

Twelve recommendations for the future

Recommendation 1

Flood protection level

Until 2050

The present flood protection levels of all diked areas must be improved by a factor of 10. To that end, the new standards must be set as soon as possible (around 2013). In some areas where even better protection is needed, a so called *Delta Dike* concept is promising (these dikes are either so high or so wide and massive that there is virtually zero probability that the dike will suddenly and uncontrollably fail. With regard to specific or local conditions, this will require a tailor made approach. All measures to increase the flood protection levels must be implemented before 2050.

Post 2050

The flood protection levels must be updated regularly.

Recommendation 2

New urban development plans

The decision of whether to build in low lying flood prone locations must be based on a cost-benefit analysis. This must reveal present and future costs for all parties. Costs resulting from local decisions must not be passed on to another administrative level, nor to society as a whole. They must be borne by those who benefit from these plans.

Recommendation 3

Areas outside the dikes

New development in unprotected areas lying outside the dikes must not impede the river's discharge capacity nor the future levels of water in the lakes. Residents/users themselves are responsible for such measures as may be needed to avoid adverse consequences. Government plays a facilitating role in such areas as public information, setting building standards and flood warnings.

Recommendation 4

North Sea coast

Until 2050

Build with nature. Off the coasts of Zeeland, Holland and the Wadden Sea Islands, flood protection will be maintained by beach nourishments, possibly with relocation of the tidal channels. Beach nourishments must be done in such a way that the coast can expand seaward in the next century. This will provide great added value to society.

Sand extraction sites in the North Sea must be reserved in the short term. The ecological, economic and energy requirements needed to nourish such large volumes must be investigated.

Post 2050

Beach nourishments continue – more or less sand required, depending on sea level rise.

Recommendation 5

Wadden Sea area

The beach nourishments along the North Sea coast may contribute to the adaptation of the Wadden Sea area to sea level rise. The existence of the Wadden Sea area as we know it at present is by no means assured, however, and depends entirely on the actual rate of sea level rise coming 50 to 100 years. Developments will have to be monitored and analysed in an international context. The protection of the island polders and the North Holland coast must remain assured.

Recommendation 6

South-western Delta: Eastern Scheldt

Until 2050

The Eastern Scheldt storm-surge barrier keeps its function. The disadvantage of the barrier is its restriction of tidal movement and, as a result, the loss of the intertidal zone. This is to be countered by additional sand nourishment from outside (as from the Outer Delta).

Post 2050

The life-span of the Eastern Scheldt storm-surge barrier will be extended by technical interventions. This can be done up to a sea level rise of approximately 1 m (2075 at the earliest). If the Eastern Scheldt storm-surge barrier is no longer adequate, then a solution will be sought that in large restores the tidal dynamics with its natural estuarine regime, while maintaining safety against flooding.

Recommendation 7

South-western Delta: Western Scheldt

This must remain an open tidal system to maintain the valuable estuary and the navigation to Antwerp. Safety against flooding must be maintained by enforcement of the dikes.

Recommendation 8

South-western Delta: Krammer–Volkerak Zoommeer

To 2050

Make sure that the Krammer-Volkerak Zoommeer, together with the Grevelingen and possibly also the Eastern Scheldt can provide temporary storage of excess water from the Rhine and Meuse when discharge to the sea is blocked by closed storm surge barriers.

A salinity gradient (a natural transition between fresh and salt water) in this area is a satisfactory solution to the water quality problem and can offer new ecological opportunities. In this case an alternative fresh water supply system must be developed.

Recommendation 9

The major rivers area

Until 2050

The programmes *Room for the River* and *Maaswerken* (Meuse Works) must be implemented without further delays. Subject to cost effectiveness, measures must be taken already now to accommodate discharges of 18,000 m³/s from the Rhine and 4,600 m³/s from the Meuse. In this context it will be necessary to conduct negotiations with neighbouring countries under the *European Directive on the assessment and management of flood risks* in order to harmonise the measures. Furthermore, room must be reserved and, if necessary, land purchased so that the river system will be able to discharge safely the 18,000 m³/s of Rhine water and 4,600 m³/s of Meuse water.

2050–2100

Completion of measures to accommodate the Rhine to discharge 18,000 m³/s and the Meuse 4,600 m³/s.

Recommendation 10

Rijnmond (mouth of the river Rhine)

Until 2050

For the Rijnmond an open system which can be closed in emergencies offers good prospects for combining safety against flooding, fresh water supply, urban development and nature development in this region. The extreme discharges of the Rhine and Meuse will then have to be re-routed via the south-western delta.

The fresh water for the Western Netherlands will have to be supplied from the IJsselmeer. The necessary infrastructure will have to be built. Room must be created for local storage in deep polders. Further research into the 'closable-open' Rijnmond system should be initiated soon.

Recommendation 11

IJsselmeer area

The level of the lake IJsselmeer will be raised by a maximum of 1.5 m. This will allow gravity-driven drainage from IJsselmeer into the Wadden Sea beyond 2100. The level of the Markermeer lake will not be raised. The IJsselmeer retains its strategic function as fresh water reservoir for the Northern Netherlands, North Holland and, in view of the progression of the salt tongue in the Nieuwe Waterweg, for the Western Netherlands.

Until 2050

Implement measures to achieve elevated water level, which can be done gradually. The aim must be to achieve the largest possible fresh water reservoir around 2050. The measures needed to adapt the lower reaches of the river IJssel and the Zwarte Water to a 1.5 m higher water level in the IJsselmeer must be investigated.

Post 2050

Depending on the phased approach adopted, follow up measures may be needed to actually implement a maximum water level increase of 1.5 m.

Recommendation 12

Political-administrative, legal, financial

1. The political-administrative organisation of our water safety should be strengthened by:
 - Providing cohesive national direction and regional responsibility for execution (ministerial steering committee chaired by PM, political responsibility lying with Minister of Transport, Public Works and Water Management; the Delta director for cohesion and progress; regional administrators for interpretation and implementation of the (individual) regional assignments).
 - Institute a permanent Parliamentary Committee on the theme.
2. Guarantee funding by:
 - creating a Delta Fund, managed by the Minister of Finance;
 - supplying the Delta Fund with a combination of loans and transfer of (part of) the natural gas benefits;
 - making national funding available and drafting rules for withdrawals from the fund.
3. A *Delta Act* will anchor the political-administrative organisation and funding within the present political system and the current legal framework. This must in any case include the Delta Fund and its supply; the Director's tasks and authority; the provision that a *Delta Programme* shall be set up; regulations for strategic land acquisition; and compensation for damages or the gradual loss of benefits due to the implementation of measures under the *Delta Programme*.