

Advice Summary

The mandate ...

The government requested the Delta Committee to present advice on protecting the coast and the entire low lying part of the Netherlands against the consequences of climate change. The issue is whether arrangements can be made so that over the very long term the Netherlands can be climate proof: safe against flooding, while still remaining an attractive place to live, to reside and work, for recreation and investment.

... and its interpretation

The issue, then, was to look further than just safety against flooding. Our vision therefore embraces interactions with life and work, agriculture, nature, recreation, landscape, infrastructure and energy. The strategy for future centuries rests on two pillars: security and sustainability. Besides protection from water, the advice names, even stresses, the opportunities for Dutch society.

Water security

Water security plays a crucial role in this advice, involving as it does protection against flooding and the security of our fresh water supplies. Achieving water security prevents casualties and social disruption, while avoiding damage to our economy, landscape, nature, culture and reputation.

The advice assumes that a secure Netherlands is a collective social good for which the government is and will remain responsible. The current level of flood protection must become at least a factor 10 higher than the present level.

Sustainable opportunities

The committee's recommendations lay emphasis on development along with climate change and other ecological processes; they are cost effective and produce additional value for society. The recommendations are flexible and can be implemented gradually; they offer prospects for action in the short term. Their implementation will allow the Netherlands better adapt to the effects of climate change and create new opportunities. The interventions proposed in the advice must be sustainable: their implementation must make efficient use of water, energy and other natural and societal resources, so that the quality of the living environment is not merely maintained but even improved.

Implementation: The *Delta Programme*

In order that the Netherlands can be made climate proof, the Delta Committee has drafted a *Delta Programme*. The programme will be anchored, financially, politically and administratively, in a new *Delta Act*.

The mission is urgent

Great urgency attaches to the implementation of this advice. The Netherlands must accelerate its efforts because at present, even the current standards of flood protection are not met everywhere. Moreover, the current standards are out of date and must be revised upwards. Furthermore, the

climate is changing rapidly, the sea level is probably rising faster than has been assumed, and (extreme) variations in river flow are expected to increase. The stakes in the Netherlands – economic, societal and physical – are great and growing still; a breach in a dike has seriously disruptive consequences for the entire country.

It is the Delta Committee’s conclusion that a regional sea level rise of 0.65 to 1.3 meters should be expected for 2100, and from 2 to 4 meters in 2200. This includes the effect of land subsidence. These values represent plausible upper limits based on the latest scientific insights. It is recommended to take these into account so that the current decisions we make and the measures we take will be sustainable for a long time, set against the background of what we can expect.

For the Rhine and the Meuse, the temperature increase and changed precipitation patterns will lead to decreased summer flows, and increases of river flows in the winter. Around 2100 the maximum discharge of the Rhine should be expected to be around 18,000 m³/s. For the Meuse this will be approximately 4,600 m³/s.

A rising sea level, reduced river discharges in summer, salt water penetration via the rivers and ground water, all put pressure on the country’s fresh water resources. This leads to damaging consequences for the water supply, agriculture, shipping and those sectors of the economy that depend on (cooling) water.

Scientific basis

The Delta Committee has received scientific advice on a number of aspects, which forms part of the present advice. In summary, these are the findings of a group of national and international experts, including those close to the IPCC and Dutch experts on water security and water management. This group of national and international experts has given us the latest insights into climate scenarios, supplemented with new estimates of extreme values.

Cost

Implementation of the *Delta Programme* until 2050 involves a cost of 1.2 to 1.6 billion Euros per annum, and 0.9 to 1.5 billion Euros per annum in the period 2050–2100. Coastal flood protection in the *Delta Programme* is partly achieved by beach nourishment. If this method is intensified to make the coasts of the Netherlands to grow seawards with 1 km, for example, and therefore gaining new land for such functions as recreation and nature, it will involve an additional cost of 0.1 to 0.3 billion Euros per annum.

Indicated extra annual costs (billions of Euros)	Period		Average
	2010–2050	2050–2100	2010–2100
<i>Delta Programme</i>	1.2 to 1.6	0.9 to 1.5	1.0 to 1.5
<i>Delta Programme</i> with additional coastal space for other functions	1.3 to 1.9	1.2 to 1.8	1.2 to 1.8

Amounts in 2007 Euros including Dutch Value Added Tax (BTW)

Twelve recommendations for the future

The Delta Committee has developed an integrated vision for the future extending to 2100 and even beyond. A long term vision like this depends on national, European and global developments. In the short and medium term we make however concrete recommendations since direct action is needed

now to increase the level of flood protection and to safeguard fresh water supply. The Delta Committee has formulated following twelve recommendations for the short and medium term,: