EUROPEAN
COMMISSION

Adaptation preparedness scoreboard:

Country fiche for the Netherlands

NOTE TO THE READER

Under Action 1 of the EU's Strategy on adaptation to climate change (COM(2013)216), in collaboration with the Member States, the Commission developed an 'adaptation preparedness scoreboard'. Using the scoreboard, the Commission prepared country fiches on each Member State in an iterative consultation process.[1] The country fiches assess the Member States' adaptation policy as of June 2018, including the content of NASs and plans, for the following aspects:

- Institutional structure
- Quality of national vulnerability assessments
- Knowledge creation (national observation systems in relevant sectors[2] and climate modelling), transfer and use
- Action plans:
  - Quality (incl. the basis used for assessment of adaptation options)
  - Actual implementation mechanisms
- Funding mechanisms
- Mainstreaming into sectoral policies, in particular:
  - Disaster risk reduction
  - Spatial planning
  - Environmental impact assessment (EIA) (how the Directive is transposed)
  - Insurance policy
- Transboundary cooperation
- Monitoring mechanisms in different sectors and governance levels

[1] The first versions of the fiches, prepared in consultation with the Member States in 2014-15, were unpublished and used to fine-tune the scoreboard. The second drafts were published, after consulting the Member States, as background documents to the public consultation on this evaluation in December 2017. https://ec.europa.eu/clima/consultations/evaluation-eus-strategy-adaptation-climate-change_en The final Member State consultation on the draft fiches took place in June 2018.

[2] These relate for example to meteorology, floods, drought, sea level, coastal erosion, biodiversity, human/animal/plant health etc.

The fiches are based on internal work by the Commission and on targeted assistance from an external contractor. They also served as input to the assessment of Action 1 of the Strategy during its evaluation. Annex IX of the Commission's SWD(2018)461 on the evaluation of the Strategy presents a horizontal assessment of the 28 country fiches, while Annex X presents the list of scoreboard indicators and the methodology used in applying them.

The assessments in the country fiches (yes/no/in progress) need to be read in conjunction with the narrative that accompanies them. They assess the state of play within each EU Member State. While all effort has been made to ensure the coherence across fiches in the assessment of the same indicator, it should not be directly compared across the Member States. Two countries with a "yes" on the same indicator could have a different national situation leading to that assessment. Not all indicators have the "in progress" status, some can only be "yes" or "no".

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List of abbreviations

CBS	Centraal Bureau voor de Statistiek (Statistics Netherlands)
DAW	Deltaplan Agrarisch Waterbeheer (Deltaplan Agrarian Water Management)
EIA	Environmental Impact Assessment
G32	The 32 largest municipalities in The Netherlands
GGD	Gemeentelijke Gezondheidsdienst (Municipal Health Service)
ICT	Information and Communication Technology
IenW	the Ministry of Infrastructure and Water Management
IPCC	International Panel on Climate Change
IPO	InterProvinciaal Overleg (Association of Provinces of The Netherlands)
KNMI	Koninklijk Nederlands Meteorologisch Instituut (Royal Netherlands Meteorological Institute)
LIWO	Landelijk Informatiesysteem Water en Overstromingen (National Information System Water and Floods)
LTO	Land- en Tuinbouw Organisatie (Dutch Federation of Agriculture and Horticulture)
MER	Milieu Effect Rapportage (Environmental Impact Assessment)
MIRT	Meerjarenprogramma Infrastructuur, Ruimte en Transport (Multi-Annual Programme for Infrastructure and Transport Projects
NAS	National Adaptation Strategy
NEN	NEderlandse Norm (Netherlands Standards Institute)
NGOs	Non-Governmental Organisations
NKWK	Nationaal Kennis- en innovatieprogramma Water en Klimaat (National Water and Climate Knowledge and Innovation Programme)
PBL	Planbureau voor de Leefomgeving (Netherlands Environmental Assessment Agency)
RIVM	Rijksinstituut voor Volksgezondheid en Milieu (Dutch National Institute for Public Health and the Environment)
SMWO	Stuurgroep Management Watercrises en Overstromingen (Steering Group Management Water Crises and Floods)

TNO	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (Netherlands Organisation for Applied Scientific Research)
UvW	Unie van Waterschappen (Dutch Water Authorities)
VNG	Vereniging Nederlandse Gemeenten (Association of Netherlands Municipalities)
WUR	Wageningen University and Research

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

Dutch adaptation policy comprises two main elements:

- The National Climate Adaptation Strategy 2016[3] (NAS) "Adapting with Ambition", which sets out a general policy for tackling the effects of climate change. It is the second NAS, the first one dates from 2007.

- The Delta Programme, which was initiated in 2010 and entered into force in January 2012.

The first NAS "Make Space for Climate" was published in 2007. The Netherlands Court of Audit published a report in 2012, stating that the Dutch climate adaptation policy did not address all aspects of climate change, and that its overall coordination could be improved. The Delta Programme covered a large part of climate adaptation, but not all aspects. In 2013 the Netherlands Climate Agenda announced the development of a new NAS. The decision for a revised NAS was also taken in response to the EU Adaptation Strategy in 2013, which encouraged Member States to adopt adaptation strategies and plans, with a review of progress proposed for 2017.

The NAS2016 aims at broad climate adaptation, and describes six climate impacts which are considered the most urgent to address in the Netherlands, next to water management which is covered in the Delta Programme. These six climate impacts are: heat stress; critical infrastructure, such as energy and ICT; agriculture and horticulture; nature; allergies and infections; and cascading effects.

The threat of sea-level rise combined with storm surges, coastal flooding and fluvial flooding events led to a long tradition of water management in The Netherlands. Since 1999, climate adaptation has been integral to flood resilience plans and projects in the Netherlands[4].

The Dutch Delta Programme[5] re-evaluated Dutch water management policies, land use and spatial planning in the context of a changing climate, with the aim of fully integrating climate adaptation. It focuses on three goals: flood protection, fresh water supply and resilience to heavy rainfall, drought and heat. It is built on the legal framework 'the Delta Act on flood safety and freshwater supply' (hereafter "the Delta Act"). The Delta Act anchors the Delta Programme, the Delta Fund and the role of the Delta Commissioner into legislation. The Delta Act entered into force on 1 January 2012.

[3] http://ruimtelijkeadaptatie.nl/english/nas/

[4] Haasnoot M., H. Middelkoop (2012) A history of futures: A review of scenario use in water policy studies in the Netherlands Environmental Science & Policy Volumes 19–20, May–June 2012, Pages 108-120 https://www.sciencedirect.com/science/article/pii/S1462901112000391

[5] Deltaprogramma http://english.deltacommissaris.nl/

A2. Adaptation strategies adopted at subnational levels

In 2009, the Dutch provinces signed an agreement with the national government to mainstream climate adaptation into spatial planning by 2015. Most provinces have now developed climate adaptation action programmes[6]. Ten out of the twelve provinces have published key vulnerability assessments; nine have published key policy or planning documents aimed at adaptation.

A number of municipalities started to develop adaptation policies and even released local adaptation strategies, for example, the cities of Rotterdam (the Rotterdam Climate Initiative[7]) and Amsterdam (Amsterdam Rainproof[8]). Many more examples exist, as summarised in the Spatial Adaptation portal[9].

The National Knowledge and Innovation Programme Water and Climate (NKWK[10]) started in 2015 and is a cooperation of governments, scientific organisations and the private sector. The partners invest in pilots, operational projects and long-term developments with the aim of adapting to climate change.

The Delta Programme, including the recently published (September 2017) Delta Plan on Spatial Adaptation, is a reflection of the close cooperation between the national government, provinces, regional water authorities and municipalities. The Association of Provinces of The Netherlands (IPO), the Association of Netherlands Municipalities (VNG) and the Dutch Water Authorities (UvW) published their Investment-Agenda[11] on 10 March 2017. This agenda contains goals, concrete objectives and actions on climate adaptation. A common priority is the mainstreaming of climate adaptation into water management, spatial planning, nature policy, agriculture and economic policy.

Adaptation action plans

B1. National adaptation plan

The implementation of the NAS is governed by a board of directors from all relevant ministries of the Dutch Government. They supervise a programme team. This programme team has delivered an implementation programme for 2018-2019[12]. The programme team cooperates in networks of national, regional and local governments, NGOs, knowledge institutes and the private sector. The approach in the NAS is to provide an overview of the adaptation needs for different sectors. This approach leads to broad support from the sectors because they understand why they are expected to contribute to adaptation.

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[6] See for (an evaluation of 240) examples the 'quick scan climate adaptation', issued by the IPO (interprovincial assembly) on http://www.ipo.nl/publicaties/ipo-publiceert-quick-scan-klimaatadaptatie

[7] Rotterdam Climate Initiative http://www.rotterdamclimateinitiative.nl/documents/2015-en-ouder/Documenten/RCI-RAS-2013-NL-LR.pdf

[8] Amsterdam Rainproof https://www.rainproof.nl/

[9] Kennisportaal Ruimtelijke Adaptatie https://ruimtelijkeadaptatie.nl/

[10] The National Water and Climate Knowledge and Innovation Programme https://waterenklimaat.nl/?lang=en

[11] "Investeringsagenda naar een duurzaam Nederland' https://vng.nl/onderwerpenindex/milieu-en-mobiliteit/energie-en-klimaat/nieuws/decentrale-overheden-presenteren-duurzame-investeringsagenda

[12] Uitvoeringsprogramma 2018-2019. Nationale klimaatadaptatiestrategie (NAS), https://www.rijksoverheid.nl/documenten/rapporten/2018/04/04/uitvoeren-met-ambitie-uitvoeringsprogramma-2018-2019-nationale-klimaatadaptatiestrategie-nas. An English translation will be available in June/July 2018.

The sub-programmes[13] of the Delta Programme resulted in a set of five Delta Decisions[14] (adopted in September 2014). In autumn 2014, the Cabinet discussed the Delta Decisions further with the House of Representatives and embedded the Decisions in, among other things, the National Water Plan, the Water Act and administrative agreements with other governments.

The Delta Programme is implemented by all relevant authorities: the central government, provinces, municipalities and regional water authorities. The business community, citizens, research institutions and civil society organisations also contribute. The regional water authorities are essential for the implementation of (regional) water management and for the management and maintenance of dikes and coastal dunes. Provincial and local authorities are responsible for spatial planning, nature conservation and area development. Central government, provinces, regional water authorities and municipalities work together in the sub-programmes of the Delta Programme. Regional steering groups provide advice on decisions, strategies and measures as well as on opportunities for using an integrated approach following the common Multi-Annual Programme for Infrastructure and Transport Projects (MIRT).[15] Each year, the Delta Commissioner sends a Delta Programme to Parliament[16]. This includes Delta Plans on protection against flooding and water scarcity and droughts. In September 2017, the first "Delta Plan Spatial Adaptation" was sent to Parliament.

B2. Adaptation plans adopted at sub-national level

As aforementioned, ten out of twelve provinces had published key studies and assessments of the climate impacts and vulnerabilities affecting their respective regions. The NAS2016 gave a new momentum to planning by provincial governments.[17]

About half of the municipalities have published plans on climate adaptation. In many cases, groups of municipalities with similar problems work on regional (sub-provincial) adaptation plans. As a follow up to the Deltaplan Spatial Adaptation, provinces, Rijkswaterstaat, regional water authorities and municipalities will carry out an adaptation stress test and start risk dialogues in order to identify their priorities for adaptation. As of 2018, municipalities, regional water authorities and provinces are expected to cooperate in around forty regions to implement the Delta Programme Spatial Adaptation.

B3. Sectoral adaptation plans

The NAS2016 incorporated the six main climate impact issues (see A1) in its implementation programme. At sectoral level, climate adaptation efforts focus on protecting vital and vulnerable functions against (future) climate impacts. Within the framework of the Delta Programme Spatial Adaptation, the programme "Vital and Vulnerable" was published and it

[13] Regionale Deltaprogramma's http://english.deltacommissaris.nl/delta-programme/contents/regions-and-generic-topics
[14] Vijf Deltabeslissingen http://www.rijksoverheid.nl/onderwerpen/deltaprogramma/vijf-deltabeslissingen
[15] Meerjarenprogramma Infrastructuur, Ruimte en Transport https://www.mirtoverzicht.nl/mirt-overzicht-2017/het-mirt-en/duurzaamheid
[16] Deltaprogramma 2018 https://www.deltacommissaris.nl/deltaprogramma/deltaprogramma-2018
[17] Deltaplan Ruimtelijke Adaptatie 2018: https://ruimtelijkeadaptatie.nl/deltaplan-ra/

is accompanied by a yearly progress report[18]. This programme focuses on the protection of vital and vulnerable functions against the consequences of flooding.

Rijkswaterstaat, the Ministry of Infrastructure and Water Management's executive arm responsible for transport infrastructure and water management, is developing a working programme for climate resilient networks: roads, waterways and water systems. As part of the programme, research to investigate the vulnerability of the highway network to climate change has been initiated. In the future, levels of acceptable risk will be established, taking into account required service levels and costs and benefits of possible measures for climate adaptation.

The Delta Plan Agrarian Water Management[19] (DAW) was initiated by the Dutch Federation of Agriculture and Horticulture (LTO) on request of the Dutch Government. The DAW addresses water issues to support economically strong and sustainable agriculture. DAW provides for cooperation between the agricultural sector and the regional water authorities. Water-related issues addressed are: water quality, salinisation, water deficit and water surplus.

The Delta Approach Water Quality was adopted by Dutch governments, NGOs and knowledge institutes in 2016[20]. It aims to achieve the EU Water Framework Directive's goals, and reducing water pollution.

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In the Netherlands, the Ministry of Infrastructure and Water Management (IenW) – more specifically the Directorate General for Water and Soil[21] - is responsible for climate adaptation policy-making, including the Delta Programme. The Ministry covers the following sectors: water and soil management, transport, infrastructure (air, road, water) and environmental protection. Furthermore, it coordinates the climate adaptation programme and communicates to the Dutch public about climate adaptation.

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

[18] Voortgangsrapportage Vitaal en Kwetsbaar https://www.deltacommissaris.nl/deltaprogramma/documenten/publicaties/2017/09/19/dp2018-d-derde-voortgangsrapportage-aanpak-nationale-vitale-en-kwetsbare-functies

[19] Deltaplan Agrarisch Waterbeheer http://agrarischwaterbeheer.nl/content/deltaplan-agrarisch-waterbeheer

[20] Delta aanpak waterkwaliteit en zoetwater https://www.uvw.nl/publicatie/delta-aanpak-waterkwaliteit-en-zoetwater/

[21] Climate-ADAPT country information: The Netherlands http://climate-adapt.eea.europa.eu/countries-regions/countries/netherlands

As indicated above, adaptation is coordinated by the Ministry of IenW. Horizontal coordination takes place by a board of directors, representing all relevant ministries. This coordination was in place during the drafting of the NAS and is currently in place to support the implementation phase. Six other ministries were involved in the development of the NAS2016: the Ministry of Foreign Affairs, the Ministry of Justice and Security, the Ministry of the Interior and Kingdom Relations, the Ministry of Economic Affairs and Climate Policy, the Ministry of Agriculture, Nature and Food Safety and the Ministry of Health, Welfare and Sport. To support the implementation of the NAS2016, an interdepartmental support group has been formed. In addition to the various ministries, the national associations of regional and local authorities and the main research institutions, The Netherlands Environmental Assessment Agency (PBL) and The Netherlands Institute for Public Health and Environment (RIVM) are also part of the interdepartmental support group.

National climate adaptation dialogues are an important element of the NAS. Such platforms have already started, or are in preparation, on the following issues: health and heat stress, nature, insurance and climate change, built environment, and agriculture. The relevant ministries are also participating in these dialogues.

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

Provincial governments, regional water authorities and municipalities were part of the process of formulating the NAS2016 by participating in working sessions and by commenting on draft versions of the NAS. Furthermore, representatives of the national associations of these three subnational governments IPO, UvW and VNG discussed the draft versions in meeting with the ministry and asked feedback from their members on the draft versions. The NAS2016 programme team supports the climate adaptation policy-making activities of the provinces. With this structure, vertical coordination mechanisms to support the implementation of the NAS are in place.

The VNG and IPO have brought the Covenant of Mayors to the attention of their members[22]. So far 21 out of about 400 municipalities have signed up[23]. A similar initiative in The Netherlands is the Climate Union (Klimaatverbond) for which 163 municipalities signed up[24]; this network focuses mostly on mitigation but also undertakes adaptation activities.

Municipalities follow additional initiatives to enhance climate adaptation. The Alliance of Climate Active Cities is a cooperation between the cities most actively involved in climate adaptation that has been in place for many years. This alliance shares knowledge and experiences regarding climate adaptation. The cooperation structure of the 50 largest cities of The Netherlands (G32) is active in the field of climate adaptation.[25]

[22] VNG info on Covenant of Mayors https://vng.nl/onderwerpenindex/europa/nieuws/covenant-of-mayors-stedenbandenprogramma-klimaat
[23] Netwerk Burgemeestersconvenant https://www.klimaatverbond.nl/projecten/netwerk-burgemeestersconvenant
[24] Klimaatverbond leden https://www.klimaatverbond.nl/leden/
[25] G32 largest cities in The Netherlands https://www.g32.nl/themagroep/duurzaamheid

The Delta Programme has clear vertical coordination mechanisms. Seven regional programmes are involving regional and local governments (Rhine Estuary-Drechtsteden, Southwestern Delta, Lake IJssel region, River Rhine, River Meuse, the Coast, and the Wadden Region)[26] in flood resilience, freshwater supply and climate-resilient spatial planning. Various governance structures within the Delta Programme were established to implement the Delta Plans on Safety against Flooding, Water Supply and Spatial Adaptation.

In addition, there is a structure called the Dutch Safety Regions. These are regional platforms organising cooperation of fire brigades, police, medical services and subnational governments to respond to disasters and crises.[27] The Safety Regions cooperate closely with the Ministry of Justice and Security.

Finally, the National Knowledge network for Water and Climate change (NKWK) facilitates voluntarily cooperation between the national government, municipalities, provinces and research institutes to develop local adaptive research projects based on local and regional needs.[28]

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

In 2016, three national workshops were organised to support the development and adoption of the new NAS2016. In addition to the relevant ministries, the following stakeholders were closely involved in the development of the NAS2016: four provincial governments, 11 municipalities, four regional health organisations, four regional water authorities, the three associations of provinces, municipalities and regional water authorities (IPO, VNG and UvW), six research institutes (KNMI, PBL, RIVM, Deltares, WUR), 15 engineering and consultancy organisations, four NGO's, two insurance organisations, one Safety Region, and ten miscellaneous organisations among which the Dutch National Bank, Rioned (the sewerage institute) and Prorail (Railway infrastructure).

Furthermore, the national climate summit in October 2016 was used to consult different government levels, civil society organisations and the private sector about the new NAS. In 2017, one workshop took place and progress was published on the website of the NAS.

In the Delta Programme, stakeholders are closely involved in developing adaptation policies, both in the regional and thematic sub-programmes, as well as in the overall programme.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

[26] Regionale Deltaprogramma's https://english.deltacommissaris.nl/delta-programme/contents/regions-and-generic-topics. http://ruimtelijkeadaptatie.nl/english/nas/

[27] Veiligheidsregio's https://www.government.nl/documents/decrees/2010/12/17/dutch-security-regions-act-part-i.

[28] NKWK programma http://waterenklimaat.nl/

The Netherlands is part of two macro-regional approaches, in which climate adaptation inter alia is addressed: the Benelux and the Wadden Sea Trilateral Cooperation.

The Benelux countries (Belgium, The Netherlands and Luxembourg) have cooperated on climate change issues since 2014[29]. In the period 2015-2016, the General Secretariat of the Benelux, in consultation with the Working Group on Climate Adaptation and other Benelux working groups, organised four exploratory workshops on climate adaptation in relation to energy, transport and mobility, public health and urban policy, and risk management. In 2017, the Benelux countries executed a joint cross-border risk analysis in the areas of transport, energy supply and/or public health. In 2018, the Benelux countries will organise 'table top exercises' on transboundary climate impacts.

In the context of the Trilateral Wadden Sea cooperation, Denmark, Germany and The Netherlands cooperate to protect the Wadden Sea, as an ecological unity. The guiding principle of the trilateral Wadden Sea cooperation is to achieve, as far as possible, a natural and sustainable ecosystem in which natural processes occur in an undisturbed way. Climate change and rising sea levels may seriously impact the structure, functions and biodiversity of the Wadden Sea ecosystem, as well as the safety of its inhabitants. A Task Group on Climate drafted a trilateral strategy on increasing the climate resilience of the Wadden Sea. This was adopted by the 12th Wadden Sea Conference in 2014.

Regarding cross-border nature issues, The Netherlands is involved in five Interreg projects with a focus on nature-based adaptation[30].

For the large rivers (Rhine, Meuse, Ems and Scheldt), international committees have existed for several decades. In these river basin committees, The Netherlands cooperates with Germany, France, Belgium, Luxemburg and Switzerland. The International Commission for the Protection of the Rhine published an adaptation strategy in 2015[31]. Climate adaptation is one of the topics in the other committees; however, this is not explicitly linked to the Dutch adaptation agenda. The International Meuse Commission specifically works on adaptation to low water levels, low water quality and high-water temperatures[32]. For the River Ems, Germany and The Netherlands cooperate to deliver the goals of the Water Framework Directive and the Floods Directive.[33]

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

[29] Benelux cooperation in climate change http://www.benelux.int/nl/nieuws/benelux-bereidt-zich-voor-op-klimaatverandering

[30] One of the Interreg projects https://www.rijkswaterstaat.nl/english/water-systems/interreg-vb-nsr-building-with-nature/index.aspx

[31] Adaptation strategy of the International Rhine Commission http://www.iksr.org/fileadmin/user_upload/Dokumente_en/Reports/219_en.pdf

[32] Meuse Commission annual report 2014, see: http://www.meuse-maas.be/Liens/Belgique.aspx

[33] Ems Commission http://www.ems-eems.nl

The Dutch meteorological institute, KNMI (Royal Netherlands Meteorological Institute), is legally obliged to provide observations on atmospheric, oceanic and terrestrial indicators; this includes data on expected extreme weather conditions. It uses red/orange/green codes to inform the general public about extreme weather events.[34]

The national agency Rijkswaterstaat provides online information on water levels along the coast and in the main rivers and predicts these six hours before they occur[35].

Monitoring extreme climate events is a responsibility of the KNMI. This institute maintains long time series on, among other variables: temperature and precipitation extremes (including heatwaves and hail), and the frequency and intensity of windstorms.

The task of monitoring impacts of extreme climate events is distributed across multiple stakeholders in different sectors. In principle, the indicators can be grouped into three main categories: economic damage, damage to the environment (including nature) and to human society (including casualties). This corresponds with the PBL vulnerability assessments used in the NAS2016[36].

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

The KNMI provided downscaled climate scenarios for The Netherlands in 2006 and updated 2014 scenarios for the NAS2016[37]. Scenarios are available for the climatological (30-year) periods centred at 2030, 2050 and 2085. The scenarios contain a broad range of climate variables, from long-term annual average, to the frequency and intensity of climate/weather extremes. A new set of climate scenarios for The Netherlands and related products will be published in 2021, aligned with the sixth assessment cycle of the Intergovernmental Governmental Panel on Climate Change (IPCC) in order to deliver state-of-the-art climate information. Attention will be paid to observed trends, projection of sea-level rise, extreme precipitation, future weather and urban climate information.

The KNMI climate models are quite elaborate, especially from a geographical point of view[38]. In-depth description of specifications and justification of the construction of the latest scenarios can be found in the KNMI library.[39]

Climate impacts are elaborated in the Dutch Climate Effect Atlas, which has been updated and published in September 2017[40]. Municipalities and other actors use the Atlas to make a first assessment of possible consequences of climate change through a stress test[41].

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[34] KNMI http://www.knmi.nl/home

[35] Rijkswaterstaat Waterinfo: water level http://waterinfo.rws.nl/#!/kaart/waterhoogte-t-o-v-nap/

[36] PBL report Adaptation to climate change in the Netherlands - Studying related risks and opportunities http://ruimtelijkeadaptatie.nl/english/nas/ and http://www.pbl.nl/en/publications/adaptation-to-climate-change-in-the-netherlands

[37] KNMI Klimaatscenario's http://www.climatescenarios.nl/

[38] Climate-ADAPT country information The Netherlands http://climate-adapt.eea.europa.eu/countries-regions/countries/netherlands

[39] KNMI klimaatscenario's 2014 http://www.klimaatscenarios.nl/brochures/images/KNMI14_Klimaatscenarios_folder_EN_2015.pdf

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

Vulnerability assessments are generally realised through national studies and European research projects. The most important national efforts include reports from the Delta Programme, The Netherlands Environmental Assessment Agency (PBL) and the Knowledge for Climate programme.

In 2011 a report was published on the vulnerability of vital infrastructure at national level. This resulted in a 'dashboard' table for the Ministry of Infrastructure and Water Management to initiate and monitor actions for the following vulnerable infrastructures: energy, telecom, drinking water, waste water treatment, health institutes, transport, chemical and nuclear facilities[42]. This dashboard resulted in the programme Vitaal en Kwetsbaar (Vital and Vulnerable)[43].

PBL published a broad climate impact report in 2012 (Dutch)/2013 (English)[44], assessing the observed and projected change in climate and the impacts on about 40 indicators. This included impacts on flood safety, freshwater availability and quality, nature, agriculture, human health and tourism in The Netherlands. In 2014, PBL and its partners published a report 'Small chances, big consequences' on the consequences of flooding in The Netherlands to guide investments in new water infrastructure[45]. In 2015 this was followed by a PBL report on climate impacts other than flooding: 'Adaptation to climate change in The Netherlands - Studying related risks and opportunities'[46]. The vulnerability of The Netherlands was assessed in the PBL report and the most urgent issues were identified. The basis for this vulnerability assessment was sectoral vulnerability studies, prepared by multiple universities and institutes across The Netherlands[47]. The sectors covered in the PBL report are transport and infrastructure, the power supply system, ICT networks, public health, nature, agriculture, and fishery. Prioritisation was achieved by comparing impacts and opportunities according to their probability of occurrence in the coming decades and their potential impact on economy, society and nature[48]. These priority impacts were addressed in the NAS2016.

Decisions in the Delta Programme are underpinned by a cost-benefit analysis.

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[40] Kennisportaal Ruimtelijke Adaptatie http://ruimtelijkeadaptatie.nl/english/

[41] Climate adaptation stress test: https://ruimtelijkeadaptatie.nl/handreiking/handreiking/weten/kwetsbaarheid/stresstest/

[42] Kennisportaal Ruimtelijke Adaptatie dashboards https://ruimtelijkeadaptatie.nl/bibliotheek/@158286/dashboards (2014)

[43] Deltaprogramma voortgangsrapportage 2018 https://www.deltacommissaris.nl/deltaprogramma/documenten/publicaties/2017/09/19/dp2018-d-derde-voortgangsrapportage-aanpak-nationale-vitale-en-kwetsbare-functies

[44] PBL rapport Klimaatverandering in Nederland 2012 http://www.pbl.nl/en/publications/the-effects-of-climate-change-in-the-netherlands-2012

[45] PBL rapport Kleine kansen grote gevolgen http://www.pbl.nl/sites/default/files/cms/PBL_2014_Kleine-kansen-grote-gevolgen_1031.pdf

[46] PBL rapport Adaptatie aan klimaatverandering in Nederland http://www.pbl.nl/en/publications/adaptation-to-climate-change-in-the-netherlands

[47] Bouwstenen NAS http://kennisvoorklimaat.nl/bouwstenenNAS

[48] PBL report Adaptatie aan klimaatverandering in Nederland http://www.pbl.nl/en/publications/adaptation-to-climate-change-in-the-netherlands

The NAS2016 is built on a three-step analysis: an effect analysis; a risk analysis; and an urgency analysis[49]. Following a coordinated bottom-up process, some key actors in vulnerable sectors, such as Rijkswaterstaat (on transport infrastructure[50]) and the Ministry of Agriculture, Nature and Food Safety are initiating action on assessing climate vulnerabilities and risks in cooperation with project groups involved in drafting and carrying out the NAS.

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / **In progress** / No

In 2015, the PBL summarised the worldwide climate effects and their risks and opportunities for The Netherlands[51]. The NAS2016 mentions the following transboundary risks: electricity infrastructure, ICT, financial systems, food production and natural ecosystems. The effects of climate change worldwide are also covered in the NAS2016. Under the heading 'International context' (p7) the NAS proposes several actions: export of knowledge, contributing to a European nature network, and climate-relevant investments in developing countries. Cross-border effects on nature (moving climate zones) have been investigated but are not integrated in nature policy. An adaptation dialogue on nature issues started in 2017.

The Delta Programme takes upstream effects for the River Rhine into account by assuming an expected future maximum discharge of 18,000 m3 per second at the entrance point to The Netherlands. However, it does not look at potential measures in the upstream German or Swiss parts of the river. Transnational cooperation in river floods has been taken up in the implementation of the Floods Directive, establishing hydraulic boundary conditions for the Rhine and sharing models in the Meuse and Scheldt. The international river commissions are closely involved in this issue.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

Two large knowledge programmes ran between 2007 and 2014: the Adaptation Programme 'Ruimte voor Klimaat'[52] and 'Knowledge for Climate'[53]. These programmes provided a broad knowledge base for all later adaptation activities. In 2015, NKWK[54] started a network in which the national government, municipalities, regional water authorities, provinces, consultancies and research institutes set up small-scale innovative projects.

[49] National Adaptation Strategy https://ruimtelijkeadaptatie.nl/nas/
[50] See ROADAPT project https://climate-adapt.eea.europa.eu/metadata/guidances/roadapt-guidelines-for-adaptation-of-road-infrastructure-to-climate-change
[51] PBL report Worldwide climate effects - Risks and opportunities for the Netherlands http://www.pbl.nl/en/publications/worldwide-climate-effects-risks-and-opportunities-for-the-netherlands
[52] Klimaat voor Ruimte publications http://www.klimaatvoorruimte.nl/dossiers/adaptatieprogramma-ruimte-en-klimaat-(ARK)
[53] Knowledge for Climate publications http://www.knowledgeforclimate.nl/
[54] NKWK website http://waterenklimaat.nl/

Many KNMI and PBL publications (see Indicator 3c), and sectoral studies that were the basis of some PBL studies, provide the scientific underpinning to the NAS2016.[55] In 2016, three national workshops on adaptation action, including identification of knowledge gaps, were attended by sectoral stakeholders from: health, security, water quality and quantity, finance, urban planning and construction, nature, insurance, agriculture, transport, and fisheries (next to many local and regional governments and research organisations). In 2017, an additional workshop was held in preparation of the NAS Implementation Plan 2018-2019. Further knowledge development is coordinated between the NAS programme team, NKWK and the Delta programme.

The Delta Programme has funding for research on flood prevention (1% of its total contribution of EUR 1 billion per year).[56] The Delta Programme Spatial Adaptation continuously evaluates the existing knowledge gaps.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

Since 2014, the Spatial Adaptation portal[57] has provided information from the Climate Effect Atlas in an accessible way to dedicated experts and professionals. Recently, information from the NAS and the Delta Programme Spatial Adaptation has been included in the portal.

The results of the research programmes Adaptation Programme, 'Climate changes Spatial Planning[58]' and Knowledge for Climate[59] are available from their website libraries. In addition, the Climate NL LinkedIn group (Knowledge for Climate initiative) is still active with over 1,000 members.

In 2014, the *overstroomik.nl* website[60] and an application were developed to prepare citizens for flooding by informing them what water levels to expect. Since its launch up to February 2018, the website and the app have had around 1,6 million unique visitors and more than 250,000 downloads.

The KNMI established a webpage[61] to provide climate information to different users. RIVM has provided information on climate adaptation on its website for several years.[62] A future aim is to cooperate more in the information provision in order to create a better overview for knowledge users.

[55] Like for example http://kennisvoorklimaat.nl/bouwstenenNAS
[56] Climate-ADAPT country information - The Netherlands http://climate-adapt.eea.europa.eu/countries-regions/countries/netherlands
[57] Kennisportaal Ruimtelijke Adaptatie http://ruimtelijkeadaptatie.nl/english/
[58] Klimaat voor Ruimte programma http://www.klimaatvoorruimte.nl/dossiers/adaptatieprogramma-ruimte-en-klimaat-(ARK)
[59] Kennis voor Klimaat programma http://www.knowledgeforclimate.nl/
[60] Overstroomik.nl (Will I flood.nl) http://overstroomik.nl/
[61] KNMI kennis en datacentrum http://www.knmi.nl/kennis-en-datacentrum
[62] RIVM klimaatverandering http://www.rivm.nl/Onderwerpen/K/Klimaatverandering

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

There are systematic capacity-building activities, some of which are coordinated through the NAS2016, while others are included in the NAS Implementation Programme. The Climate Adaptation Services foundation, assigned by the Ministry of Infrastructure and Water Management, provides workshops for regional water authorities, provincial and local governments based on the recently updated Climate Effect Atlas[63]. Sectors like transport (road, water, air), energy, nature protection, agriculture, cultural heritage are involved.

One example of capacity building can be found within the Delta Programme Spatial Adaptation, which contributes to curriculum development together with the universities of applied sciences[64].

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

The emphasis of the NAS2016 is to 'build on ten years of adaptation to climate change' in The Netherlands and to progress towards implementation of adaptation measures. In general, reports from the past are consistently used in policy making. The NAS aims at bottom up input so that all adaptation measures will be tailor-made for specific regional and local characteristics.

The Delta programme uses the following method: problem analysis > range of solutions > preferred solutions > strategic choices. The Delta Programme divided The Netherlands into six regions, which each have specific geographic characteristics: the Wadden Sea area; the western coast, the large rivers, the south-western delta (mainly the Province of Zeeland), Rijnmond-Drechtsteden, the high sandy areas (southern and eastern part of The Netherlands) and IJssel Lake. Nowadays the River Rhine and the River Meuse are the subjects of separate programmes [65]. Solutions have been identified for the main priority hazards and sectors.

Both the NAS2016 and the Delta Programme Spatial Adaptation address examples of adaptation options in additional priority sectors. The website on spatial adaptation offers good examples on a map[66].

[63] Klimaateffectatlas http://www.climateadaptationservices.com/en/klimaateffectatlas
[64] HBO netwerk Ruimtelijke Adaptatie https://ruimtelijkeadaptatie.nl/actueel/actueel/nieuws/2017/teach-the-teacher/
[65] Regions addressed in the Delta program: see menu on https://www.deltacommissaris.nl/
[66] Good examples of spatial adaptation https://ruimtelijkeadaptatie.nl/voorbeelden/

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The Dutch NAS2016 explains the decision-making process in relation to adaptation policies. The method in the NAS was 1) Climate impact analysis, 2) Risk analysis 3) Urgency analysis (to decide which risks were to be addressed first). During stakeholder workshops with many parties (including institutes like KNMI, RIVM, TNO, Wageningen Research and PBL) multiple adaptation options were compared[67].

For four years, the Delta programme used the following method: problem analysis > range of solutions > preferred solutions > strategic choices. The Delta programme has its own extensive body of research to decide on priorities. New flood resilience norms entered into force on 1 January 2017, which are explicitly based on economic analysis of assets that need protection[68].

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress /No

The Dutch Safety Regions have a mandate to address disaster risk management on a regional level. They build their activities around organising regional platforms of fire brigades, police, medical services and sub-national governments to respond to disasters and crises. Their mandate is laid down in a decree[69], but this act does not mention climate adaptation. Nevertheless, structural cooperation between the Ministry of Infrastructure and Water Management and the Ministry of Justice and Security is in place. The Steering Group National Security is the ex officio decision-making level on the approach of the Dutch central government to policies on vital critical infrastructure. The Ministry of Infrastructure and Water Management participates in the Steering Group National Safety, as well as in different projects under this steering group.

In 2015, the programme 'Water and Evacuation' began with the aim to improve the preparedness of the Dutch Safety Regions to the consequences of floods due to climate change.[70] Between 2015 and 2017, instruments were developed to assist the Safety Regions in their preparedness for water-related disasters, including floods. The instruments are now available.[71] The programme is monitored by the Steering Group Management Water Crises and Floods (SMWO, Stuurgroep Management Watercrises en Overstromingen). The SMWO is part of the governance structure under the Steering Group National Security in which

[67] NAS2016 https://www.rijksoverheid.nl/documenten/rapporten/2016/12/02/nationale-klimaatadaptatiestrategie-2016-nas

[68] Nieuwe Normering http://www.hoogwaterbeschermingsprogramma.nl/Nieuwe+normering/default.aspx

[69] Dutch Safety Regions Act https://www.government.nl/documents/decrees/2010/12/17/dutch-security-regions-act-part-i

[70] Programma water en evacuatie http://www.strategische-agenda.nl/project/water-en-evacuatie/ See for the action plan: http://www.strategische-agenda.nl/wp-content/uploads/2016/01/Samenvatting_projectplan_Water_en_Evacuatie.pdf

[71] Flood preparedness tools http://onswater.ifv/

Dutch Safety Regions, the Ministry of Justice and Security, the Ministry of Infrastructure and Water Management and the Dutch Water Authorities, KNMI and the Ministry of Defence take part. The programme links to other programmes, such as 'National Vital and Vulnerable Critical Infrastructure'[72].

In addition to the cooperation described above, the Ministry of Justice and Security participated in the formulation and implementation of the NAS2016.

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / **In progress** /No

The NAS2016 does not have an implementation budget. The NAS states that funding for adaptation must be found by all partners involved in practical adaptation projects from their own budgets.

The Ministry of IenW provides funding for the KNMI scenarios, the Climate Adaptation Services foundation[73] and the Spatial Adaptation website[74] but it is undecided how much and for how long.

The Delta Programme is funded through the Delta Act which has made a reservation of around EUR 1 billion per year, mainly for investments and maintenance of water infrastructure, such as the reinforcement of dikes and levees and freshwater supply.[75] A budget for climate investments under the Delta Programme has been published[76], indicating the estimated costs of investments in adaptation measures in the identified priority fields. Recent publications shed more light on the expected expenditure of the fund, indicating that adaptation in water management related fields will cost in the order of EUR 26 billion (with a broad margin).[77]

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

[72] Vitaal en kwetsbaar pilots See: https://ruimtelijkeadaptatie.nl/overheden/vitaal-kwetsbaar/pilots-vitaal/ and https://www.nctv.nl/organisatie/nationale_veiligheid/vitale_infrastructuur/index.aspx
[73] Klimaateffectatlas http://www.climateadaptationservices.com/en/klimaateffectatlas
[74] Knowledge portal Spatial Adaptation http://www.spatialadaptation.com/
[75] Deltawet https://www.rijksoverheid.nl/onderwerpen/deltaprogramma/inhoud/deltawet-deltacommissaris-en-deltafonds.
[76] https://deltaprogramma2018.deltacommissaris.nl/viewer/paragraph/1/2-deltaprogramma-/chapter/voortgang-op-basis-van-meten-weten-handelen/paragraph/1-financiele-borging-van-het-deltaprogramma
[77] Financiele borging van het Deltaprogramma https://deltaprogramma2018.deltacommissaris.nl/viewer/paragraph/1/2-deltaprogramma-/chapter/voortgang-op-basis-van-meten-weten-handelen/paragraph/1-financiele-borging-van-het-deltaprogramma

The Dutch Commission on EIA (Commission MER) indicates that consideration of climate change is advisable while working on an EIA[78]. The Commission MER website refers to different tests and tools with which a proper assessment can be linked to climate adaptation, such as the stress test and the Climate App, however, it is not an obligatory part of an EIA.

SEA is formally integrated in Dutch legislation but is not used much in The Netherlands[79].

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / No

Between 2014 and 2016, a National Information System Water and Floods (LIWO, Landelijk Informatiesysteem Water en Overstromingen)[80] was developed, which provides the Dutch Safety Regions[81] and all other stakeholders with up-to-date information on flood risk. Data sources are, amongst others, the database on floods administered by the Dutch Provinces (IPO), in accordance with the European Floods Directive.

The Steering Group Management Water Crises and Floods (Stuurgroep Management Watercrises en Overstromingen: SMWO) fosters a coordinated approach between Safety Regions and regional water authorities. The Dutch Safety Regions base their plans on climate projections.

Partners in the Delta Programme (national government, provinces, municipalities and regional water authorities) and partners in the structure of the Steering Group for National Security base their plans on climate projections. Dutch climate projections are regularly updated by KNMI.

In the framework of the Delta Programme a stress test was developed to assess the resilience of municipalities against climate risks (flooding, heavy rainfall, drought and heatwaves). In 2018, all municipalities are expected to conduct the test for which they can use the Climate Effect Atlas that shows local climate projections. The result is a local risk profile that must be followed by a local adaptation policy (including safety and disaster plans)[82].

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / **No**

At the beginning of 2017, the first part of the 'Nationale Omgevingsvisie' was published, which includes the issue of climate change and more specifically climate adaptation. The Environment Act (Omgevingswet) is a recent law that regulates all physical activities in the

[78] Integrating climate into EIA http://www.commissiemer.nl/themas/klimaat/stand-van-zaken
[79] EIA and SEA http://www.eia.nl/en/countries/eu/netherlands+(the)/sea
[80] Landelijk Informatiesysteem Water en Overstromingen https://professional.basisinformatie-overstromingen.nl/liwo/# and for background information: https://www.helpdeskwater.nl/onderwerpen/applicaties-modellen/applicaties-per/watermanagement/watermanagement/liwo/
[81] Dutch Safety Regions are a cooperation of emergency services like fire brigade, police and ambulances, organized in regional teams.
[82] De stresstest is aangekondigd in het Deltaplan RA. Zie https://ruimtelijkeadaptatie.nl/deltaplan-ra/. Deltaplan RA is H7 van Deltaprogramma 2018, Doorwerken aan een duurzame en veilige delta

environment, including economic development, transport, nature, and protection of cultural heritage. Existing laws on environmental quality, water, and spatial planning will merge into the new Act. The implementation of the new law, including the new visions by the national, regional and local authorities, will be elaborated over the next few years.

Part of the new Environment Act (and the old Spatial Planning Law) is the Water Assessment (Watertoets). In the Water Assessment, regional water authorities assess the impact of spatial plans and urban development on the water system and provide the planning authorities with advice on how to build while avoiding problems for the water system.[83] Climate adaptation and long-term development issues are generally discussed in this Water Assessment; however, it is not an obligation to follow the advice.

There are no regulations regarding climate resilience for urban planning as yet (e.g. in relation to urban heat problems). Only pilots exist in which present ideas are implemented. However, according to the Delta Programme, Dutch municipalities are expected to execute adaptation stress tests by 2019.

There is no legal structure for maritime planning and no obligation to take climate change into account. However, in the development of policy documents for the North Sea, the expected climate impacts are taken into consideration.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / **In progress** / No

Climate change is an important consideration in water legislation through the Delta Act, however, it is not mentioned yet in other Dutch legislation or policy. The NAS2016 states that legislative action will be discussed and prepared for 2020. Dialogues have been initiated with multiple sectors like insurance, health and nature and this may result in legislation that takes account of the need for adaptation.

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / **No**

In the context of floods and dike failure, insurers studied the effect of climate change in cooperation with KNMI[84], which led to the conclusion that premiums would become more expensive and insurers should aim at prevention measures among their clients. Although the government is bound by law to compensate damages caused by large-scale disastrous events, no evidence was found that this compensation is accompanied by incentives for adaptation on the local level.[85]

[83] Watertoets https://www.rijksoverheid.nl/documenten/rapporten/2009/12/01/handreiking-watertoetsproces-3-samenwerken-aan-water-in-ruimtelijke-plannen

[84] Klimaatverandering en schadelast https://www.verzekeraars.nl/media/1873/klimaatverandering-en-schadelast.pdf

[85] Wet tegemoetkoming schade bij rampen http://wetten.overheid.nl/BWBR0009637/2016-01-01.

In February 14, 2017 a first adaptation dialogue with the insurance sector took place with more than 50 participants. This dialogue was organised by the Union of Insurance Companies, the Dutch National Bank (De Nederlandsche Bank) and the NAS2016 team. Participants discussed intense rainfall, flooding from rivers or the sea, hail and windstorms. The NAS Implementation Programme 2018-2019[86] summarises the results of the adaptation dialogue with the insurance sector. Insurers and KNMI came to the conclusion that climate change may result in additional damage claims worth EUR 0.25 billion per year. Some of the follow-up actions are new insurance products, additional research, such as more precise monitoring of hail together with KNMI, and a website with climate information provided by the Union of Insurance Companies.

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

The previous NAS of 2007 focused on initiating adaptation research. This led to research programmes, as described under Indicator 4, and sometimes to small pilot projects, such as the Water Square in Rotterdam[87] and the spatial plan for Zuidplaspolder[88].

The NAS2016 was followed by an implementation plan 2018-2019 in March 2018. Priorities in the plan are: heat stress; infrastructure; agriculture; nature; and the built environment. Furthermore, the national government aims to cooperate with provincial and municipal governments towards a comprehensive set of provincial and regional adaptation strategies. The provinces of Overijssel and Noord-Brabant drafted implementation plans and are active with implementation.

Progress is reported in Annex 1 of the NAS implementation plan. Actions mostly consist of organising dialogues with sectors and lower governments (e.g. the insurance sector, municipalities that have experienced a flooding, the health sector, railways, the energy sector, etc.). The dialogues aim at formulating solutions together, for example, new insurance options or reconstructing vulnerable parts of the railway infrastructure.

In the health and wellbeing sector, a National Heat Plan of 2007 was updated in 2015[89]. This plan has been used every year since 2007 and informs regional health organisations (GGDs and the Red Cross) when and how to put preventive measures in action in care homes and hospitals. KNMI and RIVM have a warning system in place with threshold values that indicate a heatwave. When a heatwave is expected all Dutch care institutions receive a warning[90].

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[86] Uitvoeringsprogramma 2018-2019. Nationale klimaatadaptatiestrategie (NAS), page 28-29 https://www.rijksoverheid.nl/documenten/rapporten/2018/04/04/uitvoeren-met-ambitie-uitvoeringsprogramma-2018-2019-nationale-klimaatadaptatiestrategie-nas

[87] Water Square Rotterdam http://www.urbanisten.nl/wp/?portfolio=waterplein-benthemplein

[88] Spatial plan Zuidplaspolder http://www.climatechangesspatialplanning.nl/research-themes/adaptation/A14

[89] RIVM Nationaal Hitteplan 2015 https://www.rivm.nl/dsresource?objectid=a3dd7434-836f-4d79-8a7d-4741545171ad&type=org&disposition=inline

[90] KNMI Nationaal Hitteplan https://www.knmi.nl/producten-en-diensten/verhalen/Nationaal-Hitteplan-als-warm-weer-een-risico-is

In the NKWK programme municipalities and regional water authorities cooperate with research institutes and consultancies in implementing innovative pilots for climate adaptation. The programme works on fourteen topics for innovation[91]. These pilots could be regarded as autonomous adaptation because they are initiated in a bottom up process by actors who are interested in adaptation and who finance the implementation by themselves.

In the water sector, identifying weak spots in the flood protection system and reconstructing these is an ongoing process. Climate scenarios (e.g., for 2050) have played a role in that process since 1999. For the Delta Programme, implementation formally started in 2012 and updated Delta programmes are sent to Parliament every year[92].

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

The NAS programme team organises national adaptation dialogues on the following issues: health and heat stress, nature, insurance and climate change, built environment, and agriculture. The ministries, other governments and other stakeholders participate in these dialogues.

The Delta Programme Spatial Adaptation organises municipalities into regions. The stress test for municipalities adds to the implementation of specific actions in a coordinated approach.

The Delta Programme works with eight regional sub-programmes: the Wadden Sea area; the western coast, the south-western delta (mainly the Province of Zeeland), the high sandy areas (Eastern part of The Netherlands), IJssel Lake, the River Rhine and the River Meuse, and the region Rijnmond-Drechtsteden (including Rotterdam). Regional partners, such as provinces, regional water authorities and municipalities, are involved in those sub-programmes.

The NKWK network is a programme where national government, municipalities, provinces and knowledge providers can voluntarily meet to develop local projects.[93]

Other network organisations have been established with regard to climate adaptation, such as the G32 working group on climate adaptation, the Klimaatbestendige Stad and the City Deal Climate Adaptation. They have links with national operating programmes, such as the Delta Programme.

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / **No**

[91] NKWK programma onderzoekslijnen https://waterenklimaat.nl/onderzoekslijnen/
[92] Delta programma 2018 https://www.deltacommissaris.nl/deltaprogramma/deltaprogramma-2018
[93] NKWK projects http://waterenklimaat.nl/ and http://climate-adapt.eea.europa.eu/countries-regions/countries/netherlands

Presently the number of guidelines is limited. In 2013, the Manifest Climate-Adaptive Construction (Manifest Klimaatbestendige Stad) was published[94]. In February 2017, the Dutch association of municipalities VNG published a position paper on climate-resilient municipalities[95]. The NAS2016 announced that Rijkswaterstaat would investigate if guidelines for roads needed to be updated (page 26) and the same was said for RIVM about guidelines for new vectors of diseases (p28). The Dutch Standards Institute (NEN) has started to look at guidelines recently[96]

For the water infrastructure, new norms are under development, which not only take the water system into account but also the economic value that needs to be protected. The new norms were adopted by Parliament and senate in 2016[97] and are now implemented in practice.

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

The NAS2016 programme team organises national adaptation dialogues on the following issues: health and heat stress, nature, insurance and climate change, built environment, and agriculture. The ministries, other governments and other stakeholders participate in these dialogues. The dialogues are part of the NAS2016 and of the implementation plan 2018-2019. They are an important tool because the implementation budget has to be found through these dialogues.

Stakeholder involvement has been a crucial aspect of the Delta Programme since it was first established in 2012.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / **No**

No monitoring reports have been published on the implementation of the NAS2016. In 2015 PBL published a report on how to monitor climate adaptation[98]. The plan is for the NAS to build upon this proposal. In 2017, a plan of action on monitoring was drafted.

[94] Manifest Klimaatbestendige Stad http://bouwenmetgroen.nl/wp-content/uploads/manifest_kbs_DEF.pdf
[95] VNG position paper Klimaatbestendige gemeenten https://vng.nl/files/vng/publicaties/2017/20170217-klimaatbestendige-gemeenten.pdf
[96] NEN institute is looking at climate adaptation https://www.nen.nl/Standardization/Adaptation-to-Climate-Change.htm
[97] Nieuwe normering in de Eerste Kamer https://www.eerstekamer.nl/wetsvoorstel/34436_nieuwe_normering_primaire
[98] PBL Ontwerp voor een nationale adaptatie monitor http://www.pbl.nl/sites/default/files/cms/publicaties/PBL-2015-Ontwerp-voor-een-nationale-adaptatiemonitor-1640.pdf

In addition, the Delta Programme developed a monitoring system for following its own progress[99]. The system has been applied to the Delta Programme Spatial Adaptation[100]. A more comprehensive system is currently under development to also assess the progress and effectiveness of the programme. Its point of departure was a 2016 PBL report on reflexive monitoring and evaluation[101].

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

The NAS2016 has announced a monitoring system but it has not materialised as yet.

At the same time, progress reports on the implementation of the Delta Programme are being implemented, so progress on adaptation actions in the water sector is being reported.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / **No**

In 2015, PBL published a report on how to monitor climate adaptation[102]. The plan is for the NAS to build upon this proposal. It is not clear how sub-national adaptation will be included.

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / **No**

Progress reports on the implementation of the NAS2016 will be available as of 2019. It is not decided if and with what frequency revisions of the NAS will take place.

At the same time, under the Delta Programme annual programmes have been offered to the Parliament since 2010. Delta Programme 2018 has been published, and a Delta Programme 2019 is foreseen.

[99] Deltaprogramma Systematiek Meten-weten-handelen https://deltaprogramma2017.deltacommissaris.nl/viewer/paragraph/1/1-deltaprogramma-/chapter/deltabeslissingen-en-voorkeursstrategieen/paragraph/-eerste-uitwerking-van-de-systematiek-meten-weten-handelen

[100] Deltaprogramma Ruimtelijke Adaptatie monitoring https://www.deltares.nl/app/uploads/2017/02/170131-Eindrapport-Tussentijdse-Evaluatie-DBRA.pdf zie ook het Deltares rapport uit 2015 "Resultaten van de Monitor Ruimtelijke Adaptatie" op www.ruimtelijkeadaptatie.nl

[101] PBL report Keeping track of adaptation in the Dutch Delta http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2016-keeping-track-of-adaptation-in-the-dutch-delta-2557.pdf

[102] PBL Ontwerp voor een nationale adaptatie monitor http://www.pbl.nl/sites/default/files/cms/publicaties/PBL-2015-Ontwerp-voor-een-nationale-adaptatiemonitor-1640.pdf

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / **No**

Monitoring of the NAS2016 is not yet in place and it is unclear if involving stakeholders in the processes is foreseen.

For the Delta Programme, monitoring is still under development and, although a number of expert organisations is involved in the process (such as KNMI, Deltares and CBS), these are not a reflection of the wide range of stakeholders that are affected by the Delta Programme.

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	**Indicator**	**Met?**
Step A: Preparing the ground for adaptation		
1	***Coordination structure***	
1a	A central administration body officially in charge of adaptation policy making	**Yes** / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	**Yes** / In Progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	**Yes** / In Progress / No
2	***Stakeholders' involvement in policy development***	
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	**Yes** / No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	**Yes** / No
Step B: Assessing risks and vulnerabilities to climate change		
3	***Current and projected climate change***	
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	**Yes** / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	**Yes** / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	**Yes** / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	Yes / **In progress** / No
4	***Knowledge gaps***	
4a	Work is being carried out to identify, prioritise and	**Yes** / In progress

Adaptation Preparedness Scoreboard		
No.	**Indicator**	**Met?**
	address the knowledge gaps	/ No
5	***Knowledge transfer***	
5a	Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	**Yes** / In progress / No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	**Yes** / In progress / No
Step C: Identifying adaptation options		
6	***Identification of adaptation options***	
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	**Yes** / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	**Yes** / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	**Yes**/ In Progress / No
7	***Funding resources identified and allocated***	
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	Yes / **In Progress** / No
Step D: Implementing adaptation action		
8	***Mainstreaming adaptation in planning processes***	
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	**Yes** / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	**Yes /** No
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	Yes / **No**

Adaptation Preparedness Scoreboard		
No.	**Indicator**	**Met?**
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	Yes / **In Progress** / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	Yes / **No**
9	***Implementing adaptation***	
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / **In Progress** / No
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	**Yes** / No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	Yes / **No**
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	**Yes** / No
Step E: Monitoring and evaluation of adaptation activities		
10	***Monitoring and reporting***	
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	Yes / **No**
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	**Yes** / No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	Yes / **No**
11	***Evaluation***	
11a	A periodic review of the national adaptation strategy and action plans is planned	Yes / **No**
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	Yes / **No**