

THE NETHERLANDS IN MAPS

WATER MANAGEMENT IN THE NETHERLANDS: INTRODUCTION TO THE 2004 MAPS

PAUL J.M. VAN STEEN & PIET H. PELLENBARG

Faculty of Spatial Sciences, University of Groningen, P.O. Box 800, 9700 AV Groningen, The Netherlands. E-mails: p.j.m.van.steen@rug.nl & p.h.pellenbarg@rug.nl

INTRODUCTION: A LOW COUNTRY

The five maps of this year's series of "The Netherlands of Maps" will visualize some of the many dimensions of the fascinating topic of Dutch water management. In the Netherlands, space and water are inextricably bound up with one another. Not only is one fourth of the land surface of this "neder" (low) land situated below sea level (Meijer 1997), but the Netherlands is also clamped in between the water masses of the Northsea and of three large rivers flowing into the country from other European countries:

- * The Scheldt and Meuse rivers enter the Netherlands from the South, delivering huge amounts of water from catchment areas in Belgium and France that is transported to the North Sea in the West.
- * The Rhine river, with an extensive catchment area of over half of Germany as well as smaller albeit still impressive catchment areas in France, Switzerland, Luxembourg and even Austria, enters the Netherlands in the East. The Rhine water is partly transported to the North Sea in the West, and partly in northern direction through the IJssel river to the former South Sea (now IJsselmeer), and then through the Wadden Sea to the North Sea in the North.

Large amounts of European water thus move through the Netherlands to the sea. These water masses are tapped off for drinking water and irrigation purposes, supplemented by domestically produced rainwater and - cleaned - waste water. The main rivers and connecting channels are also used for international freight transportation by boats.

Through the ages, the Netherlands has specialized in various techniques to control these water flows as well as the seawater in coastal areas and inland water bodies. For centuries, the two main goals of water management and control were to regain or create – predominantly agricultural – land on the one hand, while at the same time to protect residents, businesses, farmland and infrastructures from flooding on the other hand. In the past century, the largest disaster was the 1953 flooding of large areas of the coastal province of Zeeland, where over 1,850 people drowned as a severe storm in combination with high tide caused many dikes to break. As a direct reaction to this flood, the Delta Works were developed – a large, multi-dimensional plan primarily aimed at the protection of the Southwestern region of the country. Because roads were constructed on the newly built dams connecting the islands and peninsulas of the province of Zeeland, the area was at the same time released from its isolated geographic and economic position.

Also internationally well-known was the creation of the "Zuiderzee" polders in the 1940s, 1950s and 1960s. These polders, which together now constitute the province of Flevoland, have added 150,000 hectares of new land at the geographic heart (and close to the Randstad, the economic heart) of The Netherlands. The first of the three new polders was primarily created for agricultural purposes, with a settlement pattern resembling Walter

Christaller's central place theory. The newest, most western polder, created in 1968, with the now booming city of Almere, has far less space devoted for agriculture and more space for residential development, recreation space and nature (Van de Ven 1993, KNAG 2001). Almere has in fact served as an expansion area for the city of Amsterdam.

THREATS

Although impressive achievements and improvements have been made in these and other areas of the country, the prospects for the near future are troublesome, to say the least. Three interrelated threats can be identified (CW 2000, Kors 2001):

1. a rising sea level – estimates for the next century indicate a rise in sea level of at least 20 centimeters to over 100 centimeters. Seadikes will need to be heightened, and therefore broadened. The latter implies that seadikes will require more space.
2. a drop in the level of the land, especially in the peatlands of the Northern and the Western Netherlands. In combination with rising sea levels, this will cause large areas to become more brackish because of the penetration of salt water.
3. changing seasonal precipitation levels, affecting river levels. Forecasts show that average winter precipitation levels will increase, whereas summer levels will decrease. In the winter, this will create capacity problems for regional and (inter)national drainage systems. It has been calculated that winter levels of the rivers Rhine, Meuse and IJssel will increase with at least 5% but perhaps even 30% in the next 100 years. In summer periods, however, the river levels could go down with, again 5% to 30%, causing problems for agricultural irrigation and river traffic.

These threats are intensified by the ongoing processes of urbanisation and increasing land use in the Netherlands. In 1950, 30 to 50% of the land area in the Netherlands in one way or another had a function in local and regional watersystems. But in 2000, only 3 to 5% of the land plays a role in a watersystem. For example, parcels of land that were once used as water storage areas in the winter, are now being used year round for agriculture or for other purposes (Van Nieuwenhuijzen & Bijlmakers 2001).

POLICY

In the summer of 2003, national, provincial and local governments signed the "National Bestuursakkoord Water" (National Water Government Agreement). This agreement contains general as well as detailed measures, amounting to expenses of over € 16 billion, in order to combat the various water threats outlined above. The key notion is that more space should be made available for water, before the water takes over that space (NBW 2003, Godijn & Hemel 2003). Designated flooding areas, for example, are needed to ensure that densely populated areas in the lower reaches of rivers will not flood in case of high river water levels – exactly what happened late 1993 and early 1995, when at one point in time over 225,000 residents were evacuated because of the threat of dike bursts (see Driessen & De Gier 1999). In 2002 the Commission Luteijn proposed three emergency spillover areas in the eastern part of the country, near the cities of Nijmegen and Arnhem, that could be used to store large amounts of river water from the Rhine and the Meuse rivers in case of extreme high river water levels. These proposals have received severe criticism, especially from governments and residents from the designated areas – illustrating a Dutch "No water in my backyard" variation of NIMBY.

These political actions and documents do not stand alone. More and more, it has become clear that water management issues should be integrated in other policy fields – e.g., physical planning, environmental planning and economic planning. An important change in planning policy was the "Startdocument on Physical Planning", published in 1999, which

reversed the historical tradition of altering water systems to the needs of society by proposing the designation of areas for future water management purposes. Illustrative is the "Commissie Integraal Waterbeheer" (CIW, Commission on Integrated Water Management), founded in 1995. This commission is chaired by His Royal Highness Prince of Orange, Willem-Alexander, heir to the throne – thus symbolizing the importance of water management for the Netherlands. CIW is an important advisory commission for national government, which not only focuses on safety issues, but also on topics of water pollution, water shortages and brackishness (CIW 2003). The CIW contains members from national, provincial and local government agencies, as well as members from waterboards. The latter are local public bodies, responsible for all facets of water management in their area. Residents and firms pay 'taxes' directly to their waterboards. These levies, which vary geographically, have increased strongly the last years.

THE 2004 MAPS

The first map of this year's series of five maps summarizes "past, present and some future" of water control in The Netherlands. To start, land reclamations since the year 1200 have been indicated, classified in three periods. All of these reclamations are, of course, situated in the "Low Netherlands", the area where almost all land lies below the +1 metre above average sea level contour line – in many areas the land lies in fact a few metres below sea level. Secondly, the location of 13 recent floodings caused by dike breaches or floodings has been indicated. All these floodings occurred in a ten year period between December 1993 and Summer 2003. The map also visualizes the suggested emergency spill over areas in the eastern part of the "High Netherlands". Finally, we have added the names of the rivers mentioned in this text as well as the location of 22 cities with 100,000 or more residents. As can be seen, over half of these cities, including the four largest cities of Randstad Holland, lie in the "Low Netherlands". In the next maps, we will present other facets of Dutch water management. The second map of this year's series will focus on waterboards and their taxes. The topics of water quality, water pollution and water shortages will be addressed in the remaining maps.

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