IUCN Academy of Environmental Law
eJournal
ISSUE 2012 (1)

COUNTRY REPORT: NETHERLANDS
Climate Change and Coasts

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Introduction

The impact of climate change on coastal areas probably is among the most discussed elements of adaptation policy and law. This is not surprising given the expected effects of climate change on the coasts. The Intergovernmental Panel on Climate Change (IPCC) projects an accelerated sea-level rise of up to 0.6m by 2100, or more if the potential breakdown of the West Antarctica and Greenland ice sheets is taken into account, with levels continuing to rise for many centuries beyond 2100.[1] Storms temporarily exacerbate higher water levels, by 20-110 centimetres.[2] Increasing storm intensity and larger storm surges as a result of climate change will combine with rising sea-levels to cause more coastal erosion and damage sea defences, which may lead to inundation of low lying areas. In north-western Europe, the situation is further aggravated by soil subsidence, which is an after effect of the last glacial period ending 10,000 years ago. By 2100, the Netherlands will have experienced soil subsidence of 1.0m on today's level. The combined effect of sea-level rise, storm surge and subsidence in the Netherlands will be equivalent to a relative sea-level rise of 2.1m by 2100. In addition to that, the Dutch delta is also confronted with altered precipitation and run-off under climate change, which may lead to freshwater estuarine flooding. It is the combination of all of these factors (high river water levels, a storm at sea and increased relative sea-level), which makes deltas such as the Netherlands particularly vulnerable.

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[1] IPCC *Fourth Assessment Report, Climate Change: Impacts, Adaptation and Vulnerability* (2007) 317.
[2] Taking the North Sea area as an example, see: IPCC (supra note 1) 325 (Figure 6.4).

Nearly nine million people live in low-lying parts of the Netherlands. About 65 per cent of the country's GNP is generated here. Without the protection of dikes, dunes, and hydraulic structures (such as storm surge barriers), approximately 60 per cent of the country would be flooded regularly. Since 1000 years, artificial dikes have been in place to protect areas that are below mean sea-level, much of which are actually drained marshes and lakes or land reclaimed from the sea, against flooding by the sea and the rivers. For centuries, laws aimed at stringent dune management and building and keeping rigid sea-defence structures, culminating in current legislation which, since the 1990's, requires that the coastline has to be maintained at its 1990 position, irrespective of future sea-level and other conditions. This approach has been criticized because it may not be the optimal response to climate change. Instead, increasing coastal dynamics and enhancing natural processes are thought to provide a more resilient coastline in the long run. This insight is slowly entering Dutch coastal adaptation policy and law, as will be shown below. Most of the land on the coastline, particularly the sand dunes and the dikes, is owned by the state. This, obviously, makes the implementation of coastal adaptation measures easier than in cases where coastal property is privately owned, such as is often the case in other countries such as the United States and Australia.

New Coastal Adaptation Legislation

The first important step towards a total revision of coastal adaptation law and policy was the publication of the influential report titled *Working Together with Water - A Living Land Builds for its Future*[3] (the *Report*) by the Sustainable Coastal Development Committee (Delta Committee) in 2008. This Delta Committee was given the mandate to formulate a vision on the long-term protection of the Dutch coast and its hinterland. The Government asked the Delta Committee to come up with recommendations on how to protect the Dutch coast and the low-lying hinterland against the consequences of climate change over a long term. The Delta Committee approached this issue in a holistic way, with its vision embracing 'interactions with life and work, agriculture, nature, recreation, landscape, infrastructure and energy'.[4]

[3] Sustainable Coastal Development Committee, *Working Together with Water. A Living Land Builds for its Future* (2008) (available from the website of the committee at http://www.deltacommissie.com.)
[4] Ibid, 7.

In 2011, the final elements of the legal framework that provides the basis for coastal adaptation measures for 21st century were adopted by Parliament. These elements, discussed below, will be inserted into existing water legislation. The Netherlands has taken a holistic approach to all water issues, in line with the EU's *Water Framework Directive*[5] (*WFD*). The *Water Act* (2009) and the accompanying *Water Ordinance* (2009) cover all water law, including rules on the prevention of flooding and the development of a marine strategy. The Act and Ordinance implements three EU Directives that deal with high-water situations: the overarching *WFD* and the more specific *Floods Directive*[6] and *Marine Strategy Framework Directive*.[7] Although water policy in general has been decentralized to water boards (based on regional weirs), responsibility for the main dikes and embankments of coastal waters and of the major rivers rests with the Minister of Infrastructure and the Environment and the national water management agency (*Rijkswaterstaat*). Management of all waters by water boards and the Minister is overseen by the provincial authorities, but the ultimate legal responsibility rests with the Minister. The Minister has to cooperate with the other authorities involved, but has far-reaching powers to either force cooperation or overrule other authorities if necessary.[8]

The *National Water Plan (2009-2015)* stipulates the overarching water policies and incorporates the four river basin management plans as required under the *WFD*. The *National Water Plan* is accompanied by a more specific policy document called *Water Safety 2009-2015*.[9] The *National Water Plan* is the policy framework for three programmes relevant to coastal adaptation: the *National Flood Defence Construction Programme*; the *Sand Nourishment Programme*; and the *Room for the River Programme*. Under the *National Flood Defence Construction Programme*, the primary weirs (weirs that are in direct contact with sea water) are reviewed every five years, taking climate change scenarios for the Dutch coast into consideration. Those weirs that fail to meet required standards must be reinforced immediately. In a dedicated programme, special attention is given to priority 'weak links', which have been identified along the coast. These links are currently being strengthened so that they can withstand a 1:4000 year storm by 2015.

[5] Directive 2000/60/EC.
[6] Directive 2007/60/EC.
[7] Directive 2008/56/EC.
[8] *Water Act*, Article 3(13).
[9] Available at http://www.rijksoverheid.nl/onderwerpen/water-en-veiligheid/.

The *National Water Plan*'s main response to sea-level rise is by large-scale beach nourishment along the entire Dutch coast, in a manner that disturbs natural processes as little as possible, and at a scale necessary to keep pace with the actual sea-level rise. Under the *Sand Nourishment Programme*, sand nourishment takes place along the Dutch coast to replenish eroded beaches. An innovative experimental sand nourishment project is proposed under the Programme. The so called 'sand engine' project involves the dredging and positioning of a super dune of sand in the sea in such a way and in a location, that enables hydrological forces to spread the sand to where it is needed. If the experiment is successful, the sand engine will replace regular artificial sand nourishment.

Under the *Room for the River Programme*, water storage areas to be used for controlled flooding were designated in land use plans and natural floodplains were expanded using a combination of land use controls and compulsory acquisition.[10] These natural floodplains were developed to deal with high water levels in the river and to simultaneously create additional wetlands under nature conservation laws, primarily the EU's *Natura 2000* network, a network of protected areas instituted as a consequence of the EU's *Birds and Habitats Directives*.[11]

While most of these policies are implemented under the *Water Act*, some are executed under the *Spatial Planning Act*. The *Water Act* contains safety norms for dikes and embankments, which vary between a 1:250 and 1:10 000 probability that critical water levels might be reached in any given year, depending on the number of people and infrastructure protected by the dike.[12] The specific requirements for dikes and embankments in terms of height and strength are derived from that norm. These norms are currently subject to debate as they are considered to take insufficient account of sea-level rise and increased storm intensity. A 0.7m sea-level rise increases the flood risk by a factor 10, and if we include the expected soil subsidence by 2100 of 1.0m, plus an additional 0.5m sea-level rise during storms, the situation is even much worse. Therefore, the influential Delta Committee, in its aforementioned *Report* (2008), advised the Dutch Government to increase the safety norms at least with a factor 10 by 2013 (up to a factor 100 for some areas), and have these

[10] The programme's international website (available at http://www.roomfortheriver.nl) contains much information on the programme, including its main implementing spatial plans.
[11] See J. Verschuuren, 'Climate Change: Rethinking Restoration in the European Union's Birds and Habitats Directives' (2010) 28(4) *Ecological Restoration* 431-439.
[12] *Water Act*, Article 2(2) and Annex II.

increased safety norms implemented before 2050.[13] This recommendation is currently being researched and debated. It is expected that in 2014, a final decision will be reached on the necessary safety norms.

The *Water Act* contains a range of provisions aimed at protecting land against flooding, including:

- Procedural provisions on decisions to create or change coastal or river defence works.[14]
- A provision granting the Minister the power to take all necessary measures in case of danger.[15] A danger is defined as 'circumstances as a consequence of which water management works are under an immediate and serious threat or can become under such a threat'.[16] The Minister is even allowed to take measures that are against the law, as long as they do not infringe the constitution or international law.[17]
- The obligation to organize exercises to deal with dangerous situations. Sometimes, international exercises are organized as well. In 2009, the exercise 'EU FloodEx' tested international assistance during a worst case flood scenario in the North Sea area on the Dutch coast. The exercise showed that in such a case an international response is necessary, but also that there are many shortcoming associated with poor cooperation of the various response services involved.[18]
- The duty on property owners to allow people appointed by the authorities to enter or do works in any place that they deem necessary, and the power of authorised officers to enter a property without the owner's consent.[19]
- The duty on property owners in water storage areas to allow their land and other property to be flooded.[20] A prohibition on owners of property in a water storage area to build anything that is considered to be an obstacle

[13] Sustainable Coastal Development Committee (supra note 3) 49.
[14] *Water Act*, Article 5(5) - 5(13).
[15] *Water Act*, Article 5(30).
[16] *Water Act*, Article 5(28).
[17] *Water Act*, Article 5(30).
[18] See R. Beerens et al, *EU FloodEx: An Analysis of Testing International Assistance During a Worst Credible Flood Scenario in the North Sea Area* (2010) (available at http://library.wur.nl/WebQuery/hydrotheek/lang/1949028.)
[19] *Water Act*, Article 5(20) - 5(24).
[20] *Water Act*, Article 5(26).

for water storage. This is regulated through the relevant spatial plans at provincial and municipal level.

- The possibility for property owners in water storage areas to claim compensation in respect of loss or damage suffered as a result of flooding or restrictions on land use.[21]
- Compulsory acquisition of land where this is necessary for dike and embankment works.[22]
- A prohibition on interfering with coastal and river defence works without a permit.[23]

As stated above, the *Delta Act on Water Safety*[24] was adopted by Parliament in 2011. This Act contains three important amendments to the *Water Act* (2009) in order to complete the regulatory framework for coastal adaptation. First, it establishes the *Delta Programme*, a new annual plan with a six-year planning horizon detailing all measures necessary to combat floods and water scarcity as a consequence of climate change. Secondly, it creates institution of a Delta Commissioner who works under the direct responsibility of the Government. His main task is to oversee implementation of the *Delta Programme*. This task will primarily involve coordinating the activities of all local, regional and national competent authorities in the field of coastal adaptation. The first Delta Commissioner and his staff are already in office since 2010, on the basis of a preliminary ordinance (so as to lose no time during the legislative process).[25] Thirdly, it establishes the Delta Fund, which will provide the resources required to implement the *Delta Programme*. The Act stipulates that, as of 2020, € 1 billion has to be made available annually under the Fund. Until 2020, the considerably lower existing annual budget will be available (because of the financial crisis, the necessary additional funds cannot be made available before 2020).

Conclusion

With all the legislation described above, the legal, administrative and policy framework to combat the expected impact of climate change on the Netherlands coasts should be ready, so that we can now move into the implementation phase. Concern, however, remains whether these new requirements will be sufficient. The

[21] *Water Act*, Article 7(14) - 7(15).
[22] *Water Act*, Article 5(14).
[23] *Water Ordinance*, Article 6(12).
[24] Parliamentary Documents No. 32 304.
[25] For more information, see: http://www.deltacommissaris.nl.

new legislative requirements were developed on the basis of an expected sea-level rise of 0.85m by 2100. There are, however, growing concerns on a possible rapid loss of the Greenland ice sheet, which will significantly add to currently expected level of sea-level rise in the North Sea area.