Chapter 5
Adaptation Strategies in the Netherlands

Joyeeta Gupta, Judith E.M. Klostermann, Emmy Bergsma, and Pieter Jong

5.1 Introduction

Although climate change has been prominently featured on the global scientific and political agendas since the World Climate Conference in 1979 (WCC 1979), the specific importance of adaptation to climate change has only been underlined about 20 years later. The Netherlands, because it lies largely under sea level, has much to benefit from climate change adaptation. Surprisingly, however, although the Netherlands has been very active in pursuing international climate change politics, the country has not put much effort in politicizing climate change adaptation internationally in this early period and domestically published its National Adaptation Strategy only as late as 2007. This chapter attempts to explain the evolution of Dutch climate change adaptation strategies. It examines adaptation policies in

J. Gupta (✉)
Department of Human Geography, Planning and International Development Studies, Amsterdam Institute for Social Science Research, University of Amsterdam, Room 2.12b, Plantage Muidergracht 14, 1018 Amsterdam, The Netherlands

UNESCO-IHE Institute for Water Education, Delft
e-mail: j.gupta@uva.nl

J.E.M. Klostermann
Water, Climate and Policy at Alterra of Wageningen University and Research Centre, P.O. Box 47, 6700 Wageningen, The Netherlands

E. Bergsma
Department of Political Sciences, Faculty of Social and Behavioural Sciences, University of Amsterdam, Amsterdam Institute for Social Science Research, Oudezijds Achterburgwal 237, 1012 Amsterdam, The Netherlands
e-mail: e.bergsma@uva.nl

P. Jong
Policy and Management, Delft University of Technology, Jaffalaan 5, 2628 Delft, The Netherlands
e-mail: p.jong@tudelft.nl

E. Albrecht et al. (eds.), *Implementing Adaptation Strategies by Legal, Economic and Planning Instruments on Climate Change*, Environmental Protection in the European Union 4, DOI 10.1007/978-3-540-77614-7_5, © Springer-Verlag Berlin Heidelberg 2014

four climate-related sectors (water, nature, agriculture and spatial planning) to identify general patterns regarding adaptation strategies in the Netherlands.

When climate change entered international politics in the 1970s and 1980s, international discussions and efforts focussed on counteracting or mitigating the causes of climate change. At the World Climate Conference (WCC 1979), the Hague summit on global environmental issues for Heads of State (Hague Conference 1989) and the Noordwijk Conference on Climate Change (Noordwijk Conference 1989), the emphasis was on realizing the seriousness of the impacts of the climate change problem, and—based on that realization—to promote efforts in the area of greenhouse gas mitigation. Although the first set of reports of the Intergovernmental Panel on Climate Change did indeed include a report on impacts and adaptation measures (IPCC-3 1990), when the United Nations Framework Convention on Climate Change (UNFCCC 1992) was finally adopted in 1992, the emphasis was clearly on mitigation as a global issue and adaptation as a local issue (Bodansky 1993). This emphasis was created for three reasons: to disconnect liability for impacts and related adaptation measures from the emissions at the global level; to make sure adaptation is not treated as a surrogate for mitigation, hence, to promote global action on mitigation; and finally, in recognition of the fact that adaptation measures are context-specific and therefore best constructed and negotiated at local level. However, at the start of the twenty-first century, calls have been increasingly made to "lift the taboo"[1] on climate change adaptation within international politics.

In the Netherlands, similar trends can be found. While there was a flurry of interest in adaptation-related issues in the early 1990s, the emphasis in that decade was on mitigation. It is only in the post-2000 period that there is a gradual re-emergence of the adaptation challenge on the domestic agenda. The following sections elaborate on this in some detail. This chapter is a further analysis based on a content analysis of the relevant policy and legal documents in the Netherlands (Klostermann et al. 2010).

5.2 The Evolution of Climate Policy in the Netherlands

Historically, the Netherlands as a low-lying country has always fought against water—the sea and the river! Since the twelfth century water management authorities have managed Dutch water issues; while this institutional structure was long characterized by high fragmentation, centralization efforts in Dutch water management started in the late eighteenth century under French influence and is currently still on-going; the number of local water boards has, for example, been reduced from about 2,500 in the 1950s to only 26 up to now, and the Delta Act (2011), included in the 2009 Water Act, intends to strengthen national coordination in flood

[1] This expression has been borrowed from Pielke's et al. (2007) commentary in *Nature* in which they argue for rehabilitating adaptation in international climate change politics.

management. This long tradition of being able to manage the water despite being below sea level has created a sense of confidence in the Netherlands that it will be able to cope with the impacts of climate change.

Despite its long history with water management, Dutch climate policy in the 1990s focussed mainly on mitigation. In the first National Environmental Policy Plan of 1988, the government adopted a mitigation target of stabilizing CO_2 emissions by 2000 at 1990 levels (VROM 1989). A year later, the newly elected government enthusiastically revised this target to stabilizing CO_2 emissions by 1994 and reducing them by 3–5 % by 2000. In 1991, the Policy Note on Climate Change (VROM 1991) developed mitigation policies, which were further revised in the second policy note of 1996 (VROM 1996). It should be noted that these ambitious targets were not supported broadly by other ministries and social actors and were not ultimately achieved. In the meanwhile, the Netherlands ratified the 1992 United Nations Framework Convention on Climate Change as well as the 1997 Kyoto Protocol (United Nations 1997) which committed the Netherlands to contribute to an overall goal for developed countries of a −5.2 % reduction of emissions from 1990 levels by 2005. This translated into a −6 % reduction of emissions for the Netherlands. In the run-up to the Copenhagen negotiations on Climate Change, the Netherlands committed itself to reducing its emissions by 30 % in 2020 compared to 1990 levels. In an effort to engage local actors and other ministries, the Netherlands has developed mitigation policies in collaboration with provincial and municipal actors since 1999.

While there have been developments in water management policies in the Netherlands in the beginning of the 1990s (e.g. VenW 1990), climate change adaptation was not seriously considered in any of the early policy documents within this domain. The reasoning was that if there was enough attention paid to mitigation, there would be less attention needed for adaptation. A parallel reasoning was evident at the global level, where apart from listing a series of potential adaptation measures, there were no real commitments with respect to adaptation either in the Climate Convention or in the Kyoto Protocol. However, pressure from the developing countries led to reconsideration of the funding rules for adaptation as applied by the Global Environment Facility; the decision was made to set up an Adaptation Fund from the proceeds of the Clean Development Mechanism under the Kyoto Protocol; as well as to finance the National Adaptation Plans of Action of the Least Developed Countries. A series of meetings of the Conference of the Parties in Nairobi and thereafter focused on the importance of adaptation strategies for developing countries. The Katrina disaster in 2005 in the United States pointed attention to the fact that even the developed countries could be increasingly vulnerable to the impacts of climate change. In the Netherlands, floods in 1995 and water problems of the late 1990s increased the awareness of adaptation needs. This led to the establishment of a Commission on Water Management for the twenty-first century and a series of measures have been taken since then.

A study of the adaptation strategies of the Netherlands is not a simple and straightforward exercise (Klostermann et al. 2009). More than 90 documents provide the basic information regarding the evolution of explicit and implicit

adaptation strategies. These can be clustered, although not without some difficulty, in terms of general adaptation strategies and adaptation strategies focusing on four specific sectors—nature, spatial planning, agriculture and water. The choice of four sectors is clearly limited as the National Program for Spatial Adaptation to Climate Change (ARK program; VROM 2006a) identifies nine sectors that are relevant to consider when thinking about climate change adaptation in the Netherlands. However, this chapter focuses on the four sectors that are most strongly related to land use, since land use planning is generally considered to provide the overarching framework for most adaptation strategies in the Netherlands (see VROM 2006a). The following sections thus describe the general adaptation strategies, and the strategies that operate in the four identified sectors.

5.3 General Adaptation Strategies

This section divides adaptation strategies into two phases—the pre-2004 phase and the post-2004 phase.

5.3.1 Pre-2004 Policy Approaches

In the pre-2004 period, three key general measures were taken which have relevance for adaptation. The first is the adoption of the Environmental Management Act of 1993 (EMA 1993), which is a living document and is regularly updated. It did not focus on climate change, but created a number of incentives that can easily be adapted for use and application in an adaptation strategy. These include environmental plans, environmental impact assessments (EIAs), environmental quality standards, environmental permits, reporting and enforcement rules. It also includes environmental subsidies, taxes and provisions for damage compensation. In reaction to the 1995 floods, a law on Compensation of Damage in case of Disasters and Accidents (Disasters Compensation Law 1998) was adopted in 1998 which provides a financial safety net for damage caused by large-scale events, including weather events. The Ministry of Internal Affairs is empowered to activate this law when a large-scale event happens. Since 2000, the Dutch government is obliged to prepare an annual Environmental Balance that assesses which environmental goals have or have not been met and where action should be focused. This assessment is based on the goals set in the regularly updated National Environmental Policy Plans, which was revised for the fourth time in 2001 (VROM 2001). However, these documents do not explicitly include climate-related or adaptation-related goals and strategies.

5.3.2 Post-2004 Approaches

In the post-2004 period, there has been a more rapid focus on climate change and adaptation. While in various (scientific) reports and at different conferences the urgency of taking adaptation measures was established, most Dutch environmental policy at the beginning of this century still did not explicitly include adaptation strategies. Key scientific documents in this period include the Climate Change Report of the House of Representatives (Rooijers et al. 2004) which, although it focuses more on mitigation, does emphasize the need to deal with floods and droughts and to provide adaptation financing to developing countries. In 2005, seven Senators under the leadership of Lemstra submitted a motion that existing spatial planning did not adequately take climate change into account and this motion was unanimously adopted (Lemstra 2005). In 2006, the Scientific Council for Government Policy (WRR 2006) argued persuasively that adaptation should be seen as a 'no-regrets' policy; at the national level the focus should be on the water and allied sectors to improve flood defenses since existing safety norms in the sector were out-of-date. The Council furthermore argued that adaptation measures could best be developed regionally since they are context relevant. Finally, the document noted that there needed to be better links between the water and spatial planning sectors, but that spatial planning alone may not be enough. The document also noted that, since climate change impacts directly affect individuals, it is essential to involve and engage stakeholders who may then be more willing to take action.

In reaction to these reports, the Dutch Government launched two adaptation policies in 2006—the Think Ahead Campaign[2] which focused, inter alia, on the potential extreme weather events and floods that may affect the Netherlands and the role of individuals in dealing with these events; and the Agenda for the Future VROM (2006b) which argues that climate change calls for understanding and revisiting the responsibilities of the different actors and that more responsibility should be passed on to the citizen. Additionally, a collaboration between various governmental actors—ministries, provinces, municipalities and water authorities—and non-governmental organizations adopted the ARK program in 2006 (National Program for Spatial Adaptation to Climate Change 2006–2014; VROM 2006a) which focuses on climate-proofing nine sectors in the Netherlands through spatial planning.

Since that moment on, adaptation issues increasingly received attention from the scientific community and governmental actors. In 2007, the Netherlands Environment Assessment Agency (Mathijssen et al. 2007) organized a conference to reflect on climate change adaptation issues and concluded that there was a need to focus not only on obvious risks in the water sector but also on more latent risks caused by climate change. It focuses specifically on the need to deal with the uncertainty of impacts; uncertain impacts call for taking risky approaches and evaluating them, for

[2] See: http://www.denkvooruit.nl. Accessed 08 November 2013.

generalized rather than specific approaches, for strong leadership, for an understanding of what can be planned in advance and what not, and finally it calls for incorporating multiple problem definitions by building on different stakeholder perspectives.

That same year, scientific work on climate change adaptation was integrated into a research document called the Route Planner (Van Drunen 2006) which identified 96 different measures that can be of relevance to the Netherlands. These measures were classified into different categories, namely: importance, urgency, no-regret measures, additional effects, mitigation effect and complexity (weighted sum of technological, social and institutional complexity). The Route Planner notes that the maximum available options are in the water sector and the lowest in the health sector; and that the biggest challenge is institutional complexity, which often stands in the way of the simplest measures. For example, the policy Room for the River, which tries to provide more space for the river to overflow, faces a number of institutional challenges especially from Spatial Planning Law. The authors call for flexible institutions that can cope with the new kinds of challenges imposed on them. In the same year, the Council for the Ministry of Housing, Spatial Planning and the Environment (VROM Council 2007) argued that uncertainty in climate science calls for structural, offensive and flexible long-term options. Such options should be robust enough to cope with not just the middle scenarios but also the extreme scenarios. Amongst other issues, it mentioned the need for establishing a watchdog to ensure that policies are implemented and to avoid administrative complexity.

Also in 2007, participants in the ARK program adopted the National Adaptation Strategy (VROM 2007a), which focuses on adaptation as primarily a spatial challenge and tries to limit risks within specific compartmentalized areas within specific dike rings. It also aims to use existing ecological processes to deal with climate change. The document focuses on hard measures (technological measures) and calls for the mobilization of large-scale investments.

In the period that followed, several policies were launched that aimed to clarify the different responsibilities for climate change adaptation. In April 2007, for example, the National Risk Strategy (BZK 2007) was adopted. This document identifies climate risks such as floods, droughts and health hazards such as flue pandemics and discusses the significance of each. It argues that crisis management involves differentiated roles for government and citizens. In June 2007, a policy vision "Working Together, Living Together" (AZ 2007) was adopted which focuses on climate proofing the Netherlands through a spatial framework in line with the central vision of all Balkenende cabinets "decentralize where possible, centralize where necessary". And in 2010, a Law on Safety Areas was adopted that allocates various responsibilities to deal with calamities, amongst others those related to water issues.

Table 5.1 provides a chronological listing of measures that have some relevance for adaptation in the Netherlands.

Table 5.1 Chronological general adaptation measures in the Netherlands (compiled from Klostermann et al. 2010)

Year/type	Institution	Focus
1993 Law	Environmental Management Act	Not on climate change; but can be adapted: includes EIA, standards, permits, reporting, enforcement rules; subsidies, taxes, compensation
1998 Law	Compensation of damage in case of disasters and accidents	Safety net for large scale-events
2000 Monitoring	Environmental balance	Takes climate change into account
2001 Policy	Ministries: National Environmental Policy Plan—4	Adaptation inadequately covered
2004 Science	House of Representatives: Climate Change Report	Mitigation; adaptation discusses dealing with floods and droughts and an adaptation fund for developing countries
2005 Motion	House of Representatives: Lemstra Motion adopted	Spatial policy should take climate change into account; FES (Economic Structuration Fund) money should be used also for knowledge infrastructure
2006 Policy	Agenda for the Future	Changes responsibilities for climate change; more responsibility on the citizen
2006 Policy	Government: Think Ahead Campaign	Extreme weather events, floods and the role of individuals
2006 Advice	Scientific Council for Government Policy	Adaptation is a 'no-regrets', regional option; link spatial planning to water sector
2006 Policy	Collaborative program: ARK	Climate-proof Netherlands for nine sectors through spatial planning
2007 Science	The Netherlands Environment Assessment Agency	Focus on obvious and latent risks; policy should deal with uncertainty
2007 Science	Collaborative research: Route Planner	Lists 96 different options for climate-proofing; stakeholder participation
2007 Advice	VROM Council Report	Uncertainty calls for structural, offensive and flexible long-term options; need for watchdog
2007 Policy	Collaborative program: National Adaptation Strategy	Adaptation is a spatial issue; compartmentalize risk; use ecological processes; hard measures; need for large-scale investments
2007 Policy	Cabinet: National risk strategy	Identifies climate risks: floods, droughts, flue pandemic; crisis management involving differentiated roles for government and citizens.
2007 Policy	Cabinet: Working Together, Living together	Climate-proofing through spatial framework
2010 Law	Law on Safety Regions	Allocation of responsibilities to deal with calamities

5.4 Agriculture

The agricultural sector in the Netherlands is one of the oldest sectors and is hugely influenced by developments at the international level within the World Trade Organization, at the European Union level within the Common Agricultural Policy (EC 2009) and global markets.

The agricultural sector does not formally and explicitly discuss climate change and adaptation. The 1993 Environmental Management Act (EMA 1993) includes regulations with respect to environmental impacts of agricultural practices. In the last decade of the twentieth century, the Dutch agricultural sector increasingly had to deal with extreme rainfall causing damage to crops. Several arrangements administered by different governmental bodies were in place to compensate farmers for their losses. This constellation of arrangements was criticised for its differentiating and non-committal character (Duin and Mesu 1995). The 1998 Disasters Compensation Law intended to centralize all damage compensation regulations into one arrangement; however, other regulations also continued to exist for the agricultural sector. For example, several studies to evaluate the possibilities for agrarian insurances were performed (e.g. LTO-Nederland 1999; IRMA 2000) and now, several insurance companies offer rain insurances to farmers. This development seems to shift some responsibility to the farmers by requiring them to insure against extreme rain. Next to these private initiatives, there are also some public arrangements that financially support farmers who have to deal with losses due to rainfall.

In 2004, the government's Agenda for a Living Countryside (LNV 2004) emphasized that non-agricultural policies and laws would have to play a critical part in helping to address climate-related water problems.

In 2005, two research and advisory documents were critical. The Social Economic Council came up with a report (SER 2005) about the opportunities for rural areas and argued that these opportunities can be optimized by linking national with European policies and mobilizing local actors. Climate adaptation is not mentioned in this report. However, the report focuses on the entrepreneurial and adaptive role of the farmer. The Ministry of Agriculture's report 'Choice for Agriculture' (LNV 2005) focused on potential agricultural developments and aims at informing farmers about these potential developments to enhance their adaptive capacity.

In 2006, a Company Premium (LNV 2009) was established and a Fertilizer Law (2006) was adopted. The Company Premium is a follow-up to the changes made to the EU Common Agricultural Policy (EC 2009) and offers income support delinked from production to farmers if they meet some criteria. This premium does not mention climate change adaptation. The Fertilizer law was established also as a follow-up to the non-compliance of the Netherlands to the EU Nitrates Directive (Dienst Regelingen 2008) and provides emission standards and rules on the use of fertilizers. This too does not take climate change into account but will perhaps need modification to do so.

In 2007, the government adopted first a strategy on rural development and then a policy. The strategy (LNV 2007a) describes how financial means from the European Agricultural Fund for Rural Development (EAFRD) will be allocated to local projects that combat biodiversity loss and climate change, and maintain water quality and quantity. The policy links up with the goals in the European Rural Development Policy (European Council 2006) focusing on the competitiveness of the agricultural and forestry sector; improving the environment and the countryside; improving the quality of life in rural areas and encouraging diversification of the rural economy; and building local capacity for employment and diversification through a leader-approach (i.e. a bottom-up approach stimulating the involvement of local actors). Although climate change is not specified, it is expected that these subsidies will help farmers to adapt. In the same year, the Rural Areas Development Act (WILG 2007) was adopted, which although it does not address climate adaptation could easily be adapted to do so. This Act divides responsibilities between the central and provincial governments with the latter held accountable for achieving rural goals. The key tool used in this document is spatial planning. This Act creates a financial investment instrument (Investment Budget Rural Areas (ILG) which provides budgets to provinces. It also changes some rules of the Agricultural Land (Transactions) Act (WAG 1981). This act now empowers provinces to rearrange and redistribute land if there is need to do so based on certain principles; and to reconstruct land areas to reduce chemical pollution, acidification and stench.

In 2010, the subsidy scheme for Rural Area Management revised the existing three subsidy schemes for nature management, agricultural nature management and private management of natural and agricultural ground (Dienst Regelingen, IPO, SNL 2009). It includes some EU funds and hence EU criteria. These measures indicate a growing integration of different measures and laws into a common legal and subsidy system.

Table 5.2 provides a chronological listing of measures that have some relevance for adaptation in the Netherlands.

5.5 Nature

The Netherlands is a densely populated small country; nature reserves are thus concentrated in relatively small areas. Regulations in this area are of relatively recent origin and quite often regulated from Brussels—e.g. The Habitats Directive (European Council 1992) and the Birds Directive (European Council 1979). In 1967 the Nature Conservation Law (NCL 1967) was adopted and provided the framework for action for the coming decades.

The Forestry Act of 1981 aims at protecting lands currently under forests from land use change until and unless there is a significantly important public good to be served. This Act includes reporting, replanting and compensation obligations and a prohibition on felling.

Table 5.2 Chronological implicit and explicit adaptation measures in the agricultural sector in the Netherlands (compiled from Klostermann et al. 2010)

Year/type	Institution	Content
2004 Policy	Agenda for a Living Countryside	Recognizes climate-related water challenges and the role of non-agricultural laws (e.g. NEN) in addressing these. Focuses on decentralization. Spatial planning has a limited role.
2005 Advice	SER: Opportunities for Rural Areas in the Netherlands	Opportunities optimized by linking national with EU policies and mobilizing local actors. Climate adaptation not mentioned and the role of the entrepreneur is emphasized.
2005 Vision	Ministry of Agriculture: The Choice for Agriculture	Describes potential agricultural developments and aims at informing farmers to enhance their adaptive capacity.
2006 Subsidy	Company Premium	Provides income support delinked from production to farmers upon conditions; climate change not addressed.
2006 Law	Fertilizer law	Creates emission norms and use norms for fertilizers; climate change not addressed.
2007 Vision	Dutch Strategy for Rural Development 2007–2013	Describes how the EU EAFRD will be allocated to local projects on biodiversity, climate change and water quality and quantity.
2007 Policy	Dutch Rural Development Policy 2007–2013 (RDP2/POP2)	Linked to EU ERDP goals. Although climate change is not mentioned, subsidies could help farmers adapt.
2007 Law	Rural Areas Development Act (WILG)	Does not address climate adaptation explicitly but could easily be adapted to do so. Provinces are accountable for achieving rural goals. Creates ILG to finance provinces and WAG to empower provinces to rearrange and reconstruct land if needed based on certain principles.
2007 Policy	Agenda for a Living Countryside 2007–2013	Decentralizes responsibilities to provinces. The multi-year programs between water authorities and municipalities incorporate WILG and ILG.
2010 Policy	Subsidy system for Nature and Landscape Management	Subsidizes public and private nature management on agricultural lands.
–	Miscellaneous (public and private) compensation schemes for damage compensation to farmers	Public and private insurances for a contribution in crop damage compensation caused by (extreme) rainfall to farmers, placing more responsibility at the level of farmers.
–	Miscellaneous subsidy schemes on nuts, cattle farms, etc.	There are a number of sector specific subsidies that could perhaps be modified for use to help the sector adapt.

In 1990 the Ministry of Agriculture, Nature Management and Fisheries adopted the Nature Policy Plan (NPP 1990) and introduced the concept of the National Ecological Network (NEN), a concept that aimed to counter the increasing fragmentation and isolation of species in specific pockets of land, by developing corridors for species to move around. These ecological zones are to be created and achieved by 2018 and are to ensure the resilience of the Dutch species, although at the time climate change was not taken into account. This omission has been remedied in a number of studies undertaken since then (Routeplanner 2007; Vos et al. 2007). This concept (NEN) has been integrated into a number of different laws including the WILG.

Five years later in 1995, the NEN was officially adopted in a Spatial Plan for the Rural Area and its related key planning decision (LNV 1995). Several policy documents after that further elaborate on the NEN, and promote the management of nature in relation to agriculture and water. In this context, the impacts of climate change are taken into account. The obligations for nature protection in the rural areas are targeted at provinces and water authorities. The role of land owners in this is emphasized. For example, the concept of a National Climate Buffer, referring to the creation of a natural zone that can absorb climate shocks, is proposed as an extension for the NEN.

In 1998, the Nature Conservation Law of 1967 was amended and focused on protecting areas and landscapes (and not species) through mandating the preparation of nature policy plans with a maximum interval of 8 years, the development of vision statements, designation decisions, preservation goals, management plans, permits and compensation rules, as well as monitoring and enforcement. Also, since 1998, Nature Balances have been made annually that describe the impacts of climate change on nature but do not discuss potential adaptation options. The Nature Exploration documents focus on how different climate scenarios may impact on the achievement of the national target.

Also in 1998 the Flora and Fauna Act (1998) was adopted. This implements the international Convention on endangered species (CITES) and the EU Birds and Habitat Regulations, and aims at protecting endangered species through rules on hunting, trade and ownership, the ‘no-unless’ rule, and a fauna fund to finance these activities. The ‘no-unless’ rule does not allow land use change unless there are no alternatives and the changes are perceived to be in the national interest. This law has not taken climate change explicitly into account.

In 2000, the ministry adopted the Nature for People, People for Nature policy (LNV 2000). It draws attention to raising public attention and support for nature as well as emphasizing that Dutch nature is unique. It uses the climate change problem to emphasize the role of nature in contributing to water management and refers to the concept of Room for the River. It promotes the implementation of multi-level regulations, provides financial incentives and a greening of the Dutch tax system and educational incentives. The concept of the National landscape is expected to help integrate the rural and aesthetic functions of the landscape. This document promotes land acquisition and spatial planning of areas for the National Ecological Network. Also, this policy note introduced the concept of robust ecological

corridors as additions to the NEN. While ecological corridors, or climate buffers, have not been officially included in the NEN, 19 national climate buffer projects, supported by payments from the High Water Security Program, have been initiated[3] (Rijkswaterstaat 2007).

In 2007, the Ministry of LNV published a policy document which provides clear rules with respect to interpreting the NEN and explains how the concepts of 'no-unless', 'compensation rule',[4] 'redemarcating the NEN'[5] and 'the NEN balance approach'[6] should be interpreted (LNV 2007b). However, while the NEN is a key policy for nature management in the Netherlands, its financing has been reduced and its policy goals have been softened by the previous government (cabinet Rutte 2010–2012), amongst others pressured by the economic recession. The future status of the NEN has become insecure.

As in other sectors, a coming together of different measures is visible in the Dutch nature sector. Table 5.3 sums up the key policies.

5.6 Water

The Netherlands, as has been mentioned before, lies largely below sea level. It is a delta country with four major rivers (Rhine, Meuse, Scheldt and Ems). Its coast needs to be protected by man-made dunes, dikes and other structures. The water sector is perhaps the most regulated sector in the Netherlands. This section only examines the recent and most relevant regulations and policy decisions that deal with this sector.

In 1990, a New Coastal Defence Policy (VenW 1990) for the Netherlands was adopted. It explained that following the 1953 floods, the dikes and dunes along the North Sea were raised to 'Delta Height'. The protection should ensure that regions would be protected from the extremes of a 1 in 10,000 year storm (Annex II of the Water Act 2009). Given the potential impacts of climate change and following several studies, four options were identified: retreat; selective preservation; preservation; and seaward expansion. In the 1990 Coastal Defence Policy, the choice for dynamic preservation was made (dynamic to allow for some 'natural' movement of the shoreline), but the preservation goal aimed at both combating coastal erosion and dealing with sea level rise, primarily through sand nourishments and replenishment and stone revetments in weak locations. Dyke protection was to be

[3] See also: http://www.klimaatbuffers.nl/english-homepage-2. Accessed 08 November 2013.

[4] If spatial developments are allowed, negative impacts on nature should be mitigated and remaining damage should be compensated.

[5] Allows changing the borders of NEN areas on a small scale when this has a positive effect on quality or quantity. When it happens for other reasons, the 'no-unless' principle applies.

[6] A development approach allowing an integrated approach to NEN areas combining different qualitative or quantitative aims.

Table 5.3 Chronological implicit and explicit nature measures in the nature sector in the Netherlands (compiled from Klostermann et al. 2010)

Year/type	Institution	Content
1967 Law	Nature Conservation Law	Framework for conservation
1981 Law	Forestry Act	Protects forests through reporting, replanting and compensation obligations and a prohibition on felling.
1990 Policy	Nature Policy Plan	National Ecological Network (NEN) to be created by 2018
1995/2001 Policy	Spatial Plan for the Rural Area	Elaborates further on NEN; sees water as an organizing principle; delegates responsibility to decentralized governments and farmers.
1998 Law	Nature Conservation law, amended	Calls for regular nature policy plans, vision statements, designation decisions, preservation goals, management plans, permits and compensation rules, monitoring and enforcement
1998 Policy	Nature explorations and balances	Annual reports on the nature sector by Netherlands Environmental Assessment Agency
1998 Law	Flora and Fauna Act	Protects endangered species through rules on hunting, trade and ownership, the 'no-unless' rule and a fauna fund; does not explicitly take climate change into account
2000 Policy	Nature for People, People for Nature	Land acquisition and spatial protection of NEN; incentives and taxes; education; climate change addressed
2000 Policy	Nature Policy Plan	Promotes robust ecological corridors and climate buffers
2007	Rules of the NEN	Document that interprets key terms—NEN, compensation, no-unless, NEN balance approach

undertaken by maintenance while dune coasts were to be allowed some dynamic movement.

In 1996, a program for testing the flood defences every 5 years was established—to see if these still meet the safety norms. The test conducted in 2006 revealed that 24 % of the barriers did not meet the norms. This led to the establishment of a High Water Security Program in 2006 (Rijkswaterstaat 2007) with 93 measures that needed to be undertaken and would cost 2.3 billion Euros.

In the second half of the 1990s, two near-floods in the Netherlands led to the establishment of a Commission on Water Management for the twenty-first Century. The Commission's 1999 report (Commissie Waterbeheer 2000) concluded that the greatest challenges were in integrating and linking the water sector to spatial planning objectives and developments. The Commission recommended a clarification of responsibilities, greater collaboration between the different concerned actors including scientists, the promotion of no-regrets measures and the need to raise

additional resources to deal with the problem. The report recommended that excess water should be retained upstream, in surface water, and, if necessary, in temporary basins.

In 2000, the Third Policy Note on Coasts (VenW 2000) was adopted. It focused on strengthening coastal protection by focusing on the weak parts of the coastal protection chain and dynamic maintenance of the coastal boundaries including through sand replenishment. In 2003, based on an assessment of the weak links in the coastal defence system, the government adopted a program focusing on ten weak links. Appropriate policy is being developed in these regions (VenW 2003).

In 2003, the different administrative and social actors came together to adopt the National Administrative Accord on Water (NAW 2003) and decided to develop policies for areas that fall outside the formal dike protection of the Netherlands, and a policy line to manage the coastal areas with special attention for the parts of the coast that have weaker protection. The NAW approach was evaluated in 2006 and the evaluation concluded, inter alia, that the approaches adopted were very complex and that the financial responsibilities were not always clear. In 2008, the NAW was made up-to-date based on the latest information about climate scenarios and the obligations that flowed from the European Water Framework Directive. That same year, a water test was included in the Spatial Planning Act which calls for testing spatial planning for their impacts on water quality and quantity (RIZA 2003).

In 2006, the third policy note (VROM 2007b) focusing on the Waddenzee was adopted. 90 % of this area is seen as a National Nature Monument and is also covered by the Habitats Directive of the European Union. The document calls for prevention of pollution discharges into the sea, greater cooperation with Germany and Denmark and appropriate policy with respect to gas and fish exploitation.

A 2006 Policy Document (Policy Guideline for Major Rivers: VenW and VROM (2006) replaced a 1997 policy document to focus on room for the river. This document was drawn up in cooperation with social actors. In 2007, a decision was taken to make Room for the River; this was a major shift in mindset from creating hard protective measures to allowing the rivers space to overflow in selected areas if necessary. This includes 40 context-related measures related to the Rhine and the Meuse.

The 2007 evaluation of the Third Policy on Coasts was positive and recommended specific rules regarding areas outside dike protection, weak links in the coastal defence system and sand replenishment. In the same year, a revised law on the water authorities (Water Authorities Modernization Act 2007) was adopted that changes the mandate and management system of these authorities. These water authorities are empowered to make water management plans, water ordinances and charge taxes.

In 2008, a Delta Commission (led by Veerman; Delta Commission 2008) came out with its report focusing on the long-term goals for water management. It concluded that the safety levels for water protection should be increased by a factor of 10, and building in risky places should be based on an evaluation of the costs and

benefits. It made recommendations with respect to specific elements of the coastal defence system.

In 2008, the government adopted the National Water Plan (NWP) based on a Water Vision published in 2007 (VenW, VROM and LNV 2009). This plan adopts and integrates the existing programs of coastal protection, Room for the River and river expansion in the Maaswerken, agreements between the state and other actors regarding water shortage and excess, and river basin management flowing from the Water Framework Directive. The NWP recommends taking climate change impacts into account in water policy. It creates a multi-level security approach: in the first layer the focus is on prevention of flooding, in the second layer the focus is on sustainable spatial planning, and in the third layer the focus is on crises management.

Municipal water plans are plans made by municipalities in cooperation with water authorities and social actors and can go beyond their official task of managing the sanitation system to include the broader management issues in relation to water. In 2008, the Act on Municipal Water Tasks (2008) was adopted that amends previous laws and integrates new tasks and although it does not mention climate change, is a result of a recognition of the impacts of climate change at the municipal level. The law allocates responsibilities for sanitation and rainwater within municipal boundaries.

In 2009, the Government adopted a Water Act (2009), which replaces and integrates eight other water laws.[7] The Water Act discusses water shortage, water safety and water quality. It calls for 12 yearly revisions of the norms and six yearly policy revisions. It bundles the existing system of permits. This Water Act integrates past Acts into one consolidated system.

The latest policy development within the Dutch water sector is the adoption of the 2011 Delta Act. This law regulates Dutch flood risk protection and fresh water supply, principally by ensuring sufficient financing for water safety in the Netherlands as well as by creating a "delta commissioner" that coordinates all water safety regulations and oversees the fulfilment of national water safety goals (Table 5.4).

5.7 Spatial Policy

In 2006, the Government adopted the Spatial Policy Note that amended previous documents and presented a national policy for the period until 2020 and discusses the period 2020–2030 as well (VROM et al. 2006). The policy calls for shifts from

[7] Among the laws are the Water Management Act which managed both quality and quantity issues, the Flood Defences Act of 1996, the Groundwater Act, the 1969 Surface Waters Pollution Act, the 1975 Marine Waters Pollution Act, the Act of 14 July 1904 containing provisions on land reclamation and construction of dikes, the Public Works Management Act (sections relating to waterways), the Public Works Act 1900 (sections relating to waterways). The Act on Municipal Water Tasks (2008) has partly been integrated in the Water Act.

Table 5.4 Chronological implicit and explicit adaptation measures in the water sector in the Netherlands (compiled from Klostermann et al. 2010)

Year	Institution	Content
1990 Policy	New coastal defence policy	Choice for dynamic preservation of dikes (maintenance) and dunes (flexible)
1997 Policy	Policy Directive: Room for River	Room for the River concept
1999 Advice	Commission on Water Management for the twenty-first century	The 1999 report requested the Royal Netherlands Meteorological Institute for climate scenarios; greatest challenge linking water to other sectors
2000 Policy	Third Coastal Policy	Focus on weak parts of the coastal defence system
2003 Policy	National Administrative Agreement on Water (NAW)	Collaboration between all governmental actors to deal with water on ten different weak parts
2003 Law	Water test	Included in existing Spatial Planning Law
2006 Law	Tests of flood defences	The last test in 2006 showed that 24 % of the flood defences did not meet the norms and a program with 93 measures has been adopted
2006 Policy	Evaluation of NAW	Collaboration complex, division of responsibilities not clear
2006 Policy	Policy note on Waddenzee	90 % of sea is a nature reserve; measures include international collaboration, limits on fish and gas exploitation, and standards on discharges
2006 Policy	Major Rivers Delta Plan, later renamed as Room for the River	Room for the River: includes 40 context relevant measures for the Rhine and Maas
2006 Policy	High Water Security Program	Improving coastal flood defences for ten weak spots and realizing emergency retention areas
2007 Policy	Evaluation of Third Coastal Policy	Generally effective; more attention to areas outside the dikes
2008 Policy	National Administrative Agreement on Water amended (NAW)	Includes implications for Water Framework Directive and clearer division of responsibilities
2008 Advice	Delta Commission (Veerman)	Water safety levels should be increased by factor 10
2008 Policy	National Water Plan (NWP)	Integrates existing programs for coastal protection, river management and implementation of the WFD
2009 Law	Water Act	Replaces and integrates eight other water laws; climate change not explicitly taken into account; calls for 12 yearly revisions of norms and 6 yearly water policies.
2011 Law	Delta Act	Regulates water safety management at the national level.

planning to development and towards decentralization. It engages to maximize the participation of social actors at multiple levels of governance and thereby to maximize the opportunities for diverse responses. It aims to strengthen the economic competitive position of the country, equitably promote vital cities and

villages; and protect important spatial values and the security of the country including water security. Climate change and its impacts are explicitly taken into account and there are efforts to see the impacts also in terms of how they can improve the living environment. The Spatial Planning Note distinguishes between responsibility for running the system and responsibility for achieving goals. The national government is responsible for ensuring the basic quality of the system. The spatial policy for major rivers and the IJsselmeer fall under the responsibility of the state; the spatial policy for the coast, the National Ecological Network, and the national landscapes fall under the responsibility of the state and provincial governments.

A year later, in 2007, an Urgency Program for the Randstad was established to promote 35 projects to enhance the resilience of spatial areas within this economically active region (VenW 2007). In 2008, the Spatial Planning Act of 1965 (SPA 1965) was revised (SPA 2008) to provide new procedures, but this Act does not explicitly take climate change into account. All government levels are empowered to make 'structural visions' and this new term encapsulates a number of different terms used in the past. The visions should integrate and provide direction and bind the authority that has designed them. There are also land use plans to be revised once every 10 years and these plans will be used for giving permits for buildings and demolitions. Where large-scale projects are being planned that do not fit into the nature of the relatively small-scale land use plans, the Environmental Licensing Bill (2010) provides for the possibility of a project license. Finally, the state and the provinces are empowered to make land use plans in case there are national (state) or provincial interests at stake (*inpassingsplannen*). Legal procedures have been simplified so that the response time is reduced. This Spatial Planning Act amends some existing laws: It modifies the Municipal Priority Right (that calls on land owners to give first priority to the municipality when they sell their property) to ensure that these rights are included into the land use plans. The Act includes the Ground Exploitation Act, enabling municipalities to place restrictions on the use of an area.

A number of other laws are also relevant. An Act on Expropriation (1851) allows the state to claim property rights from the owner based on a full compensation to the land owner when there is clear public interest involved; for 'green' reasons such as the National Ecological Network; for 'blue' reasons such as the Room for the River policy or for infrastructure and housing. A Building Decree of 2008 revising a previous Decree of 2003 calls for climate mitigation but not yet climate adaptation to be taken into account in building standards. There are plans to simplify the multiple permits needed for construction purposes into one integrated permit that allows for balancing between different interests.

The Environmental Management Act of 1994 calls for environmental impact assessments for specific types of projects. In addition, a European Directive of 2001 calls for strategic environmental evaluations for strategic projects. These instruments have an impact on spatial policy. Furthermore, a Social Cost Benefit Analysis is compulsory since 2000 for all large projects (Table 5.5).

Table 5.5 Chronological implicit and explicit adaptation measures in the spatial planning sector in the Netherlands (compiled from Klostermann et al. 2010)

Year	Institution	Focus
1851 Law	Law on expropriation	Allows expropriation with full compensation when it is in the public interest.
1965 Law	Spatial Planning Act	Framework for spatial planning in the Netherlands.
2006 Policy	Spatial Policy Note	Amended previous documents and presented a national policy for the period until 2020; shift towards development and decentralization/ participation. Climate change impacts explicit; distinguishes between system responsibility and goal accountability; delegates responsibilities.
2007 Policy	Urgency Plan for the Randstad	35 projects to enhance the resilience of spatial areas.
2008 Law	Spatial Planning Act of 1965 revised	New procedures, but does not explicitly take climate change into account. Tools: 'structural visions', land use plans, project decisions; revises Municipal Priority Right and includes Ground Exploitation Law.
2008 Law	Building Decree (revising a previous Decree of 2003)	Takes mitigation into account, but not adaptation, in building standards.
2010 Law	Environmental Licensing Bill	Provides for the possibility of a license if a project is not in accordance with a land use plan.

5.8 Analysis

This chapter has tried to give a bird's eye view on national adaptation policy in general and in four of the nine sectors seen as important for climate change adaptation in the Netherlands. It shows that there has been an enormous degree of activity in the policymaking sphere in these four sectors in the last few years. The question that rises is: How can this activity be characterised? We identify six key trends in the evolutionary process:

5.8.1 Shift from Sectoral to Integrated Approaches to Adaptation

An evolutionary understanding of the climate change adaptation problem and the challenges it poses to society can be culled from the information provided in the last four sections. While clearly the water sector was most aware of the potential consequences of climate change since the early 1990s (VenW 1990), over time the awareness has reached other sectors and levels. First, importance was accorded to adaptation at the national level and its scope (e.g. Lemstra Motion 2005). Second, the awareness has spilt over to other sectors (e.g. the nature sector—Policy Note Nature for People, 2000; the spatial planning sector—Spatial Policy Note, 2006;

and the agriculture sector, although most policies in this sector deal with climate change implicitly). Third, there is a growing realization of the links between sectors. The lack of linkage, and hence, the need for links between the water and spatial policy sectors grew in significance in the 2000s (Commission on Water Management in the twenty-first century; Lemstra 2005; WRR 2006; National Adaptation Strategy 2007; Policy note Living Together, Working Together, 2007). The Agenda for a Living Countryside (LNV 2004) recognizes that non-agricultural policies are critical for dealing with climate impacts on the countryside. In 2001, the link between nature, agriculture and water was emphasized (Spatial Plan for the Rural Area 2001). In 2000, the role of nature in water management was emphasized (Policy Note Nature for People 2000). These growing links and the diversity of instruments being developed in different sectors is now leading to a fourth phase where integration is key. Here, there is a tendency to move towards simplifying pluralistic and competitive procedures into a comprehensive planning process in an effort to provide forums where multiple objectives and concerns can be integrated into decisions. For example, the Water Act (2009) replaces past laws and integrates a number of issues into one document. Similarly the Spatial Planning Law (2008) also aims to integrate different goals and policy instruments. The Rural Areas Development Policy and Law (WILG 2007) also attempts to integrate different goals for the rural areas and their financing instruments (ILG 2007) and land consolidation instruments (WAG).

An interesting link between the Water Act and the Spatial Planning Act has been established. The spatial aspects of national and provincial water plans are also considered as spatial structural visions of the Spatial Planning Act. This link between the two Acts opens the possibilities to implement the water plans with spatial planning instruments.

5.8.2 Shift from a No-Priority to a No-Regrets to a Priority Issue

The move from sectoral through national to integrated also reflects changing perspectives on the adaptation issue. As mentioned earlier, although a substantial part of the Netherlands lies below the sea level, it was not seen as vulnerable; there were high expectations from the global emission reduction strategy which would reduce the need for adaptation. Besides, it was not clear how robust policies could be made to deal with uncertain impacts. This led to a general under-emphasis being given to the adaptation process. However, by 1997, it became increasingly evident (a) that a global emission reduction strategy would at best be a very modest one, (b) that physical impacts of the 1995 floods, the 2003 research on the ten weak spots in the coastal defence system and the 2006 research results that 23 % of the storm surge barriers did not meet national standards, and (c) that although the Netherlands is not seen as vulnerable, it was soon felt that it will be increasingly exposed to the

impacts of climate change as the newer reports of the IPCC continued to predict that climate change could have very serious impacts globally.

By the end of the decade, people were referring to adaptation strategy as a 'no-regrets' strategy (Commissie Waterbeheer 2000) and this acquired a high political and scientific allure when it was repeated in the WRR document of 2006 (WRR 2006). However, it was soon realized that adaptation measures would have to go far beyond no-regrets policy to also include important and urgent measures, measures that have a contribution to make to adaptation as well; and more complex integrative measures (Route Planner 2007). Furthermore, the scenarios developed by the Royal Netherlands Meteorological Institute which downscaled global impacts to national and local level provided a framework within which climate change adaptation could take place. In the meanwhile, a philosophy was developing on how to cope with uncertainty; uncertainty was seen as calling for different institutional skills (MNP Conference 2006) and approaches (VROM Council 2007). Adaptation is becoming a national priority, although the current political situation in the Netherlands shows that climate change may be slipping fast from the agenda in the face of the transatlantic recession.

5.8.3 Shift from a Technological to Post-Modern Concept

While technological and rationalistic rule-oriented approaches have been dominant in the past, there is an increasing tendency to innovatively design new principles of management and new instruments to help society cope with a range of new problems and challenges and to meet different goals.

The concept of dynamic protection adopted with respect to the coasts tries to combine the need for national physical security with the need to recognize that coasts are by their very nature dynamic—they move with the ebb and flow of the seas (VenW 2000). While dynamism is essentially applied only to the dune defence system, there are limits to the dynamism and dune replenishment and nourishment are key tools here.

The concept of Room for the River is another such concept that provides rivers the space to grow and contract with seasonal variations (VenW, VROM and LNV 2006). Although this sounds like a simple concept, it has major implications for spatial policy, has to be implemented all along the river banks in different provinces and municipalities—and calls for a series of context relevant institutional measures for effective implementation.

A third post-modern concept is that of the National Ecological Network (LNV 1990) and the related concepts of Robust Ecological Corridors and Climate Buffers (LNV 2000). The National Ecological Network allows for linking up ecological zones all over the country by 2018, while the 13 planned Robust Ecological Corridors allow for larger links between the larger ecological zones. Climate Buffers are expected to enhance the ability of the land to cope with climate change.

The state has in the past mostly focused on rational and efficient measures, but in recent years there appears to be a trend shift in the direction of post-modern concepts: redundancy, flexibility and the recognition of multiple rationalities. All of the three above-mentioned concepts have implications for how people live; they call for recognition that people live with nature and must make space for nature. While this is a theoretically attractive notion, actually implementing it might imply the expropriation of land and will require not only very good quality persuasion, but also remarkable access to resources and a flexible spatial planning system. Possibly some of the difficulties in implementing these have led to a partial return to hard measures in the 2007 National Adaptation Strategy (VROM 2007a).

5.8.4 Shift from a Top-Down Consensus Policy Approach Through Decentralization to a New Balance?

A fourth interesting tendency in the policy process is the move from top-down consensus policy to a more bottom-up approach of engagement of civil society and sub-national authorities. The climate mitigation targets of 1988 and 1989 were not achieved, possibly because of a lack of general support for these targets. The need to engage the population and ensure that policies have public support is seen as critical in the Netherlands in this phase. At the same time, there is an increasing neo-liberal interpretation of the role of state as minimal, of passing on responsibilities to other social actors. The norm of 'individual responsibility' is increasingly seen as a dominant value in Dutch society (Think Ahead Campaign 2005; Agenda for the Future 2006). The motto of "Decentralize where possible, centralize where necessary" and stakeholder participation appear to have become buzz words in the policy discussions. For example, the role of farmers and rural dwellers as entrepreneurs in addressing their own problems is emphasized in a number of documents (SER 2005; LNV 2005; LNV 1995) and subsidies are provided to help them use their own initiative (Rural Development Program 2, LNV et al. 2008; WILG 2007); while there is a Disaster Compensation Law (1998) that aims to compensate individuals in the event of an extreme event, newer initiatives try to ensure that farmers take out their own insurance for such events.

However, the trend towards decentralization of responsibilities to the lower levels is subject to so many strategic visions at the central and provincial level that the question of how to balance and divide responsibilities between different levels is critical. This is especially so in the spatial planning sector. In the nature sector there is a complete clash between the top-down nature of the targets set and the actual physical impossibility to prevent species movements as climate changes, even though the physical boundaries of nature reserves remain static. Furthermore, while it is important to have public support for policies, shifting responsibilities to citizens is an interesting but not always practical suggestion. Although the WRR (2006) claims that individuals will feel more engaged to participate in adaptation measures than in mitigation measures, because it concerns them directly, allocating

responsibility to home owners on ground water and storm water is not always practical and the line between state and resident responsibility is difficult to draw (Bergsma et al. 2009). After all, most home owners in cities have absolutely no interest in or knowledge of ground water levels under their houses.

5.8.5 *Different Paradigms in Different Sectors*

A fifth interesting outcome of analyzing the different adaptation policies in the different sectors is that there are vastly different paradigms evident in the different fields. These different paradigms have occurred partly because of the different historical evolutionary processes that these policy fields have undergone. For example, water governance in the Netherlands was traditionally dominated by a Delft University of Technology-oriented approach. This paradigm has been changing under the influence of the trends described above, but still a proper calculation will always be the basis of Dutch water policy. Also, water governance has historically involved the decentralized water management authorities within a common vision of protection from floods and multi-level governance. Cooperation is thus institutionalized. Furthermore, the Dutch have been able to master their environment to such an extent with engineering measures that they are now able to discuss the possibility of social and ecological engineering to provide more space to nature and be more fluid in their protection standards.

The Nature regulations of the European Union appear to be more rigid and static, more top-down and unable to cope with the notion of a fluid natural system where changes in global, local and micro climate can have influences. This is so even though the EU directives are based on bottom-up information; possibly the process of making EU directives is too slow. Multi-level cooperation is far from institutionalized and the notion of space for nature carries a rigid framework of maps with boundaries. The paradigm at work in the nature sector is that the past contains the ideal to which we must strive in the future (in the Netherlands: the nature we had in 1850). Such a paradigm obviously conflicts with the changes climate change may bring. In contrast, the agricultural regulations have focused on providing a framework within which innovation and the market can function, allowing for greater autonomy to the farmer and policy intervention only when a social and/or ecological problem was signalled. The farmers have traditionally coped with climate variability through history. The paradigm in the agricultural sector appears to provide farmers with information inputs and financial incentives and to help them become more adaptive. The spatial planning process is much more densely regulated and has multiple tools and instruments at its disposal—but these can also be experienced as highly constricting when it comes to adaptation to climate change. The paradigm in Dutch spatial planning is to accommodate urbanization processes. Because all the good building locations are already taken, this results in developing unsuitable and marginalized locations, also from the climate change viewpoint. Attempts at making this sector less rigid are evident in the new Spatial Planning Act (2008) and the tools of project decisions. Changing this paradigm will not be easy.

5.8.6 *From Adaptation Strategies to Adaptive Capacity*

An examination of the sectoral adaptation strategies leads to the following impression. For more or less certain impacts (the sea is expected to rise), there are hard measures being taken like the strengthening of the coastal defence system. However, for the more or less uncertain impacts, the focus is on creating procedures and tools (e.g. the water test), general public awareness and engagement both at community level and sub-national level in order to mobilize people to come up with their own autonomous adaptive solutions. This is clearly the case in the agricultural sector and to some extent in the spatial planning and water sectors (especially with respect to precipitation) but less so in the nature sector. However, increasingly the nature organizations are arguing in favour of dynamic nature management. A critical element of adaptive capacity is trying to ensure that institutional complexity and especially the interplay within and between formal and informal institutions is taken into account. While the interplay between formal institutions is being incrementally revised in the last decade especially in response to the understanding that institutional complexity is perhaps the most complex challenge facing adaptation strategies (Route Planner 2007), the interplay between formal and informal institutions seems crucially important and is at the same time unexplored. More research is needed in the role of informal institutions in adaptation to climate change.

5.9 Conclusions

This Chapter has tried to examine the transition in adaptation policy in the Netherlands over the last 20 years in general and with respect to four sectors. The Netherlands has a long history of coping with water problems. This has led to an accumulation of expertise in this area. There is a saying that God made the world and the Dutch made the Netherlands. With engineering marvels such as the 32 km Afsluitdijk that transformed a North Sea inlet into a freshwater lake, the Neeltje Jans and in more recent years the Maeslant Barrier, floating houses along the Meuse, coupled with a tradition of community management and funding of water works through water management authorities that can be traced back to the Middle Ages, show that the Dutch have a high pedigree when it comes to coping with the vagaries of nature. As a result, nature becomes 99 % managed and the value of the remaining parts becomes contested. A famous Dutch poem says: ‘And what remains of nature in this land, a forest that has the size of a hand’ (Bloem 1965). Luckily, the paradigm change in the water sector also promises more room for nature.

The above chapter shows that there are six major trends in the development of adaptation policy in the Netherlands. On the one hand, this accumulation of expertise creates confidence in the ability of the Netherlands to be able to rise to

any challenge; and on the other hand, one can question whether the Dutch have become over confident. Clearly, climate change is a very complex problem, and the solutions chosen are also complex and pluralistic. The complexity of the entire process raises the hope that society as a whole can be empowered to deal with climate change impacts. However, the fear is that adaptive efforts may be dissipated between different actors and individuals and that the collective action may not amount to more than a sum of the individual acts. The VROM Council warned of this and called for the establishment of a watchdog to monitor the entire process (VROM Council 2007).

Acknowledgements This chapter was partially funded by past research entitled: 'IC12: Institutions for Adaptation: The Capacity and Ability of the Dutch Institutional Framework to Adapt to Climate Change', which is funded by the Netherlands BSIK-Program Climate *changes* Spatial Planning (CcSP).[8]

Biography Joyeeta Gupta is Professor of Environment and Development in the Global South at the Amsterdam Institute for Social Science Research of the University of Amsterdam and at UNESCO-IHE Institute for Water Education in Delft.
Judith E.M. Klostermann is Senior Researcher for Water, Climate and Policy at Alterra of Wageningen University and Research Centre.
Emmy Bergsma is a Ph.D. student in political sciences at the University of Amsterdam, Faculty of Social and Behavioural Sciences, Amsterdam Institute for Social Science Research, department of Political Sciences.
Pieter Jong is a Senior Researcher at the Faculty of Technology, Policy and Management, Delft University of Technology.

References

Act on Municipal Water Tasks (2008) Wet Gemeentelijke Watertaken. Bull Acts Decrees 2007 (276):277
Agricultural Land (Transactions) Act (1981) Wet Agrarisch Grondbeheer (WAG). Bull Acts Decrees 248:374, last revisions: Bull. 2010, 155, Bull. 2008, 180
AZ (2007) Samen werken—samen leven, Policy Program Balkenende IV government, 2007–2011. English text can be found at: http://www.government.nl/Government/Policy_statement
Bergsma EJ, Gupta J, Jong P (2009) IC12: institutions for climate change—case study on individual responsibility in adaptive capacity. Working Document 7, nr. W09/10. Institute for Environmental Studies, Amsterdam
Bloem CJ (1965) Verzamelde Gedichten. Athenaeum—Polak & Van Gennep, Amsterdam
Bodansky D (1993) The United Nations framework convention on climate change: a commentary. Yale J Int Law 18:451–588

[8] http://www.climatechangesspatialplanning.nl

Building Decree (2003) Bulletin of Acts and Decrees, 2002, No. 518; last revision: Bull. 2009, No. 400

BZK (2007) Strategie Nationale Veiligheid. The Hague: ministry of the interior and kingdom relations. Online available at: http://www.minbzk.nl/actueel?ActItmIdt=105235

Commissie Waterbeheer 21e eeuw (2000) Water beleid voor de 21e eeuw—Geef water de ruimte en de aandacht die het verdient. Den Haag: Commissie Waterbeheer 21e eeuw

Declaration of the World Climate Conference (1979) WMO proceedings of the world climate conference: a conference of experts on climate and mankind. Geneva, 12–32 February 1979. WMO - No. 537. ISBN 92-63-10537-5

Decree B (2008) Revision on energy efficiency of buildings. Bull Acts Decrees 2008(325):373

Delta Act (2011) Deltawet waterveiligheid en zoetwatervoorziening (Stb. 2011, 604)

Delta Commission (2008) Samen werken met water—Een land dat leeft, bouwt aan zijn toekomst. Rotterdam: Deltacommissie. Available online at: http://www.deltacommissie.com/doc/2008-09-03%20Advies%20Deltacommissie.pdf

Dienst Regelingen (2008) Brochure Mestbeleid 2008–2009. The Hague: ministry of agriculture, nature and food quality. Accessible online at: http://www.hetlnvloket.nl/portal/page?_pageid=122,1780509&_dad=portal&_schema=PORTAL&p_file_id=30906

Dienst Regelingen, IPO, SNL (2009) Brochure Subsidiestelsel Natuur- en Landschapsbeheer Onderdeel agrarisch natuur- en landschapsbeheer. The Hague: ministry of agriculture, nature and food quality. Available online at: http://www.hetlnvloket.nl/portal/page?_pageid=122,1780509&_dad=portal&_schema=PORTAL&p_file_id=42365

Disasters Compensation Law (1998) Law on compensation of damage In case of disasters and accidents (Wet Tegemoetkoming schade bij rampen en zware ongevallen). Bull Acts Decrees No. 325; last revisions: Bull. 2010, No. 146 and Bull. 2009, No. 617

Duin MJ, Mesu JJ (1995) Wie zal dat betalen? Overheid, schadevergoeding en aansprakelijkheid bij wateroverlast. Bestuurskunde 4(8):361–369

EC (2009) The common agricultural policy explained. Brussels: European Commission, Directorate-General for Agriculture and Rural Development. Available online at: http://ec.europa.eu/agriculture/publi/capexplained/cap_en.pdf

Environmental Licensing Bill (2010) Bull Acts Decrees 2008, No. 496; last revisions: Bull. 2013, 144

Environmental Management Act of 1993 (1993) Bull Acts Decrees, No. 693; 1994, No. 80; last revisions: Bull. 2010, No. 187 and Government Gazette 2010, No. 20455

European Council (1979) Council Directive 79/409/EEC on the conservation of wild birds. Available online at: http://europa.eu/legislation_summaries/environment/nature_and_biodiversity/l28046_en.htm

European Council (1992) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive). Available online at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31992L0043:EN:NOT

European Council (2006) Council Decision (2006/144/EC) on Community strategic guidelines for rural development (programming period 2007 to 2013). Available online at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:055:0020:0029:EN:PDF

Flora and Fauna Act (1998) Flora en Faunawet. Bull Acts Decrees, No. 402, 1999, No. 264; last revisions: Bull. 2008, 4 and Government Gazette 2010, No. 20455

Hague Declaration on Climate Change (1989) Adopted by 22 Heads of State, The Netherlands

IPCC (1990) Climate change: the IPCC impacts assessment. UNEP and WMO, Australian Government Publishing Service, Canberra

IRMA (2000) Risicofinanciering van oogstschade door extreme weersomstandigheden. Wageningen Universiteit & Research Centrum, Wageningen

Klostermann J, Gupta J, Jong P, Bergsma E (2009) Institutions for climate adaptation: An inventory of Institutions in the Netherlands that are relevant for climate change—working document 4. Institute for Environmental Studies, Amsterdam

Klostermann J, Gupta J, Jong P, Bergsma E (2010) Institutions for climate adaptation: Applying the adaptive capacity wheel on the background document of the content analysis—working document 5. Institute for Environmental Studies, Amsterdam

Law on Safety Regions, (2010) Wet veiligheidsregio's. Bull Acts Decrees 2010(145):146

Lemstra W (2005) Motie-Lemstra (CDA) c.s. inzake lange termijninvesteringsstrate-gieën op het gebied van ruimtelijk-economisch beleid in Nederland (EK, XXI-C). The Hague: The Senate

LNV (1990) Natuurbeleidsplan. Governmental decision. House of representatives, year 1989–1990, 21149, no. 2–3

LNV (1995) Structuurschema Groene Ruimte: het landelijk gebied de moeite waard. Deel 4: Planologische Kernbeslissing. The Hague: Ministry of Agriculture, Nature and Food Quality

LNV (2000) Natuur voor mensen, mensen voor natuur. Nota Natuur, Bos en Landschap in de 21e eeuw. The Hague: Ministry of Agriculture, Nature and Food Quality. Available online at: http://www.minlnv.nl/portal/page?_pageid=116,1640360&_dad=portal&_schema=PORTAL&p_file_id=41642

LNV (2004) Agenda voor een Vitaal Platteland—Visie: Inspelen op veranderingen. The Hague: Ministry of Agriculture, Nature and Food Quality. Available online at: http://www.minlnv.nl/portal/page?_pageid=116,1640321&_dad=portal&_schema=PORTAL&p_file_id=13747

LNV (2005) Kiezen voor Landbouw—Een visie op de toekomst van de Nederlandse agrarische sector. The Hague: Ministry of Agriculture, Nature and Food Quality. Available online at: http://www.minlnv.nl/portal/page?_pageid=116,1640321&_dad=portal&_schema=PORTAL&p_file_id=13085

LNV (2007a) Meerjarenprogramma Vitaal Platteland 2007–2013. The Hague: Ministry of Agriculture, Nature and Food Quality. Available online at: http://www.minlnv.nl/portal/page?_pageid=116,1640321&_dad=portal&_schema=PORTAL&p_file_id=14197

LNV (2007b) Spelregels EHS. The Hague: Ministry of Agriculture, Nature and Food Quality. Available online at: http://www.minlnv.nl/portal/page?_pageid=116,1640321&_dad=portal&_schema=PORTAL&p_file_id=20630

LNV (2009) Brochure bedrijfstoeslag 2009. The Hague: Ministry of Agriculture, Nature and Food Quality. Online available at: http://www.hetlnvloket.nl/portal/page?_pageid=122,1780509&_dad=portal&_schema=PORTAL&p_file_id=18868

LNV, VROM, V&W and the Provinces (2008) Plattelandsontwikkelingssprogramma 2007–2013 voor Nederland (POP2)—Version of 6 June 2008, The Hague. Available online at: http://www.regiebureau-pop.nl/nl/info/4/

LTO-Nederland (1999) Weer zelfverzekerd? Verkennende studie naar de mogelijkheden voor risico-afdekking tegen schade door extreme weersomstandigheden. Dutch Federation of Agriculture and Horticulture, The Hague

Mathijssen J, Petersen A, Besseling P, Rahman A, Don H (Eds.) (2007) Omgaan met Onzekerheid in Beleid; Report on the Conference Dealing with Uncertainty in Policy-making, held on 16 and 17 May 2006 in The Hague. Bilthoven: The Netherlands Environmental Assessment Agency. Available online at: http://www.rivm.nl/bibliotheek/rapporten/550032003.pdf

Nature Conservation Law (1967) Natuurbeschermingswet. Bull Acts Decrees 572

Nature Conservation Law (1998) Natuurbeschermingswet. Bull Acts Decrees, No. 403; 1999, No. 15; last revisions: Bull. 2010, No. 135, 142, Government Gazette 2010, 20455

Noordwijk Conference on Climate Change (1989) The Noordwijk Ministerial Conference held in November 1989 in Noordwijk, The Netherlands

Pielke R, Prins G Jr, Rayner S, Sarewitz D (2007) Lifting the taboo on adaptation. Nature 445: 597–598

Rijkswaterstaat (2007) Brochure Veilig achter duin en dijk—Hoogwaterbeschermingsprogramma. Lelystad: Programmabureau HWBP. Available online at: http://www.helpdeskwater.nl/waterkeren/hwbp

RIZA (2003) Handreiking Watertoets 2. The Hague/Lelystad: RIZA. Available online at: http://www.av-consulting.nl/activiteiten/watertoets/handreiking2.pdf

Rooijers FJ, Keizer I de, Slingerland S, Faber J, Wit RCN, Verbeek J, van Dor-land R, van Ulden AP, Hutjes RWA, Kabat P, van Ierland EC (2004) Klimaatverandering, klimaatbeleid. Inzicht in keuzes voor de Tweede Kamer. Main report and background report. Delft: CE report no. 3.748.1

SER (2005) Advies: Kansen voor het platteland. The Hague: SER publication number 12. Available online at: http://www.ser.nl/nl/publicaties/adviezen/2000-2007/2005/b24110.aspx

Spatial Planning Act (Wet op de Ruimtelijke Ordening) (1965) Bull Acts Decrees 1962, 286

Spatial Planning Act (2008) Wet ruimtelijke ordening. Bull Acts Decrees, 2006, No. 566, 2008, No. 227; last revisions: Bull. 2010, No. 135 and Government Gazette 2010, No. 20455

United Nations (1992) United Nations Framework Convention On Climate Change. Available online at: http://unfccc.int/resource/docs/convkp/conveng.pdf

United Nations (1997) Kyoto protocol to the United Nations framework convention on climate change. Kyoto

Van Drunen M (red.) (2006) Naar een klimaatbestendig Nederland—Samenvatting Routeplanner. Joint publication of the national research programs Climate change Spatial Planning, Living with Water, Habiforum and CURNET. Available online at: http://www.klimaatonderzoeknederland.nl/gfx_content/documents/ark/Samenvatting%20routeplanner.pdf

VenW (1990) Kustverdediging na 1990. First coastal policy. The Hague: ministry of transport, public works and water management

VenW (2000) Derde Kustnota: tradities, trends en Toekomst. Third coastal policy. The Hague: Ministry of Transport, Public Works and Water Management

VenW (2003) Procesplan Zwakke Schakels In De Nederlandse Kust. The Hague: Ministry of Transport, Public Works and Water Management. Available online at: http://www.verkeerenwaterstaat.nl/Images/Procesplan%20Zwakke%20Schakels_tcm195-101251.pdf

VenW (2007) Randstad urgent. The Hague: ministry of transport, public works and water management. Available online at: www.vrom.nl/get.asp?file=docs/publicaties/w947.pdf.

VenW, VROM and LNV (2006) Brochure PKB Ruimte voor de Rivier - Investeren in veiligheid en vitaliteit van het rivierengebied. The Hague: Ministry of Transport, Public Works. Available online at: http://www.ruimtevoorderivier.nl/files/Files/brochures/EMAB%20PBK%20Nederlands.pdf

VenW, VROM and LNV (2009) Nationaal waterplan 2009–2015. The Hague: ministry of transport, public works. Available online at: http://www.verkeerenwaterstaat.nl/Images/NWP_tcm195-270588.pdf

Vos CC, Opdam PFM, Nabuurs GJMM, Bugter RJF, Epe MJ (2007) Klimaatverandering en ruimtelijke adaptatie natuur: wat we (niet) weten. Brinkman Climate Change, The Hague

VROM (1989) Nationaal Milieubeleidsplan; Kiezen of verliezen. House of representatives, year 1988–1989, 21 137, no. 1–2. The Hague

VROM (1991) Nota Klimaatverandering. Ministry of Housing, Spatial Planning and the Environment, The Hague

VROM (1996) Vervolgnota Klimaatverandering. Ministry of Housing, Spatial Planning and the Environment, The Hague

VROM (2001) Nationaal Milieubeleidsplan 4. The Hague: ministry of housing, spatial planning and the environment. Available online at: http://www.vrom.nl/pagina.html?id=2706&sp=2&dn=1076

VenW and VROM (2006) Beleidslijn grote rivieren. The Hague: ministry of transport, public works. Available online at: http://www.verkeerenwaterstaat.nl/Images/Beleidslijn%20grote%20rivieren%20handreiking_tcm195-162030.pdf

VROM (2006a) Nationaal programma Adaptatie ruimte en klimaat. The Hague: ministry of housing, spatial planning and the environment. Available online at: http://www.vrom.nl/pagina.html?id=2706&sp=2&dn=6241

VROM (2006b) Toekomstagenda Milieu: schoon, slim, sterk. The Hague: ministry of housing, spatial planning and the environment. Available online at: http://www.vrom.nl/pagina.html?id=2706&sp=2&dn=6139

VROM (2007a) Maak ruimte voor klimaat! Beleidsnotitie. The Hague: ministry of housing, spatial planning and the environment. Available online at: http://www.vrom.nl/pagina.html?id=2706&sp=2&dn=7503

VROM (2007b) Ontwikkeling van de Wadden voor natuur en mens - Deel 4 van de planologische kernbeslissing Derde Nota Waddenzee. Text after acceptance of the parliament. The Hague: Ministry of Housing, Spatial Planning and the Environment. Available online at: http://www.vrom.nl/pagina.html?id=2706&sp=2&dn=7040

VROM, LNV, VenW and EZ (2006) Nota Ruimte—Ruimte voor ontwikkeling. The Hague: Ministry of Housing, Spatial Planning and the Environment. Available online at: http://www.vrom.nl/notaruimteonline/

National Accord on Water (2003) Nationaal Bestuursakkoord Water. The Hague: Het Rijk, IPO, VNG and de Unie van Waterschappen. Available online at: http://www.helpdeskwater.nl/wetgeving-beleid/nationaal/?ActItmIdt=1280

VROM Council (2007) De hype voorbij—Klimaatverandering als structureel ruimtelijk vraagstuk. The Hague, VROM council, Advice 060. Available online at: http://www.vromraad.nl/Download/37238_DeHypeVoorbij2.pdf

Water Act (2009) Waterwet. Bull Acts Decrees, No. 107, 549; last revisions: Bull. 2010, 135, Government Gazette 2010, 20455

Water Authorities Modernization Act (2007) Wijziging van de waterschapswet. Bull Acts Decrees, 2007, No. 208, 581; last revisions: Bull. 2010, 199

WILG (2007) Wet Inrichting Landelijk Gebied. Bulletin of Acts and Decrees, 2006, No. 666, 677; last revisions: Bull. 2009, 18

WRR (2006) Klimaatstrategie - tussen ambitie en realisme. The Hague: WRR report no. 74. Available online at: http://www.wrr.nl/content.jsp?objectid=3619