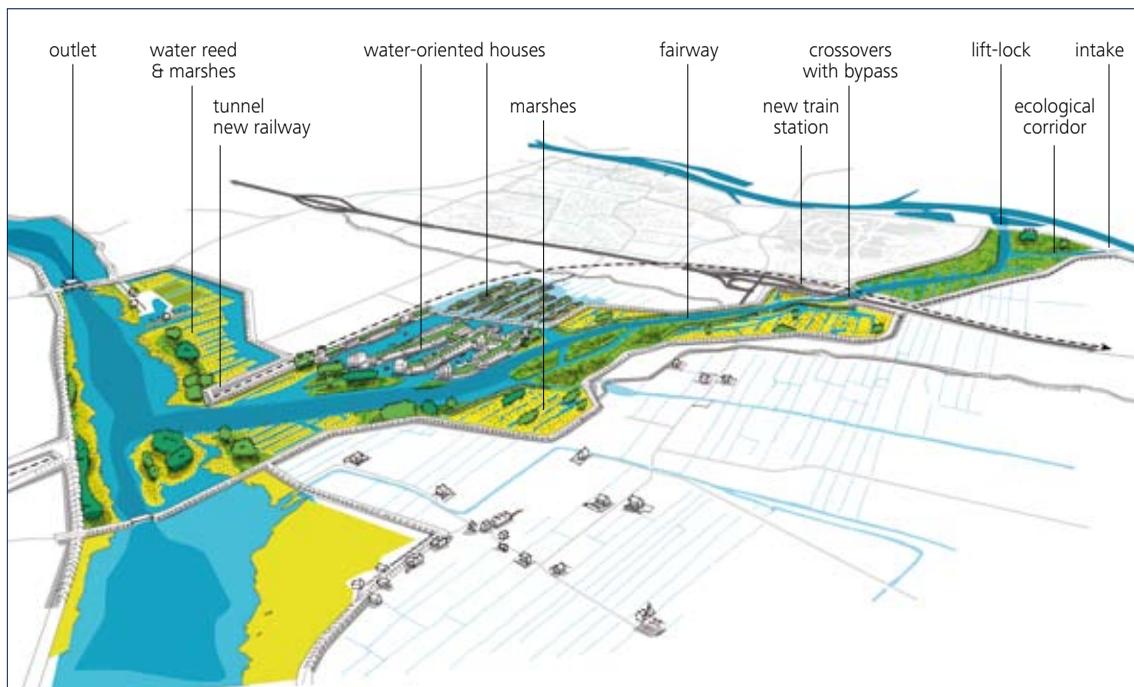


Figure 7: Bird's eye perspective of the plan IJsseldelta (autumn 2008).





### Water as a motor for nature development

A central issue in the plan-making process is how to coop with the dynamics of the water. On the one hand there is the desire to regulate the water level and fluctuations of the water level in the bypass as much as possible. The reason to do this is the wish to prevent the effects of water seepage in the vicinity of the bypass. On the other hand there is the desire to utilize the dynamics of the water as a 'motor' for nature development. Frequent inundations - caused by high water in the river as well as by situations of storm in Lake IJsselmeer - are an important mechanism for the creation of special habitats (e.g. water reed, marshes and flats) that are characteristic for river deltas. Figure 8 shows how storm situations in Lake IJsselmeer can penetrate in the bypass.

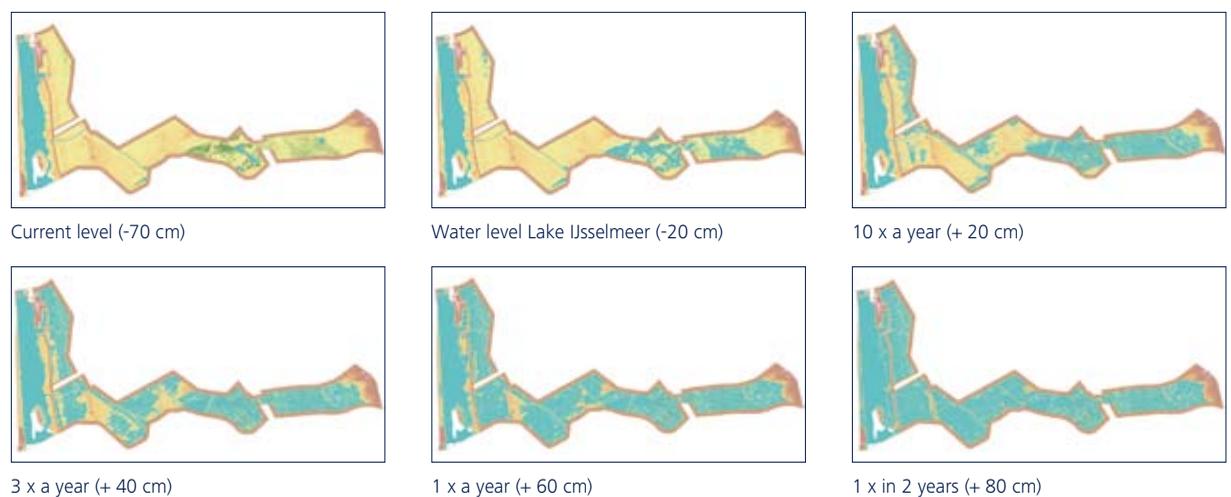


Figure 8: Inundations of the bypass caused by storm on Lake IJsselmeer.

An interesting frame of reference for Project IJsseldelta is Lake Peipsi at the border of Estonia and Russia (figure 9). Especially as an example for nature development and water dynamics. Lake Peipsi has a lot in common with Lake IJsselmeer, but one of the main differences is, is that the first is more natural and the latter more artificial. As 'twin lakes' they can learn a lot from each other and for the Ministry of Transport, Public Works and Water Management this has been the reason for a joint cooperation between Dutch, Estonian and Russian specialists.



Figure 9: Lake Peipsi as a frame of reference for Project IJsseldelta.

The visibility of frequent inundations and variable water levels is also of importance for keeping and raising the awareness of the public for such an elusive matter as climate change. This issue of awareness raising is addressed in the Dutch knowledge impuls programme 'Living with Water', in which (international) project consortia collaborate on achieving changes in water management.



### Implementation

The review of the - above mentioned - provincial plans is a next step towards the implementation of the plan. Financing the project (which will cost about €325 million in total) is another important aspect that needs to be arranged in the beginning of 2009. Already €30 million has been invested, as a part of these total costs, to finance the necessary adaptations of the infrastructure. A new railway is already under construction;



Figure 10: Impression of housing development on a (climate proof) dike (source: Municipality of Kampen).

the bypass will cross this railway two times. Furthermore, the Province of Overijssel has funded €20 million for anticipatory purchases of land and real estate (on a voluntary basis) in the bypass area.

At this moment the environmental impact assessment (EIA) is being made for the review of the local land use plan and the 'dike displacement plan'. One of the challenges for coming period will be to find ways to prevent, mitigate or compensate the effects of water seepage. The final step, after the finish of the formal plan procedures, will be the application for licenses and permits. When everything goes according to plan and without delay, the construction of the dikes, sluices, bridges, dams and a storm-surge barrier will start in 2011. This tight time schedule is a necessity because the bypass needs to be operational in 2015. In case the river bypass won't or can't be implemented in 2015, a cheaper, less complex - but also less sustainable - short term alternative will be carried out to protect the IJsseldelta against flooding: the enlargement of the summer bed of the river IJssel (over a length of 22 kilometers, with an average depth of 1.5 meter).

### Consequences of the advice of the Delta Committee

In 2007 the Government of the Netherlands requested an independent Committee of State (the Delta Committee) to give its advice on climate change and flood protection in the Netherlands for the next century. The Delta Committee presented her advice in September 2008. The Committee has made twelve recommendations in order to increase the level of flood protection and to safeguard the fresh water supply. Two of them are of major importance for the IJsseldelta. The first one underlines the necessity to implement the long term 'Room for the River' measures - such as the river bypass - as soon as possible. The second one is to increase the level of the Lake IJsselmeer with a maximum of 1.5 m in the long term. This recommendation will also affect the IJsseldelta and - as a consequence - additional measures might be necessary. Possibly, a combination of a river bypass with the enlargement of the summer bed is already necessary in 2015 or shortly after. The combination of the two measures can even be an advantage, because in that case the sediment of the river IJssel can be used to construct the dikes of the river bypass or the embankment that is needed for housing development.

One of the most recent ideas is to develop a climate proof dike - a kind of super dike along the river bypass - that at the same time can act as an embankment for housing development. Figure 10 gives an impression of how housing development on a (climate proof) dike might look like.

### Information

For further information about Project IJsseldelta visit our website: [www.ijsseldelta.info](http://www.ijsseldelta.info)

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*The photo of the Great White Egret is taken in the IJsseldelta (by Ed van Zoonen)*

### Public partners of project IJsseldelta



Province of Overijssel



Province of Flevoland



Municipality of Kampen



Municipality of Dronten



Municipality of Oldebroek



Municipality of Zwolle



Waterboard Groot Salland



Waterboard Zuiderzeeland



Staatsbosbeheer



Ministerie van Verkeer en Waterstaat

Ministry of Transport, Public Works and Water Management



Ruimte en Milieu  
Ministerie van Volkshuisvesting,  
Ruimtelijke Ordening en Milieubeheer

Ministry of Housing, Spatial Planning and the Environment



agriculture, nature  
and food quality

Ministry of Agriculture,  
Nature and Food Quality

### Main consultants



DHV Consultancy and Engineering



H+N+S Landscape Architects

