NATIONAL

DELTA PROGRAMME 2025

TOWARDS A NEW BALANCE IN THE LIVING ENVIRONMENT: ROOM TO LIVE WITH WATER

2025 Delta Programme

TOWARDS A NEW BALANCE IN THE LIVING ENVIRONMENT: ROOM TO LIVE WITH WATER

Cover photo: Bollard indicating the water depth on the road with rising water in the Ooijen-Wanssum high-water channel, September 2021. Photo: Tineke Dijkstra.

Inhoudsopgave

Ministry of Infrastructure
and Water Management

The Chair of the House of Representatives of the
States-General
P.O. Box 20018
2500 EA THE HAGUE

Ministry of Infrastructure and Water Management
Rice Street 8
2515 XP The Hague
P.O. Box 20901
2500 EX The Hague
T 070-456 0000
F 070-456 1111

Annexes
2

Date Sept. 17, 2024
Subject Cabinet response to 2025 Delta Programme

Dear President,

It is my pleasure to present to you the 2025 Delta Programme (DP2025), also on behalf of the Minister of Housing and Spatial Planning and the Minister of Agriculture, Fisheries, Food Security and Nature. This is the annual proposal from the Delta Commissioner concerning the fields of flood risk management, freshwater supplies and spatial adaptation, which is presented to you in accordance with Article 4.10(1) of the Water Act. The DP2025 reports on progress and changes in the Delta Programme and on the measures for the years ahead. It was written in close collaboration between the national government, municipal and provincial authorities, water authorities, stakeholder organisations and the business community.

The Delta Commissioner presented the DP2025 to the Cabinet on 22 July of this year. In his cover letter accompanying the DP2025, the Delta Commissioner sets out three recommendations and the related advice:

1. *Think bigger and look ahead: break the deadlock*. The advice is to prioritise a perspective for the rural area, including future-resilient agricultural land use that, where possible, also contributes to the agendas for water and soil in the broad sense.
2. *Give water space*. The Delta Commissioner states that the Delta Programme can begin to work with all regions to establish a picture of what constitutes a tenable water balance. In addition, the Delta Commissioner recommends that, during the periodical evaluation of the space set aside under the direction of the Minister of Infrastructure and Water Management, the perspective for the areas that are, or will be, covered by space reservation arrangements should be elaborated.
3. *Invest in good time in organising enough operational capacity*. The Delta Commissioner calls for attention to be paid to the long-term financial stability of the Delta Programme. He also advises the establishment of agreements with educational institutions and the employers concerned about how to train (or retrain) enough professionals in good time. In addition, he points out that the upcoming periodical evaluation of the Delta Programme will also identify the knowledge and expertise needed to achieve the longer-term goals of the Delta Programme.

Cabinet response to the DP2025

In this letter, the Cabinet informs both houses of parliament about which steps are being taken to be better prepared for the consequences of climate change, and how the Delta Commissioner's recommendations are included in that process:

Ministry of Infrastructure and Water Management

Date
17 September 2024

1. *Think bigger and look ahead: break the deadlock*
   The Cabinet shares the Delta Commissioner's view that many agendas overlap in the scarce space available and that interests can clash in the process. To continue making progress, it is desirable to have a coordinated picture of the agendas, perspectives and considerations of the national and regional governments and to set out a path ahead on the basis of the long-term tenability of flood risk management, freshwater supplies and spatial planning.

   In this context, the government is working on the new National Spatial Policy Document, which includes the integrated future perspective for the spatial development of the Netherlands. We are taking the effects of climate change into consideration in this document. Drawing on its own knowledge base and the national structure, the Delta Programme can contribute to the development of this perspective. The Cabinet expects that the Delta Programme can play a role in contributing to strengthening structural collaboration between the national and regional governments and the orchestration of the decisions required at different scales. The Cabinet is thinking here in particular about the long-term sustainability of the water and soil system, not least in the light of increasingly extreme weather and climate change. In addition, resources have been made available for provincial packages of measures to achieve water, nature and climate objectives.

2. *Give water space*
   The Cabinet acknowledges the Delta Commissioner's call for the identification of tenable water balances in all regions. The challenges involving water shortages, problems with excessive water and flood risk management are getting larger. The outline agreement of 16 May of this year stated that the Netherlands will need to adapt further to climate change. It referred to updating the adaptation approach, with attention being paid to the availability of fresh water. The Freshwater Delta Programme is identifying bottlenecks in collaboration with the freshwater regions and water balances are being drawn up.

   The 2028-2033 National Water Programme will decide about the measures and systemic choices needed to maintain the equilibrium of the water balance, even during dry summers or peak rainfall. In preparation, possible strategies for addressing future freshwater shortages will be explored in 2024 and 2025, analogous to the possible solutions from the Sea Level Rise Knowledge Programme. Parliament will receive further information in this respect in late 2024.

   The Cabinet also subscribes to the Delta Commissioner's recommendation about earmarking space. A climate-resilient water and soil system is a prerequisite for future-resilient spatial developments. The planning decisions needed in this regard involve intensive collaboration with local government authorities, stakeholder organisations and organisations representing the business community.

Ministry of Infrastructure and Water Management

Date
17 September 2024

The Cabinet emphasises the major importance of rivers for our country, for example in the areas of freshwater availability, water storage, nature and leisure. The Cabinet is therefore working on a renewed Room for the River programme. This means that rivers will remain navigable and be given more space. The Flood Protection Programme (HWBP) is also being re-evaluated to ensure that our dikes will continue to provide adequate and timely protection in the future. In all cases, there will need to be a focus on the perspective for the areas covered, now or in the future, by space reservation arrangements.

3. *Invest in good time in organising enough operational capacity*
   The Delta Commissioner calls for attention to be paid to the long-term financial stability of the Delta Programme. The Cabinet will, in conjunction with the results of the evaluation of the Water Act and the HWBP subsidy scheme, further elaborate the issue of financial stability in close consultation with the water authorities for the purpose of updating the prevailing financial agreements for the HWBP. The Cabinet agrees with the Delta Commissioner that attention must be paid to operational capacity and supports the recommendation to include educational institutions and relevant employers in that process.

In conclusion
The cabinet thanks the Delta Commissioner for his advice and work on the Delta Programme.

It recognises the challenges involved in the issue of climate change potential consequences. The KNMI'23 climate scenarios show us a future in which weather will become more extreme, winters wetter and summers drier, and in which the sea level will continue to rise.* The most recent report from the Netherlands Environmental Assessment Agency (PBL) on climate risks shows that the Netherlands must be well prepared for the consequences of climate change.** The impact of climate change is becoming increasingly visible and it will become more noticeable.

For a secure future for the generations to come, it is important for the Netherlands to continue adapting to climate change. The national government and other government authorities will therefore have to continue working together to achieve the objectives in the water and soil agendas.

Yours sincerely,

THE MINISTER OF INFRASTRUCTURE AND WATER MANAGEMENT,

Barry Madlener

Delta Commissioner

B. Madlener
Minister of Infrastructure and Water Management
P.O. Box 20901
2500 EX The Hague

Delta Commissioner
P.O. Box 90653
2509 LR The Hague
www.deltacommissaris.nl

Our reference
DC-2024/519

Annexes
2

Date 22 July 2024
Subject Presentation of 2025 Delta Programme - Towards a new balance in the living environment: room to live with water

Dear Minister,

It is my pleasure to present to you the 2025 Delta Programme (DP2025). This Delta Programme has come about thanks to the contributions of many, and it therefore follows the tradition of working collectively on the future of our country. Even, or precisely, when interests clash.

The Netherlands is a wonderful country: on a small part of the planet's surface, you find a panoply of venerable, and at the same time modern, towns and villages, a high-quality infrastructure, wide beaches, and countryside stretching to the horizon, with farmhouses and unique natural areas. And virtually everywhere, water is nearby or it has shaped the landscape.

That water has helped to make our current prosperity possible: our country's propitious position as a river delta in a temperate maritime climate has secured us a steady supply of fresh water from rainfall and the rivers. The availability of adequate supplies of clean fresh water is essential for growing food and for biodiversity. Moreover, access by water is an important factor for the development of a very favourable business climate.

Climate change is putting increasing pressure on the vitality of our delta: we need to look for a new balance. At the same time, we are seeing a decline in biodiversity and healthy soils. The ecological functioning of water bodies and natural areas is under increasing pressure due to climate change. Optimising what we have been doing excellently for centuries – managing the water system – will not get the job done: solutions are needed in addition to water management. That is the core message of the joint government authorities in the 2025 Delta Programme: we will also have to seek the solution in how we plan and use our space, and learn to live better with too much and too little water.

In addition to the proposals in the present 2025 Delta Programme, I offer the following recommendations in my role as government commissioner for the National Delta Programme:

1. Think bigger and look ahead: break the deadlock
A lot of good things are happening but, despite this, many people working in the physical domain feel there is a lack of operational capacity and: perspective that future generations can work towards. Sectoral agendas are tumbling over each other to compete for priority. Investment plans are still being launched that we may regret in the long term, for example because we do not take weather extremes or the need to store and retain water into consideration enough. Or because projects that require a lot of water are going ahead without it being clear how these projects fit in with area ambitions to establish a tenable water balance. It should be remembered that freshwater availability is already under pressure in many areas. This does not detract from the appreciation for the fact that many projects are indeed now implementing optimisation measures.

However, we cannot cope with the effects of climate change with optimisation alone. In the years ahead, the periodical evaluation of the delta decisions will probably lead to far-reaching recommendations for change. About the future of the Rhine-Meuse estuary and the replacement of the Maeslant barrier, for example, and about the allocation of the increasingly scarce fresh water to different areas in the country. It is necessary to provide spatial direction on a regional scale for a climate-robust future and the investments required for that purpose. In tackling this urgent agenda, it is very important to look beyond sectoral interests and set out the course and choices in close conjunction with national and regional spatial processes. Examples are the spatial arrangements, the programme for the execution of the National Strategy on Spatial Planning and the Environment, the new National Spatial Policy Document and the provincial environmental visions. This is also crucial for the agricultural sector. In regions with low water availability, profitability is already under pressure. I therefore advise the Cabinet to prioritise a perspective for the rural area, including future-resilient agricultural land use that, where possible, also contributes to the agendas for water and soil in the broad sense. In my view, this could serve to kickstart the change required in the physical domain on the regional scale.

In order to make progress, it is necessary to establish a clear picture of the regional challenges in the physical living environment and how they are related, what the boundary conditions are on the basis of Water and Soil as Leading Factors, which investments are needed and which instruments can be used. European legal obligations relating to water and nature must also be included here. The available knowledge and insights from the Delta Programme relating to flood risk management, fresh water and spatial adaptation can be used for this purpose. Where necessary, as Delta Commissioner, I can make additional proposals to break the deadlock.

Even when we know what the useful next steps are on the road to a climate-resilient Netherlands, it has proven difficult to take them consistently. Government authorities look to each other and wait for funding or frameworks. Companies and investors ask for direction for the medium and long term. We can arrive at concrete solutions only on the basis of coordination and direction.
Sectoral resources will continue to be earmarked for the stated purpose, but will be linked in conjunction to a substantive agenda. It is possible that the draft strategic investment agenda from the new

government's Outline Agreement will provide a basis for taking further steps in this respect with partners in the spatial domain and the civil service.

2. Give water room

Water is increasingly becoming a spatial issue. When large amounts of rain fall, we must be able to store the water. Throughout the year, we need to retain water better in order to get through the drier and hotter summers. With new types of land use, we can also retain and store more water in the soil. This all requires space. My recommendations are therefore as follows:

a. During the ongoing periodic evaluation of spatial reservations under the direction of the Minister of Infrastructure and Water Management, the perspective for the areas that are, or will be, covered by space reservation arrangements should be elaborated. Which spatial functions *are* possible? Which land uses (temporary or otherwise) can continue?
b. On the basis of the Delta Programme, we can work with the regions to establish a picture of what constitutes a tenable water balance: how much water is available through the year and what is it used for? In that way, we will identify the vulnerabilities and risks. We will have to learn again as a country to live with both too much and too little water. Which risks are we prepared to accept when there is too much water? Climate adaptation is also climate acceptance.

3. Invest in good time in organising enough operational capacity

Climate change still involves many uncertainties but the effort required will increase significantly in all scenarios. This means that we need enough manpower, knowledge and funding. The Cabinet can take steps in good time to arrange the boundary conditions that facilitate this work by making agreements about the nominal growth of budgets in the Delta Fund in order to provide long-term financial stability. In this respect, you are referred to the advisory letter sent to the Dutch House of Representatives on 28 November 2023 about the dike upgrade agenda.[1] I advise the Cabinet to make agreements with educational institutions and the employers about how to train (or retrain) enough professionals urgently so that we can get the job done. The upcoming periodical evaluation of the Delta Programme will also reveal which knowledge and expertise are needed to achieve the longer-term goals for flood risk management, fresh water and spatial adaptation.

Delta Commissioner

Date
22 July 2024

Our reference
DC-2024/519

Confidently looking to the future

In a distant past, we build our country by draining the swamps and, thanks to the skilful management of water and soil systems, we were able to build a dynamic and prosperous society together. Climate change is forcing us to change course, with water and soil leading spatial decisions more.

This also requires a mental and cultural transition. Only in this way can we also offer future generations a bright future in a high-quality living environment. All the partners involved are aware of this: the national government, water authorities, provincial and municipal authorities, knowledge institutes, stakeholder organisations and business.

Given the firm commitment to climate adaptation in the Outline Agreement, I am counting on the recommendations set out here being granted a proper place in the new Cabinet's policies.

With confidence, therefore, I am presenting you the first Delta Programme for which I bear responsibility as government commissioner.

Yours sincerely,

Professor J.C. (Co) Verdaas
Government Commissioner for the Delta Programme

Recommendations from the Delta Commissioner

In his role as government commissioner for the National Delta Programme, the Delta Commissioner submits recommendations to the cabinet

Think bigger and look ahead: break the deadlock

Investment plans are still failing to take more extreme weather into consideration enough. Prioritise a perspective for future-resilient agricultural land use that also contributes to the water and soil challenges. Target sectoral financial resources in a coordinated way.

Give water room

Make room to store surplus precipitation and retain water for drier summers. The Delta Programme can show for each region where there are vulnerabilities to water shortages and surpluses. On that basis, possible adaptations to spatial planning and land use can be identified, as can the remaining risks for water users.

Provide clarity for areas with earmarked zones

A number of areas have been set aside for water storage in extreme circumstances. For these areas and any new areas that are set aside, make it clear which land use is acceptable or not, temporarily or permanently.

Invest in financial certainty and training

In all regions, increasing water challenges are leading to more work. Invest in operational capacity. Make agreements about nominal increases in the budgets of the Delta Fund. And make arrangements with education and employers to train enough professionals in good time.

Chapter 1
Administrative introduction

Water storage in Haastrecht Hooge Boezem, February 2024. Photo: Jos van Alphen

CORE MESSAGE

The Netherlands must start dealing differently with water shortages and surpluses by implementing both water management and spatial measures

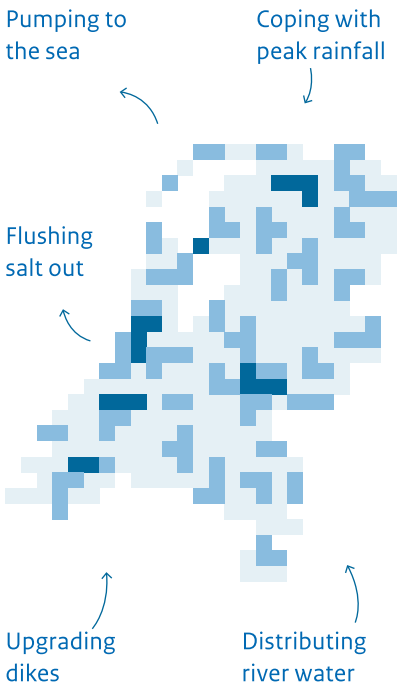
The leap to a safe and liveable future begins now

The past few years provided a foretaste of the new climate of the Netherlands. We had extreme water shortages and surpluses.

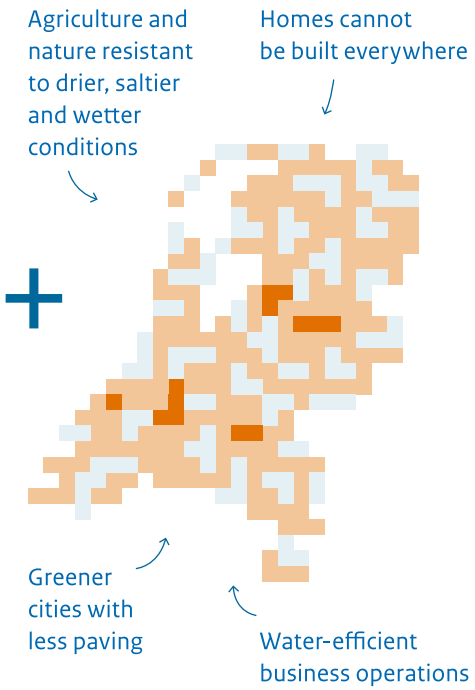
In the Delta Programme, we are preparing for the new climate. The current focus is still on water management solutions. They remain important but they are not enough.

Even if we pull out all the stops in water management, the challenge facing us will increase: more dike upgrades, more salinisation, more freshwater shortages, more problems with excessive water.

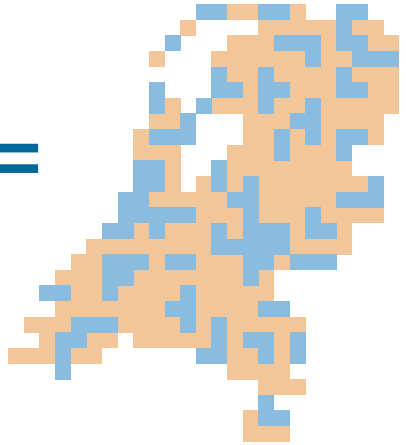
Additional efforts in water management will allow us to cope with climate change to some extent. But not completely (by a long way).



The solution is also to be found in how we plan and use the space we have.



With this combination, we will keep the Netherlands safe and liveable. We have to change our approach to water *and* land use.



Learning to live with water again

2024 started out wet. Very wet indeed. The climate of the future with hot, dry summers and mild, rainy winters is already upon us. Fortunately, most things went well: the dikes held and all the water was drained away just in time. Primarily thanks to the tireless efforts of alert dike managers. Recent dry summers have shown that we need to focus more on water shortages as well. Drinking water supplies are already under pressure. We have to alter our approach to water!

Extreme conditions will become more frequent and the extremes will become more extreme. The KNMI'23 climate scenarios are clear about what the Netherlands can expect: winters will be wetter and summers hotter and drier (see inset on page 21). The sea level is rising, and higher or lower river discharges will be more frequent. The formulation of the new climate insights in terms of new delta scenarios (four possible futures – see insert on page 21) shows that, in all scenarios, the work needed to address water shortages, excessive water and flood risk management will increase substantially, in some cases even before 2050. Moreover, these water challenges are stacking up in space *and* time: sometimes, they coincide; at other times, they follow on from each other in rapid succession. Areas in both the high-lying and low-lying parts of the Netherlands are facing water shortages *and* problems with excessive water *and* more frequent high water. That has a major impact on the physical living environment.

The Netherlands will retain its AAA status for climate resilience only if we prepare for the changing climate in time. A good business climate requires us to make timely decisions in favour of a robust water and soil system (see insert on page 23). Optimising and implementing smart improvements in the water system will no longer be enough to cope with the more capricious climate. The solution is to be found in how we design and use the space we have. Faster progress and difficult decisions are needed with respect to water management, land use and spatial planning to respond to extreme weather. Large-scale interventions such as the Delta Works in the twentieth century and the future replacement of the Maeslant barrier take a long time to prepare and implement. With major investments of this kind, we must take the long-term challenges into account as best as we can. That can be done with the updated delta scenarios. These large-scale interventions, in which the long term has to be taken into consideration, come on top of the work to address existing bottlenecks. We will have to pull out all the stops in terms of operational capacity to get everything done in time.

With the Delta Programme, we are preparing for the consequences of climate change in terms of flood risk management, fresh water and spatial adaptation in conjunction with other spatial agendas. That will involve looking ahead to 2050, 2100 and beyond. The uncertainties relating to climate change are still considerable: there is a bandwidth of possible futures. It is therefore difficult to make definitive decisions for the long term at present.[1] What we can do now is include forecasts about too much and too little water in short-term decisions about water management and in investments in urban development, infrastructure, nature and agriculture, and dike upgrades: maintaining freshwater stocks represents a considerable challenge, a lot of work will be required to upgrade our dikes, and we must steer our spatial planning towards a climate-resilient country. The solutions now have to involve more than just extra efforts in the areas of water management or optimising the water system. A different approach to both water *and* space is essential.

1 Interim Report for the Sea Level Rise Knowledge Programme

Main messages in the 2025 Delta Programme:

1. A different approach to too much and too little water and dealing with accumulating weather extremes is not a choice but a necessity. This requires:
   - genuinely committing to Water and Soil as Leading Factors;
   - focusing on spatial measures in addition to water management;
   - altering our approach to water and land use.
2. Ongoing investment in flood risk management, fresh-water availability and spatial adaptation.
3. New collective awareness of water: uncertainties, risks and use.
4. Climate adaptation as a design challenge.
5. Regional leadership in implementation: strengthening capacity, quality and expertise.

1.1 Not a choice but a necessity: altering our approach to water

Climate change is a given; the only thing that is still uncertain is the extent to which the climate will actually change. It continues to be necessary to make every effort to minimise the rise in temperature (mitigation). Mitigating carbon emissions means a less substantial increase in global warming and therefore reduces the challenge facing our delta. But climate adaptation is needed in every scenario: the effects of climate change will persist for a number of centuries, even if we manage to attain the objectives of the Paris Agreement worldwide. So adaptation is no longer a choice but a necessity. We must learn to live with water (again).The question is how. Our understanding of the pace and consequences of climate change has changed significantly in the past decade. In all probability, the future will involve even more uncertainties; we cannot predict everything in detail. That realisation also requires a different perspective on how we deal with water challenges. For a long time, we thought we could keep up with the effects of climate change by fine-tuning what we have been doing excellently for centuries: strengthening our primary flood defences and regulating our water system (distribution and storage). We are now running up against the limits of optimisation, and so we cannot achieve our goals for flood risk management, fresh water and spatial adaptation by intensifying our efforts in this respect. Different, tougher and more far-reaching decisions will be needed to prepare for all scenarios. These *systemic decisions* will lead to a fundamental change in how we manage the water system and land use. Examples include allocating the available fresh water differently to the respective demands, the establishment of areas for water storage and a different discharge distribution between the branches of the rivers. But also a more economical use of the available water on all fronts. This means that everyone will have to play a part. The Delta Programme therefore sees that more attention has to be paid to the socio-economic and behavioural sides of this transition.

The management of the main water system has reached its technical limits for both high and low water. This can already be seen in the high-lying areas of the country with sandy soils. The absorbent quality of the soil (its sponginess) has to be restored and that requires a different approach to the management of the land. More dialogue and coordination are needed between the main water system and the regional water system. We need to take larger, and different, steps to respond to extreme weather, and look at the agendas for individual areas in conjunction with sustainable land use. Doing this means we can no longer rely on technology alone. Wherever possible, we will have to work with *nature-based* solutions, as was the case with the Sand Motor on the coast and Room for the River. Examples like this are a source of inspiration for the future. The Delta Programme's job is to get all the decisions required onto the agendas of all the relevant actors in time on the basis of sound scientific arguments. And in particular to provide the partners in the Delta Programme with careful preparations for decision-making, including different policy options. An example can be seen in the interim results of the Sea Level Rise Knowledge Programme. Those results indicate what we how we can best prepare for uncertain long-term developments and the possible consequences of climate change, and sea level rise in particular.

Given this perspective, every euro invested, whether in housing construction, infrastructure or networks, will have to be spent in a climate-robust way. In that way, we can prevent disinvestment. In the periodical evaluation of the National Delta Programme, we will be drafting proposals in the years ahead for the decisions intended to provide us with a future-resilient country.

Spatial measures also needed alongside water management

Many of the crucial decisions for a climate-robust future are spatial decisions. This requires establishing connections between the task facing the Delta Programme and spatial planning, and the inclusion of the agendas of the Delta Programme in spatial planning. Which spatial decisions contribute to a climate-robust future? What should we stop doing because we are running up against the limits of the system? Which climate-robust solutions are emerging? How can we achieve implementation? For many years, water management could facilitate society's ambitions on the basis of its independent functional role; these days, water, climate and space have become increasingly interrelated. This requires a new definition of water management and abandoning old habits, not only in the water world, but also in spatial planning. At the same time, society must be guided towards a new perspective for living with too much and too little water.

A lot of initiatives are already in place. An example is the Parliamentary Letter on Water and Soil as Leading Factors and the measures to consider the effects of climate change in housing construction and urbanisation. The Ministries of the Interior and Kingdom Relations, and of Infrastructure and Water Management, are talking with other government authorities about how the National Yardstick for a green climate-adaptive built environment can be enshrined in law (at the national level). In May 2024, the cabinet published the Spatial Assessment Framework for a Climate-Adaptive Built Environment. That document answers the question of where best to build given the site-specific risks associated with the water and soil system. The options relating to whether and how the instrument can also be enshrined in law will be studied in the time to come.

With the first step in the stricter formulation of the Major Rivers Policy (Bgr) effective 1 April 2024, the Minister of Infrastructure and Water Management now has greater latitude to refuse permission for non-river-related activities in the part of the riverbed covered by the discharge regime. The Freshwater Letter published in late May 2024 emphasises the urgency of decisions for the satisfactory distribution of increasingly scarce fresh water.[2] Similar steps are needed in the short term for the options to cope effectively with weather extremes such as intense rainfall, heat and drought.

The agendas relating to flood risk management, spatial adaptation and freshwater availability have a major impact on other spatial developments and functions. Being prepared for weather extremes, for example, requires changes to land use. In addition, there is already a mismatch between demand for fresh water for the present functions and freshwater supplies. The expectation is that this balance will be increasingly disturbed if we fail to opt for a different approach: retaining more water, a different distribution of functions and land use that is appropriate for the local water and soil system. A climate-resilient water balance is an unavoidable prerequisite for future development in every area. These decisions must be followed up in the spatial domain: water and soil should, from now on, actually guide spatial planning in day-to-day practice. And that includes the areas of housing construction, investments in the energy transition and the rural transition. Not just where this is straightforward. The water agendas are a new factor in the struggle for space, and there will be more frequent clashes of interests. That should not stop us from acting while we still can. By making decisions now, we can avoid passing on problems to future generations. The environment in which we currently live and work, and the liveability of that environment, are to a large extent the result of decisions made by past generations. At the national level the Spatial Policy Document considers major spatial agendas in conjunction and makes future-resilient decisions about the allocation of scarce space. In the short term, it is essential to include the spatial consequences of Water and Soil and the agendas of the Delta Programme in the National Spatial Policy Document. The national government intends to do so, making grateful use of the latest insights from the Delta Programme.

1.2 Ongoing investment in safety, freshwater availability and spatial adaptation

Two-thirds of the Netherlands are susceptible to flooding. Our country therefore has a major interest in flood protection, for example through the implementation of the Flood Protection Programme. Currently, a large pro-

2 Parliamentary Paper 27625 no. 669.

portion of the dikes do not meet the flood risk management standards set for 2050. The ambition and the expectation are that the dikes will be in order by 2050. It was announced in late 2023 that the dike upgrade agenda will be significantly more expensive. In total, this work will cost between € 16 billion and € 33 billion. That is still a broad bandwidth, and it will be narrowed in the time to come. In all cases, the costs considerably exceed the budget that is currently available. The number of kilometres requiring upgrading is also increasing significantly to about 2,000 kilometres instead of the 1,500 kilometres at the outset of the programme. This is a result of new insights into the actual dike upgrades required.

Action is therefore imperative. The preparations and construction of dikes, dams, storm surge barriers and river widening projects will, depending on the measure, take between ten and thirty years. Not least because of all the interests involved in the spatial domain. In addition to the budgets for the Delta Programme, the human resources available for the medium and long term must also be in place to start and complete the work on time. The Delta Commissioner advised the Dutch House of Representatives about this in November 2023.[3]

As extremes coincide more frequently, the urgency of the Delta Programme challenges will become even greater. The events in Limburg in 2021 already showed how things stack up: high water levels in the rivers *and* enormous amounts of rainfall *and* a saturated regional water system. In the winter of 2023-2024 as well, there was more water than we could discharge and floods threatened in some areas. No one can control how much or how little water comes through the rivers or from the skies, whether or not in combination with a northwesterly storm. The flip side of the coin is the higher frequency of dry periods or actual drought. For several summers in succession, the Netherlands had water shortages that caused considerable economic damage. Extreme weather conditions such as heat, intense and prolonged rainfall, and storms also generated more and more problems. It is difficult to predict how long extreme weather will last. The near-crisis with the North Sea Canal in November 2023, when the water level rose by 30 centimetres due to a failure with discharge tubes, illustrates the limited resilience of the current design of the water system and its dependence on technology and people. The Netherlands was able to see both the strength and the vulnerability of the water system in action.

In addition to flood risk management, freshwater availability and spatial adaptation also require more ongoing efforts in the Delta Programme. We want to make the Netherlands resilient to freshwater shortages and make spatial planning climate-resilient and water-robust, now and for future generations. So implementation needs to start speeding up now. With regard to the Spatial Adaptation Delta Plan, it will be necessary to explore how the approach can be safeguarded on a structural basis, including governance and funding.

1.3 Towards a new collective awareness of water

Water has shaped the Netherlands and it will continue to do so. The tradition of protecting ourselves against water is relevant and crucial, and it will remain so. A new tradition is emerging as we go down this road: living *with* water. The partners in the Delta Programme are already working hard on connecting the two traditions. Water affects our daily lives in many ways. In a positive sense in the fields of leisure and the quality of the living environment, drinkable tap water and a source of life for crops. Learning to live with less positive consequences such as flooding, heat and drought damage will increasingly be a part of this picture. Providing action perspectives can help to get everyone moving in this direction.

The quality of the physical environment is important for our country's prosperity and business climate. That impact is greater than initially thought. The risks of problems with excessive water, heat, land subsidence and foundation problems often accumulate in areas where local people are already vulnerable.[4] This touches on the theme of climate justice and the advice of the Scientific Council for Government Policy to pay systematic attention to the fair sharing of the burden in climate policy. Repairing damage quickly after problems with excessive water or drought is not only important for individuals. Research by the financial sector has shown that the existence of a system geared to fast and smart recovery has an effect on citizens' livelihoods *and* the financial stability of Dutch banks. For everyone in our country, clarity about the objectives and the direction, in conjunction with medium-term action perspectives, is crucial.

3 Letter from Delta Commissioner on the Dike Upgrade Agenda, 27 December 2023.
4 ABN AMRO Bank (2023). Stapeling klimaatrisico's en financiële draagkracht op de woningmarkt.

Learning to live with water requires a new impetus to raise water awareness among all Dutch people. This means recognising that there will always be a risk of flooding, damage as a result of problems with excessive water and drought, and heat. The key is to prepare as well as possible. What can we do to minimise the effects (damage and casualties) caused by climate change and by too much and too little water? And what must we do if things go awry after all? Living in the Netherlands means we need to be alert, both when there is too much and when there is too little water.

The Delta Programme pays particular attention to future generations: they will live in the country we leave behind and they are now involved less often in decisions than the generations before them. A 'quartermaster' has been appointed in the Delta Programme to explore how we can better involve, anchor and monitor the participation of young people in policy developments relating to water and climate adaptation. Her plan of action states that:

> 'We are now in an age that is the result of the policies, visions and actions of past generations going back centuries. The decisions they made at the time, deliberately or inadvertently, have an ongoing impact on our daily lives. At the same time, in many areas – including water and climate adaptation – we are currently working on creating a new vision of the future. And it is important in that process to learn from the past and leave room to manoeuvre for the generations that will have to live with the consequences of our present policies for longest.'

Learning to live with water is, however, not just a challenge for young people or people with technical expertise: it concerns every person and every business in the country. Everyone must know which options are open to them to respond to water surpluses or shortages. The Delta Programme helps here, for example through our Climate-Resilient Together platform. But particularly through national and regional decision-making, which is where the guiding decisions are made about water storage, the sparing use of water and flood risk management. With our partners, we are working on establishing sound foundations for the periodical evaluation of the delta decisions and preferred strategies in 2026.

The central question is: how do we take concrete steps together towards climate resilience and how do we leave behind the phase of observation and agenda setting? The physical domain has reached a tipping point. There is a clear awareness that not everything can be done everywhere any longer and that tough decisions are required. However, actually making those decisions and taking concrete steps is proving difficult. To prepare the Netherlands as well as possible, the Delta Commissioner sees it as his job to put the uncomfortable dilemmas on the table as clearly and as early as possible in order to support the regions as they seek direction for the future. Where the outlines of the steps required are clear, the next task is to actually take those steps together.

An action perspective of this kind helps to feed the collective awareness and invites people to start shaping the future together. We have the knowledge, skills and resources to keep the Netherlands safe, healthy and liveable, now and in the long term. By bringing the future forward, we will ensure that the costs will not continue to rise. We must not fail to take the measures we know are wise, necessary and/or no-regret, learning from the past. In regional plans, we can describe that possible future in concrete terms, for example in terms of the water distribution for the rivers or the perspectives for the Rhine Estuary-Drecht Towns region.

1.4 Climate adaptation as a design challenge

Implementation requires direction. Only then will major issues be addressed both nationally and locally. Together, the water domain and spatial planning should develop an appealing perspective that can also be embraced at the political level. In what type of country do we want to live? Water can contribute to an appealing business climate in a much more positive way. Seeing ourselves as 'guests' in the landscape provides a different perspective. How can we pass on our country in respectable and liveable shape to subsequent generations?
Being prepared for climate change means establishing a picture in a targeted way of what our country can expect. How will our opportunities for using the space change? What are the consequences of climate adaptation and which measures are needed? A design-oriented approach – in which different possible futures are elaborated in images and measures – has proven to be an important tool in coping with uncertainties such as climate change. The Delta Programme is already working on several fronts to firm up the deployment of a design-oriented approach, for

example by collaborating in the project of Redesigning Deltas. This is generating numerous wonderful examples of projects that provide good solutions for several agendas at the same time. Examples include the Ooijen-Wanssum Meuse Park, the Paddenpol dike relocation, the ideas for flood-defence landscapes or the integrated approach to Fresh Water in the Eastern Netherlands.

Many areas are facing a combination of problems. Striking a balance between the need to retain and buffer more water for dry periods and measures to cope with extremes involving excessive water will present us with dilemmas. The various major agendas in the physical domain, the accumulation of challenges at the regional level and the need for appealing prospects are a new reality. In this light, the Delta Programme cannot do otherwise than evolve into a design agenda for the climate-resilient future of our country. In other words, the Delta Programme will be looking for possible, climate-resilient futures for the Netherlands even more than at present, complete with water measures and spatial proposals. Studying the design agenda for water and space in conjunction will allow new opportunities for climate-resilient futures to emerge. The new delta scenarios provide an important starting point here. They offer the room needed to explore perspectives with more *nature-based* solutions in order to establish a climate-resilient water and soil system and therefore to keep, or make, the Netherlands AAA climate-resilient. They show what each region needs to prepare for. The water can come from several directions, and the overlapping of conditions that are not extreme in themselves requires much more attention. The delta scenarios also show what is possible and the opportunities afforded by possible futures.

Too much and too little water, accumulation of extreme weather

Climate change is leading to more erratic, unpredictable and extreme weather. See the recent reports of the IPCC as formulated for the Netherlands by the KNMI (Climate Signal 2021, new Climate Scenarios in October 2023). In the summer of 2021, Limburg was battered by pluvial and river flooding due to record rainfall. The Deltares report "What if the torrential rains had fallen elsewhere in the Netherlands?" (2021) shows that this scenario is also possible in other areas at any time, and that it could result in widespread and, above all, long-term problems with excessive water (lasting more than a week). The report states that the overall damage could exceed one billion euros and that, if flood defences were to fail, there could even be fatalities.

Since 2018, we have also had four dry years. In 2022, discharges in the Rhine reached record lows. The shortage of water is already causing structural damage to nature, shipping restrictions, land subsidence and damage to foundations. There are also bottlenecks affecting drinking water sources, as a result of which drinking water companies cannot always fully meet drinking water demand from business customers. Drinking water companies are already being regularly forced to fall back on buffers. The decline in water availability during dry periods with low river discharges may lead to problems with water quality at intake points for regional water systems and drinking water because discharges into the rivers continue as usual during these periods, with high concentrations of substances in the water as a result.

Another consequence of climate change is more frequent hot weather. A heat wave can cause surplus fatalities. For example, over 450 more people died in the summer of 2022 as a result of the heat. Global and ocean warming are causing an acceleration in sea level rise. In recent centuries, the global average rate of rise was about 2 mm per year. Since the 1990s, it has increased to 4 mm per year. The sea level will also continue to rise on the Dutch coast in the coming centuries and the acceleration is now perceptible.

The KNMI'23 climate scenarios and socio-economic scenarios were combined in 2024 to produce new delta scenarios. Those scenarios describe four possible, plausible futures for 2050 and 2100. They take into account climate change, climate mitigation and socio-economic changes such as population growth, and economic and spatial developments. A study was conducted for each delta scenario to outline the future water agendas for freshwater availability, problems with excessive water and flood risk management in 2050 and 2100. This provides an overall picture of the bandwidths of these agendas. The delta scenarios describe the size of the challenges in the absence of new (additional) policy.[5]

5 Van der Brugge, R. & R.C. de Winter (2024). *Deltascenario's 2024 - Zicht op Water in Nederland*. Deltares 11209219-000-ZKS-000.

The regional implementation of the delta scenarios reveals possible choices for the future, ranging from continuing with the present strategy to the elaboration of a fundamentally different approach. Not in order to opt immediately for one of the possible pathways but in order to determine what these scenarios could deliver for the specific areas, what the consequences are and – hopefully – which measures add value in all scenarios (in other words, the no-regret measures). This provides a basis for decision-making, for arriving at actual decisions *and* for the possible phasing of those decisions over time. See the approach in the Sea Level Rise Knowledge Programme. All the regions will have to determine their own directions, taking national choices and decisions into account, and translate them into subsequent action.

A design-oriented approach supports this strategy at the regional level because agendas and possible directions can be formulated in concrete terms for each region. This also provides a clear picture of the options for linking the long term to short-term agendas and ambitions, of which measures are feasible and where, and of the costs and consequences. The Delta Programme is looking at how a design-oriented approach can be used as a tool for knowledge development, assessment and decision-making. Examples include the overview of design concepts to be used for Water and Soil as Leading Factors, the Toolbox for the design-oriented approach to Redesigning Deltas, the contribution to the NWA consortium Red&Blue and the elaboration of the possible conceptual perspectives of the Sea Level Rise Knowledge Programme.

1.5 Regional leadership in implementation

Agendas in the domains of agriculture, land subsidence, housing construction and the implementation of regional energy strategies all have an important spatial component and they are the subject of debate in the social and political arena. All of these agendas meet at the regional level, where tailored solutions can be developed that are guided by the principle of Water and Soil as Leading Factors. Water connects and it can help to implement interdependent policy ambitions on the basis of a coordinated approach. An example is the importance of water for nature conservation and restoration: the core objectives can be achieved only in connection with other agendas at the regional level: flood risk management, the adequate availability of fresh water and climate-adaptive spatial planning.

It is important to ensure that regions do not get tied up in a Gordian knot of national ambitions and agendas. The implementation programmes of the Delta Programme can help to provide the sectoral agendas with more orchestration. On the basis of the water and soil systems, the Delta Programme is laying a foundation for connecting interdependent policy ambitions by bringing them together in regional perspectives on the basis of oversight, commitment and *joint fact-finding*. The Delta Programme does not take over the agendas and solutions: it supports and drives them by identifying and placing the urgent dilemmas on the agenda, and escalating if necessary. The regional administrative and implementation structure is subservient to this work because numerous partners are working together in the Delta Programme to establish a climate-robust delta in which we are more resilient. Simultaneously looking ahead, working on future-proof solutions and investing in long-term solutions provide the necessary direction to achieve actual implementation.

Support and consensus for proposals and measures are important values in the Delta Programme approach. It is essential that we strengthen capacity, quality and expertise at the regional level and focus on implementation.

Turning to problems with excessive water, the current collaboration and governance arrangements at the regional level are not adequate to mitigate the impact on society of the increase and intensity of rainfall adequately and to initiate action from all the players required. The competences at the required supraregional level relating to looking at problems with excessive water, and particularly events exceeding the design requirements, are not in place. It is therefore important for stakeholders to work together on reviewing the details of the work required, as well as roles relating to the theme of problems with excessive water. The Ministry of Infrastructure and Water Management will initiate a dialogue.

In conclusion

The aim of the Delta Programme is to describe the long-term agendas as well as possible, including the bandwidth and uncertainties. The implications only really become concrete at the regional level. This is where government authorities and stakeholders elaborate the search for possible solutions and the measures required, and it is here that it becomes clear how the agendas can be addressed (in adaptation pathways), and what the action perspectives are in the short term. That is how the Delta Programme wishes to fulfil its task: by initiating discussion about the inevitable choices in good time and carefully preparing the related decision-making. What can we do now, what is a good idea in all circumstances and what should we stop doing now? And the next step is: how do we raise these questions on the relevant agendas and in decision-making processes at the right time and in the right way? This can sometimes involve difficult political choices. In the time to come, it will be important to go searching for the painful issues together: what choices are there, what are the consequences? What are the benefits and drawbacks of deciding too early, too late or not at all? In order to make widely supported decisions, it is necessary to get started in time and to provide the room needed for a dialogue about developments and the choices at the area level. In which circumstances should which decisions be made? Where do interests clash? Working together on the drawing board and making calculations for possible solutions, and then visualising the consequences of the choices, establishes a shared basis for decisions. This is also the approach advocated by the Delta Programme for the periodical evaluation of the delta decisions and preferred strategies in 2025-2026.

The importance of using water and soil sustainably

A decision to stop exceeding the limits of the water and soil system is required to make the Netherlands climate-resilient and adapt the country sustainably to cope with the effects of climate change on river discharges, precipitation patterns and sea level rise. Sustainable land use is necessary to avoid passing on problems (including those related to water and soil) to other areas or future generations. This means that choices have to be made.

In several areas, however, the limits of the water and soil system have already been reached or exceeded. If we carry on down the same road in these areas, we will run into a dead end. This is already happening in the High-Lying Areas with Sandy Soils, where water shortages are causing major problems, and in the peatland areas, where land subsidence is causing more and more problems such as high costs for society, untenable land use, carbon emissions and declining natural and water quality (RLI, 2020). Raising the groundwater levels will have drastic consequences for farmers in the peatland areas: their land will be waterlogged, forcing them in many cases to change how they work, for example with extensification, fewer cattle per hectare and/or other crops, and other revenue models that respect landscape management and blue services.

Better coordination of freshwater supply and demand is crucial, as are water extraction areas that are in balance with the water and soil system and land use.

Dutch nature is still under severe pressure from aridification and eutrophication. Biodiversity loss is increasing. Water plays a key role. Climate-adaptive nature can contribute to the implementation of the freshwater agenda and it supports adequate freshwater supplies for vulnerable functions. At the same time, nature has its own requirements and achieving the current nature objectives may be complicated by any water surpluses or shortages. Drinking water supplies – for the growing population and economic developments – will already be tight by 2030 due to the limited availability of good-quality water/groundwater.

Chapter 2

Developments in and around the Delta Programme

Installation of pumps on the Afsluitdijk, May 2024. Photo: Jos van Alphen

More erratic weather, bigger challenges

Periodical evaluation of Delta Programme brings new choices into the picture

New delta scenarios – scenarios that show the water agendas of the future – were drafted in 2024.

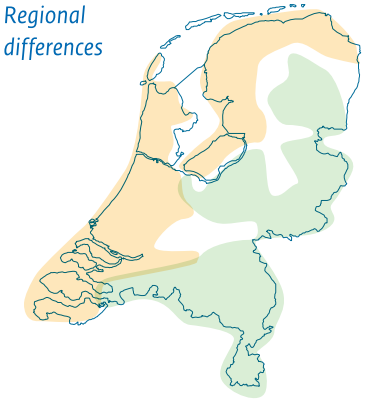
In all scenarios, challenges relating to water shortages, water surpluses and flood risk management will increase. This is mainly because the weather is getting more erratic: we will have wetter winters, drier summers and more peak rainfall. This will affect all areas and all water users.

In combination with other developments in the environment of the Delta Programme, this calls for new choices. The periodical evaluation of the Delta Programme, which will take place over the next few years, brings these choices into focus.

Problems with surplus water

More frequent disruption, larger consequences

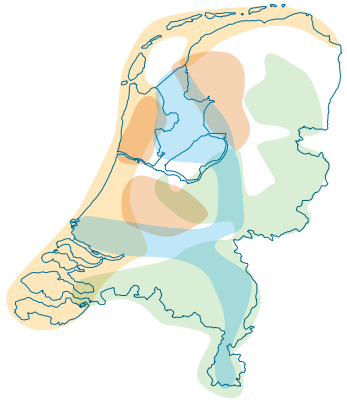
Regional differences



- Low-lying Netherlands: problems with surplus water during peak rainfall, and when pumping stations cannot drain water away quickly and discharge it to the sea due to sea level rise
- High-lying Netherlands: problems with surplus water when brooks and rivers burst their banks

Water shortages

Less fresh water, higher demand

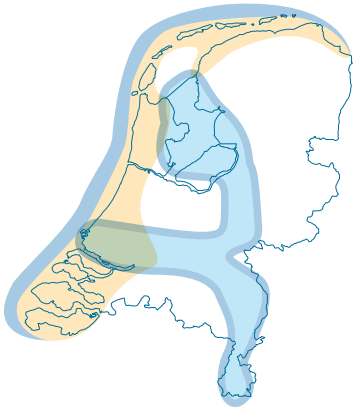


- Coast: increasing salinisation
- Low-lying peatland: higher water demand, but land subsidence and carbon emissions
- Rivers: more frequent low river discharges

High-lying Netherlands: more frequent aridification

Flood risk management

More frequent high water, flooding has more impact



- Coast: sea level rise
- Areas outside dikes: inundated more often
- Rivers: more frequent high water levels in the rivers

The climate is changing faster and becoming more erratic. Where there are already issues with too much or too little water, the problems will increase. New bottlenecks will also emerge. All areas and users will be affected. In addition, the world is changing faster and faster, and the pressure on available space is increasing. This raises new knowledge questions and has implications for ongoing implementation and the existing strategies for the future. The Delta Programme is evaluated periodically on the basis of these developments. The work of the Delta Programme will move from optimising strategies and measures through to transformation. That will result, in 2026, in proposals for amendments in or changes to the delta decisions and the regional preferred strategies.

2.1 Water and Soil as Leading Factors

The Dutch cabinet sent the Water and Soil as Leading Factors parliamentary letter to the Dutch House of Representatives in November 2022. The aim of the principle of Water and Soil as Leading Factors is to avoid passing on problems to future generations or other areas, or from the private to the public arenas. The principles of Water and Soil as Leading Factors overlap in full with the principles of the Delta Programme. The Delta Programme was intensively involved with the development of this policy. The focus of the Delta Programme last year was on the implementation of those principles. That work was based in part on the Delta Programme for Spatial Adaptation, which contributed to the development of the National Yardstick for a green climate-adaptive built environment and the spatial assessment framework for a climate-adaptive built environment.
Parties in the Delta Programme are also working on research to put Water and Soil as Leading Factors into practice. For example, the Delta Programme for the IJsselmeer Area contributed to the development of the IJsselmeer Compass, which describes the consequences of new initiatives for the water system. The Freshwater Delta Programme is developing knowledge about raising groundwater levels in low-lying peatland and about increasing the sponginess of the areas with sandy soils. Working in line with the water and soil system is the basis for the periodical evaluation of the Delta Programme (see Section 2.2).

The implementation of the principles of water and soil as leading factors comes with obligations. It must be anchored in the instruments of the national and regional governments and in the spatial plans being developed, including the National Spatial Policy Document, the NOVEX development perspectives, the provincial strategies for spatial planning and the environment (POVIs) and the proposals in the Provincial Programmes for Rural Areas (PPLGs). The Delta Programme contributes to this process through governmental collaboration and by making knowledge and information available that help with water and soil analyses and the system consistency that constitutes the basis for planning. Examples are the delta scenarios and the conceptual perspectives in the Sea Level Rise Knowledge Programme. In the process of the periodical evaluation, the Delta Programme will establish connections with the spatial plans based on Water and Soil as Leading Factors. Both when river influxes are high and when there are water shortages, water management is running into the limits of what is technically possible.
A change in the spatial planning process and awareness is needed on the road to an approach in which the water and soil system serves as the starting point for spatial decisions and land use, as has been the custom for centuries.

2.2 Periodical evaluation of the Delta Programme

Through to year-end 2026, the Delta Programme will be conducting the second six-yearly periodical evaluation of the delta decisions and preferred strategies from the 2015 Delta Programme. At present, the work is based on the first periodical evaluation from 2020. Are the delta decisions and preferential strategies still tenable and adequate?

Is implementation on track or are adjustments needed? And if so, what form will this take? The results of the second periodical evaluation will be included in the 2027 Delta Programme. The national government, provincial and municipal authorities, and water authorities will incorporate the policy resulting from the 2027 periodical evaluation in their own instruments (such as strategies for spatial planning and the environment, water authority ordinances and environmental plans). In the case of the national policies resulting from the proposals, this will be seen in any case in the 2027-2033 National Water Programme.

2.2.1 KNMI'23 climate scenarios

In 2023, the KNMI published four new climate scenarios sketching the possible future climate in the Netherlands. These climate scenarios formulate the global climate projections of the IPCC, the United Nations climate panel, for the specific case of the Netherlands.

The climate scenarios show that the climate is changing. The Netherlands will be faced with the effects of climate change more often than at present. In general, our weather will be warmer and wetter in winter, and drier in summer. In addition, extreme weather conditions will be seen more often.

The extent to which the climate changes will depend to a major extent on reducing emissions, in other words the extent to which the world manages to cut greenhouse gas emissions. If the world abides by the Paris Climate Agreement (2015), the climate will change much less. On the other hand, if the world fails to reduce emissions, there will be more climate change.

The KNMI produced two scenarios for high and low emissions: a 'wet' scenario in which winters are much wetter and summers slightly drier, and a 'dry' scenario in which winters are slightly wetter and summers much drier. The resulting four scenarios underline the importance of climate mitigation, in other words the reduction of the global emissions of greenhouse gases. They also make it clear why climate adaptation is important. It can be seen that, even in the scenarios with low emissions of greenhouse gases, the climate will change more than previously expected.

The KNMI'23 climate scenarios paint a picture of the consequences for the Dutch delta issues. They provide the scientific basis for the delta scenarios that look at the impact on future water agendas relating to freshwater availability, problems with excessive water and flood risk management.

2.2.2 Updating the delta scenarios

The National Delta Programme published the new delta scenarios in 2024. They describe four possible, plausible futures for 2050 and 2100. They take into account climate change, climate mitigation (reducing global emissions of greenhouse gases) and socio-economic changes (population growth, and economic and spatial developments). A study was conducted for each delta scenario to describe the future water agendas for freshwater availability, problems with excessive water and flood risk management in 2050 and 2100. This provides an overall picture of the bandwidth of these agendas.

In all scenarios, the challenges relating to water shortages, problems with excessive water and flood risk management are becoming more challenging and bottlenecks are emerging in more locations. In addition, the agendas will stack up more and more often: areas will have to address challenges relating not only to freshwater availability, but also to problems with excessive water and flood risk management. Each area will have to address the knock-on effects of these challenges. There is a lot of work to be done throughout the Netherlands.

The accumulation of water agendas makes it clear that it is becoming more urgent to take measures. The key here is to look not only at measures in the water domain but also beyond. The solution can also be found in the planning and use of space.
The delta scenarios show where there will be difficulties and they help to find solutions. They can be used for purposes such as determining water agendas (further quantification), formulating policy options with possible measures, and testing the effectiveness, robustness and scope of those measures. They therefore constitute an important basis for the periodical evaluation of the Delta Programme. The delta scenarios can also be used for other agendas such as housing and infrastructure projects, the National Spatial Policy Document, the programme for the execution of the National Strategy on Spatial Planning and the Environment, and the National Programme for Rural Areas (NPLG).

2.2.3 Sea Level Rise Knowledge Programme

The Minister of Infrastructure and Water Management and the Delta Commissioner launched the Sea Level Rise Knowledge Programme in 2019. The aim is to establish a clearer picture of the possible consequences of accelerated sea level rise on flood risk management, freshwater supplies and the sandy coast. The focus here is on the question of the extent to which existing policies and the existing water system – as well as the existing dikes, dams and defences – are tenable and flexible in different scenarios for sea level rise. And also on establishing a picture of a range of possible, alternative, conceptual perspectives for the long term, looking at sea level rises of up to five metres.

The Sea Level Rise Knowledge Programme released the Interim Report in November 2023 with the initial insights relating to the rate of sea level rise, the implications for flood risk management and fresh water, and options for action.[6] The main conclusion is that the Netherlands can manage a sea level rise of at least three metres with the present strategy for flood risk management. It is important to set aside the space needed to keep out, remove and store water. Enough space must also be earmarked in the North Sea for the future extraction of sand for nourishment operations for the purpose of coastal maintenance. Another important conclusion is that salinisation and problems with excessive water already require appropriate measures. The Ministry of Infrastructure and Water Management is working up these interim findings into concrete actions in consultation with sector organisations.

In addition to the Interim Report, three consortia worked out technically, physically and spatially feasible conceptual perspectives for a sea level rise of up to five metres: Protect, Seaward and Accommodate. The Protect conceptual perspective builds on the current policy of coastline maintenance with sand, strengthening flood defences and deploying, adapting or replacing dams, storm surge barriers and locks. The Seaward conceptual perspective uses space offshore to simplify changes to the Rhine-Meuse estuary and the Southwest Delta, for example in the case of the current dikes, which will need less raising and strengthening.

In the Accommodate conceptual perspective, water is given more and more room, and land use and built-up areas are adapted accordingly.

These consortia consisted of both the government (the Ministry of Infrastructure and Water Management, the Delta Commissioner's staff and Rijkswaterstaat), knowledge institutes, engineering and design firms, and hydraulic engineers. The consortia presented their findings in early March 2024 at the annual conference of the Sea Level Rise Knowledge Programme. The main conclusions are that the Protect, Accommodate and Seaward conceptual perspectives all include valuable building blocks that can be combined well on a regional scale.[7] In the Randstad urban agglomeration, the focus will continue to be on protecting its residents and economic activities, in part because of the importance of this area for the national economy. Following on from the results of the consortia, an exploration of the possibilities of deploying *nature-based* solutions is being conducted with the aim of addressing sea level rise.[8]

The Sea Level Rise Knowledge Programme is combining the 2024 Interim Report and the conceptual perspectives from the consortia into adaptation pathways for decisions about the main water system. These pathways describe which measures are needed and when, at what rate of sea level rise, and which preparations will be required. For example, when an open or closed Rhine-Meuse estuary and the storage of river water in the Southwest Delta will be needed, and which studies in this respect should be initiated now. The adaptation pathways constitute building blocks for the elaboration of area-specific adaptation pathways and the periodical evaluation of the regional preferred strategies.

2.2.4 Second periodical evaluation of the Delta Programme

On the basis of initial studies and analyses, both the urgency and magnitude of the agendas resulting from the second periodical evaluation of the Delta Programme

6 www.kpzss.nl/tussenbalans and Parliamentary Paper 36410-J no. 5.

7 See also the report 'Room for sea level rise. An exploration of conceptual perspectives to keep the Netherlands safe and liveable in the long term as sea levels rise'.

8 *Nature-based Solutions are multi-functional* solutions that use nature to address a range of social agendas simultaneously while also improving nature.

are expected to be larger than at the time of the first.[9] That will require a change in the course of the Delta Programme. Simply optimising existing situations will no longer be adequate everywhere. The weather will be more erratic, with wetter winters and drier summers than expected on the basis of the scenarios used for the current strategies. Problems with excessive water will also be more frequent. Demand for water has increased. It is expected to increase further due to climate change, but also because of developments in land use, such as the construction of data centres and developments in the hydrogen economy, and policy changes such as raising the groundwater level in peatland areas. In addition, statutory objectives for nature, groundwater and surface water require water-related measures. Finally, the need to coordinate the work of the Delta Programme with other social agendas and policy programmes – such as nature restoration, agricultural policy and nitrogen deposition (NPLG), housing construction, the current built-up environment (rebuilding) and energy – has increased.

The Delta Programme commissioned an analysis of the assumptions in the design of the programme and how these assumptions are reflected in the organisation of the Delta Programme (see background document A). It also explored which assumptions are being challenged by recent developments, events and new insights. These include assumptions about matters such as climate change as a gradual process, the uncertainty relating to the dynamics of the water and space system, and the expectation that these systems are manageable. And finally, the assumption that there is broad consensus in society about the nature and extent of the adaptation agenda and what is needed to live with the changing climate.

Another reason for the periodical evaluation is that the course of the Delta Programme needs to be altered in adaptive ways in line with changes in the physical and societal environment. Examples include expectations relating to climate change (KNMI'23 climate scenarios), activities to reduce greenhouse gas emissions, spatial developments and rising water demand (new delta scenarios). Furthermore, there are new socio-economic developments, including demographic changes, economic growth and land use, and new insights in these areas (as described in *PBL-Welvaart en Leefomgevingsscenario's 2024*). The areas and themes formulate the new insights and developments and the building blocks from the analyses in terms of the impact on the current delta decisions and preferred strategies. That includes developments resulting from new policies, such as Water and Soil as Leading Factors, and the effect of nature and environmental regulations.

Nationally, the building blocks, insights and developments serve as the basis for the additions to existing computer models, methods for assessing the effects and comparison systems (the Delta instruments), and changes in the organisation and working methods of the Delta Programme. Those processes include:

- the refinement of the system for comparing solutions for the future;
- strengthening the consistency between the various agendas in the Delta Programme;
- establishing connections with other developments in the physical living environment that affect the agendas of the Delta Programme;
- the ongoing development of adaptive delta management with transformative delta management.

The last of these processes is required because simply optimising existing activities will be inadequate with a view to the long term and developments in the Netherlands in the run-up to 2100 and beyond.

9 De Bruijn, K.M. (December 2023). 'Relevante ontwikkelingen en nieuwe inzichten voor de herijking van het Deltaprogramma: Een eerste verkenning'. Deltares.

By the end of 2024, a clearer picture will emerge of which delta decisions, preferred strategies and possible solutions (or their various components) will be revised. In 2025, possible alternatives to keep the Netherlands safe, liveable and water-resilient in the long term will be developed and compared. That will form the basis for proposals for changes or refinements in the strategies, decisions and delta decisions, and for the measures to be taken in 2026.

It is important to initiate the dialogue in this respect and with respect to area-level choices in good time. That will involve working with water and spatial planning experts from other government authorities to look at which decisions are needed, when, and in which circumstances. And working together on the drawing board and making calculations for possible solutions before visualising the consequences of the choices. This will provide the partners with a shared basis for decisions looking to the future.

Studying consistency and connections between agendas

In the second periodical evaluation of the Delta Programme, consistency, interdependencies and connections are a major concern. The delta scenarios show that water challenges will stack up in every area of the Netherlands (see Section 2.2.2). How they will stack up will vary depending on the region and that will make tackling the agendas more complex. It is therefore important to address the agendas in a coordinated way. The periodical evaluation of the Delta Programme will study climate-resilient solutions for water management and the decisions relating to the planning of our water system (see below under 'Ongoing development of adaptive delta management'). These decisions can affect multiple areas and other subareas and systems. That includes the impact on adjacent areas, the interaction between the main water system and the regional water systems, and the interaction between water, soil and space. These interdependencies will be addressed in the second periodical evaluation of the Delta Programme.

The solutions for the future can no longer be sought in the water system alone; they will also require decisions about spatial planning, land use and a new collective awareness. Climate-resilient area planning can help to reduce vulnerability, or be a part of the solution. Alternatively, measures may be considered to use water more efficiently. This means that connections with other agendas, such as policies for the rural areas, the energy transition and housing construction, will also require more attention than in the past.

Ongoing development of adaptive delta management: switching to other systems

Given the pace of climate change, and the associated erratic and extreme weather patterns, there are concerns about whether the Netherlands will be able to adapt quickly enough. The question arises of whether climate adaptation needs to accelerate and whether this does not require much more fundamental changes. The current modus operandi of the Delta Programme – adaptive delta management – involves the step-by-step adaptation of existing systems and adaptation pathways to link the short term to the long term, and transparently addressing uncertainties relating to climate change. This approach may no longer be adequate in all cases and it may be necessary to prepare for larger transformations. This implies moving from an incremental approach to a transformational approach. The Delta Programme is therefore exploring the possible extension of adaptive delta management to include interventions for switching to other systems. Here, the Delta Programme uses insights from the tipping points and adaptation pathways method, supplemented with insights from transition management and *theory of change*. In addition, the application of Water and Soil as Leading Factors is intended to prevent future *lock-ins*.

The aim is to continue developing knowledge and methods with a transformation-based approach to developing perspectives and visions of the future in the run-up to 2100 and beyond, as well as the associated strategies for the long term. If challenges cannot be addressed with optimisation measures (including technical measures) in the current water system, a transformation may be necessary. Insights into current system limits and extreme events contribute to awareness relating to the major challenges and the changes required in that respect. A spectrum of scenarios and visions of the future shows the shape the spatial elaboration of possible solutions could take as ways of orienting transformation processes in specific areas or systems. A design approach helps to bring together insights based on climate change, agendas, developments and possible futures in the spatial domain. This constitutes the basis for visualising transition pathways for the long-term development of the Netherlands. In the Rhine Estuary-Drecht Towns, the Southwest Delta and Central Holland, experience is being acquired with the design approach and transition pathways for major changes.

Where transition pathways are needed, they will be elaborated in the periodical evaluation in collaboration with experts from a range of disciplines. This allows for an assessment from different perspectives of the added value of area solutions and new combinations of the water and soil system, user functions and spatial planning.

2.2.5 Social engagement: OFL recommendation and young people

The Physical Living Environment Consultation Body (OFL) provides the Delta Programme with support in the area of getting social partners involved at the national level.[10] In consultation with the OFL, it was found that the periodical evaluation would have such an impact on society that this involvement will be intensified in the time to come. The OFL also provides support for the exploration of innovative participation instruments. For example, in the supra-regional project looking at problems with excessive water in the Den Bosch area, the Delta Programme and regional partners are acquiring practical experience with Participatory Value Evaluation, a new method to facilitate the mass participation of local people. The crux of this method is to involve residents in thinking about dilemmas and therefore to create an understanding of how decisions can affect other areas. The OFL helped to set up this method.

Young people and participation in the periodical evaluation

The promise of the Delta Programme is to pull out all the stops to keep the Netherlands safe and liveable for future generations. The input of young people is important for all the topics and agendas of the Delta Programme. The Delta Commissioner regularly invites students, recent graduates and young professionals to attend Delta Programme activities and contribute their ideas, insights and techniques. For example, in response to suggestions from young people, the Delta Commissioner included a recommendation in the 2024 Delta Programme to apply a generation test to decisions about the spatial planning of the Netherlands. That included an offer to work with young people and the partners in the Delta Programme on the development of the test and to apply the test, in any case during the second periodical evaluation in 2026. The Dutch cabinet (led by Prime Minister Rutte) supported the proposal and wanted young people to be involved from the outset in the development of an approach to include the long-term impact of decisions better. The cabinet also wanted the young people to have the opportunity to be involved in discussions about, and contribute to, solutions.
The first real step has been taken towards giving young people a seat at the table. The Ministry of Infrastructure and Water Management, the Delta Commissioner's staff and Rijkswaterstaat have appointed a quartermaster to involve, secure and monitor 'intergenerational participation' and the input of the perspective of young people in the formulation of government policy with respect to water and climate adaptation. The quartermaster, in collaboration with other young professionals, is developing a method to secure, protect and monitor the involvement of young people and future generations in consultations.

2.2.6 Delta Programme Signal Group

The scientific signal group monitors developments (including developments in society) that are relevant for the Delta Programme, with a focus on climate change. The Delta Programme Signal Group advises the Delta Commissioner in this respect on an annual basis. Since 1 January 2024, Professor Arthur Petersen has chaired this group, which was recently expanded to include participants from the Social and Cultural Planning Office (SCP) and the National Institute for Public Health and the Environment (RIVM). This is part of the further development of the Signal Group based on the broadening of the knowledge base to include physical and socio-economic signals. That development was initiated in response to the external evaluation of the Signal Group.

The Group is expected to publish a new advisory report in late 2024 about relevant scientific and social insights, and trends that require the attention of the Delta Programme. The previous advisory report dates from late 2022. See background document A in the 2024 Delta Programme.

2.2.7 Design-oriented approach

To be prepared for future developments, it is essential to establish a specific picture of climate-robust water and soil systems. What can specific areas expect? How will that change the options for using space? What are the consequences of climate adaptation and water and soil as leading factors here? Moreover, at the regional level, all the agendas come together in the search for tailored

10 See background document B Advisory document from the Physical Living Environment Consultation Body and response from the Delta Commissioner.

arrangements. There is a design challenge here. Design research is therefore being used in the periodical evaluation of the Delta Programme. That approach combines research and the design of possible solutions in a single process. The process of spatial design is used here to learn from a range of possibilities for planning the Netherlands on spatial-resilient lines. The goal is to establish closer connections between the agendas of the Delta Programme and spatial planning, as advised by the Dutch Court of Audit in the report 'Voorbij de dijken' (Beyond the dikes). Knowledge about historical water systems can help here.

A design-oriented approach is also an important tool for coping with uncertainties such as climate change. It can make it clear how spatial systems and the water and soil system operate, and respond to changes and major social challenges. It can also show how the boundary conditions of flood risk management and water availability affect other societal ambitions.

- The Delta Programme is already working on several fronts to strengthen the use of this approach: in 2022, on behalf of the Delta Programme, inspiring examples were collected of the use of a design-based approach. That resulted in a consistent set of principles for arriving at a solution in a concrete situation.[11] The partners of the Delta Programme can use those principles as a guide.
- The Delta Programme is a partner in Redesigning the Deltas (IHE): the development of a toolbox for design research.
- In the Sea Level Rise Knowledge Programme, conceptual perspectives were developed in a 'computing and drawing board' approach.
- The organisation of the NL2100 platform and also, for example, involvement in the National Spatial Policy Document and Mooi Nederland (Beautiful Netherlands).

2.3 Financial sector and climate adaptation: Netherlands AAA Climate-Resilient

The financial sector is showing increasing interest in the consequences of climate change for their customers and the risks to which banks and insurers may be exposed as a result, both nationally and internationally. The financial sector is therefore keen to be involved in thinking about the role the sector and the government play in making the Netherlands climate-resilient, and the measures and policies required for that purpose. In the area of climate adaptation, the government authorities themselves also face major challenges requiring sizeable investments. The government is therefore also very interested in how this agenda can be accelerated and intensified in collaboration with the financial sector. The government and financial sector must work together on a safe and climate-resilient Netherlands as an appealing place for people to work and new businesses to operate. In short, the financial sector is indispensable for climate adaptation, and vice-versa.

To give more shape and substance to this process, the Financial Sector Climate Adaptation Working Group was established in 2021 under the Sustainable Finance Platform of the Dutch National Bank (DNB). It brings together the financial sector, a number of ministries and the Delta Commissioner's staff. In late 2023, the working group produced its first exploratory report with recommendations for the sector itself and for government authorities. The report was presented to the Minister of Infrastructure and Water Management. In addition, the financial sector has produced a range of studies and reports, for example on the pricing of climate risks and the impact on, for example, the housing market.

Since 2023, the Delta Commissioner has been paying extra attention to the financial sector and issues relating to climate adaptation. During the Delta Congress in 2023, he launched the concept of 'Netherlands AAA Climate-Resilient' with the goal of establishing stronger connections between the financial sector and government authorities in this area, and together taking steps to ensure that the Netherlands remains 'AAA Resilient' (in a reference to the eponymous international credit ratings). Led by six Netherlands AAA Climate-Resilient Ambassadors from the public and financial sectors, a plan of action will be drawn up for this initiative in 2024.

In 2024, the government and the financial sector are also continuing to work on making the Netherlands climate-resilient. They are building on previous results and collaborating on a range of pilot projects, for example in

11 See Overzicht voorbeelden ontwerpgerichte benadering klimaatadaptatie, bodem en water sturen het landgebruik.

the area of climate-resilient building and improving the quality and availability of the data required. An active search is also being conducted into how the various action perspectives of government authorities and the financial sector can be used and what the effects will be.
A framework has been developed for this purpose that actively brings together administrators in the sector, the Climate Adaptation Financial Sector Working Group and the activities (national and international) of the government authorities. This approach also ensures consistency with relevant knowledge programmes such as Red&Blue and Resilient Delta.

2.4 Developments in national programmes, international rivers and water quality

2.4.1 National programmes

National Spatial Policy Document

The Netherlands is a small country with major spatial agendas that, almost without exception, affect the living environment. Examples include the work that has to be done in the areas of agriculture and nature, energy, economy and housing construction. Climate change also has an important effect on land use. The new National Spatial Policy Document will outline the integrated future perspective for spatial development for the Netherlands in the run-up to 2030 and 2050, and look ahead to 2100, including directions and decisions. After adoption, as the new national strategy for spatial planning and the environment, it will replace the NOVI from 2020 as the overarching framework for national policy relating to the living environment. In June 2024, the previous Dutch cabinet published the preliminary draft,[12] which succeeded the contour document published in October 2023 and is serving as the intermediate step for a definitive version after the draft memorandum. It sets out a broad basis that the national government, in close collaboration with provincial authorities, intends to use for dialogues about spatial decisions with municipal authorities, water authorities, society at large and various sectors. For a number of themes, the preliminary draft lists the choices that should be included in the National Spatial Policy Document. Among other things, it points out that continuing down the current road is not a solution. Were the Netherlands to do so, it would no longer be able to count on having enough energy, fresh water or housing. And there is simply not enough space to continue as we have in the past. Decisions are needed about how and where space will be made available, and for which purposes. The preliminary draft also indicates that, despite the effects of climate change, the Netherlands must remain safe and liveable in the longer term, with healthy soil and adequate amounts of clean water. The approach to the urgent agendas is taking a new direction by making spatial decisions that respond to a dynamic future. By matching land use to the water and soil system, the Netherlands will be more resilient to weather extremes. The water system and the approach are designed to be flexible and robust in order to cope better with increasing drought, and extreme or prolonged rainfall. Enough space, for example, will be maintained for the main water system in order to keep the Netherlands protected from high water and flooding.

In the context of the programme for the execution of the National Strategy on Spatial Planning and the Environment (NOVEX), which resulted from the NOVI, each provincial authority published a spatial proposal at the request of the previous cabinet. Those proposals elaborate the major spatial agendas that play a role at the national and regional levels for each province. On the basis of the proposals, the national and provincial authorities will work towards spatial arrangements that will include mutual agreements about the spatial agendas for each province. There is a strong interaction between the drafting of the spatial arrangements and the National Spatial Policy Document, with the former serving as an important basis for the latter.

National Programme for Rural Areas

In rural areas, the work on the agendas of the Delta Programme, the National Programme for Rural Areas (NPLG) and the Provincial Programmes for Rural Areas (PPLGs) can provide reciprocal support. The NPLG includes objectives for the themes of nature, water and climate. It sets out planning decisions that help to achieve these objectives. In that respect, it implements the principle of Water and Soil as Leading Factors.The national and regional authorities work together in the programme to achieve the objectives. The national government lays down

12 Parliamentary Paper 29435 no. 267

the frameworks and the provincial authorities elaborate them in PPLGs with the associated packages of measures. This involves an analysis of the water and soil system and the climate resilience of that system. The resulting description constitutes the basis for area processes and the direction of development for agriculture, new forests and nature, creating space for the water system, developing the sponginess of the areas further and establishing a priority sequence for using groundwater. Knowledge and information about the water system and existing consultation structures in the Delta Programme can be used to seek joint solutions for sustainable planning. In the NPLG, the peatlands, stream valleys and transitional areas are priority areas with an urgent agenda. The current area processes and implementation programmes in the Delta Programme can help to give implementation a flying start. In July 2023, the provincial authorities published initial versions of the PPLGs and the national government assessed them. New versions of the PPLGs and packages of measures will be made available in 2024. Collaboration between the programmes involves the risk that they may wait for each other to take action. Ensuring that this does not lead to delays is therefore an area requiring attention.

National climate adaptation strategy

In 2016, the National Climate Adaptation Strategy (NAS) was the Dutch response to the European Commission's call for all Member States to draw up a climate adaptation strategy by 2017 at the latest. The NAS looks at the agenda for climate adaptation in a range of policy areas such as the built environment, agriculture, nature and health care. This is in addition to the agendas of the Delta Programme for flood risk management, fresh water and spatial adaptation. The Interdepartmental NAS Consultation Platform and the NAS Directors Consultation Platform, both led by the Ministry of Infrastructure and Water Management, are currently evaluating the NAS in conjunction with the periodical evaluation of the Delta Programme.
In May 2024, the Netherlands Environmental Assessment Agency published the report 'Climate Risks in the Netherlands. The Current State of Affairs' (in Dutch). The report provides an overview of the new insights for all climate risks and the current consequences of climate change. The study shows that the Netherlands is already more likely to be affected by heat, drought and intense rainfall. The new NAS will be published in 2026.
This periodical evaluation includes the recommendations from the 2022 NAS evaluation, such as the concretisation of the objectives in the NAS, more intensive monitoring, and a stronger focus on the impact of climate change on people, culture and nature.

Infectious diseases

Projects involving water storage and green spaces must take infectious diseases into account. Water and green areas can become hotspots for bacteria, viruses and fungi, and for animals such as rats and mosquitoes that spread pathogens. It is important to manage those risks during projects or to limit contacts with people. More information can be found on the websites of the RIVM, the Climate Adaptation Knowledge Portal and Waterkwaliteitscheck.nl. Municipalities can contact the local health services in their region for specific advice about managing health risks associated with pathogens.

Programmatic Approach for the Main Water System

With the Programmatic Approach for the Main Water System (PAGW), the national government, with other government authorities and stakeholders, is working on the sustainable restoration and improvement of ecological water quality and nature in the main water system between now and 2050. That system includes the Wadden area, the IJsselmeer area, the Rhine-Meuse-Scheldt estuary and the river area. The aim of the PAGW is to take systemic measures to bring the main water system into a position that will allow it to attain the WFD and Natura 2000 objectives. In addition, the PAGW will use systemic measures to draw up a picture of *nature-based* solutions that can make sustainable contributions to the interests of, inter alia, the Delta Programme. To achieve these goals, the PAGW has engaged in a collaborative process with the Freshwater Delta Programme and the Flood Protection Programme (HWBP) to explore opportunities involving the

programmes and to shape joint action perspectives for the future. Resilient ecosystems provide opportunities for these programmes by, for example, helping to manage problems with excessive water (and water shortages) and helping with measures for freshwater storage. In collaboration with the PAGW, the HWBP aims to make dikes with soft edges and natural transitional areas that reduce erosion and allow biodiversity to improve. This is an example of a sustainable solution for the future that can be combined well with other interests in an area.

2.4.2 International rivers

Rivers do not stop at national borders. Upstream changes can have consequences downstream. The Rhine and Meuse rivers flow through several countries before joining the sea in the Netherlands. Insights into the effects of climate change, socio-economic developments and interventions in the upstream sections of these rivers are therefore extremely important.

Measures taken by neighbouring countries in and around their rivers can reduce, but also exacerbate, the challenges facing the Netherlands. What if our neighbouring countries start to retain as much water as possible in times of drought and less water reaches us? And what if high dikes are built upstream, leading to more water coming our way? This is why the Delta Programme has been reporting on progress on the development of catchment-wide river knowledge since 2022.

An overview of questions and the available knowledge was developed and split up into three tracks in 2024:

1. the functioning of major rivers now and in the future and from source to estuary;
2. the subsequent effects on functions and use; and
3. possible action perspectives.

This overview identifies the knowledge gaps and, on that basis, agreements can be made about how to address them. This will be done where possible in existing programmes, and particularly in the Integrated River Management (IRM) Programme and the Rivers Delta Programme. How international alliances can be used in this regard will also be investigated.

For the Rhine, Meuse, Scheldt and Ems catchments, the Netherlands already has long-standing alliances with its neighbouring countries in international river commissions.[13] Those commissions were charged with managing the international coordination and alignment of the implementation of the Flood Risk Directive and the Water Framework Directive (WFD). They are ideally placed to address catchment-wide issues on a collective basis for countries in the same catchment. The ICPR agreed to reduce the flood risk by 15% in 2024. In addition, the ICPR's working programme includes low water, partly in response to input from the Netherlands. That includes low-water monitoring and research into discharge scenarios in order to be in a position to adapt the climate adaptation strategy in the context of the international catchment. The IMC publishes a low-water report on a weekly basis, implementing one of the actions from this committee's plan of action for low water. To organise further collaboration in the river commissions, ways to strengthen involvement in international commissions are being explored, in part in relation to the Delta Programme. In addition, the Netherlands is committed to bilateral consultations with neighbouring countries about both the main rivers and the regional waters.

2.4.3 Water quality and the Delta Programme

The quality and quantity of surface water and groundwater in the Netherlands are under pressure. The water contains too many harmful substances. Water quantity and water quality are closely related. Clean water in the right quantities is indispensable for many ways of land use and in our daily lives. In dry periods, it has emerged that the less water, the higher the concentration of waste substances. In addition, there are problems with water quantity due to climate change and current land use, which leads to a lot of evaporation.

Examples from the field

Chapters 2 through 5 conclude with examples of regions which are working to cope differently with too much and too little water. The examples illustrate the shape that a cohesive approach to the agendas and their extensions to using space and spatial can take in practice.

13 Respectively, the International Commission for the Protection of the Rhine (ICPR), the International Meuse Commission (IMC), the International Scheldt Commission (ISC) and the International Coordination Group for the Ems.

Water quality in the Netherlands is not improving fast enough to comply with the WFD by the end of 2027. At present, more than three quarters of the water quality objectives have been achieved. In order to do everything possible to comply with the WFD in time, the national government and the relevant authorities launched the WFD stimulus programme in the spring of 2023. In addition to the quality of groundwater and surface water, the WFD also covers the quantity of groundwater. The groundwater levels in many nature areas do not comply with the requirements of the statutory conservation objectives. In the regional Delta Programmes of the IJsselmeer area and the Southwest Delta, agendas relating to ecology, flood risk management and water availability are addressed in an integrated way. The approach of the Freshwater Delta Programme focuses on restoring groundwater levels and high-quality sources of drinking water, and the yardstick and stress tests of the Delta Programme for Spatial Adaptation explicitly include biodiversity and water quality.

Given the increase in water shortages, whether or not to continue flushing water through the rivers to combat salinisation is another urgent issue that also emphatically interacts with water quantity and water quality. By contrast, water retention can combine well with improvements in water quality. Measures for climate-adaptive agriculture, climate-adaptive nature management and brook restoration in the same water system require the commitment of farmers, the general public and industry. Spatial planning is an important factor for quantity and quality. These domains are therefore closely related to one another at the regional level in the process of solving the puzzle of spatial arrangements. Specific intensive crops can be very demanding in terms of water availability and also have a major impact on water quality. The impact of this relationship on specific areas may make transitions necessary.

Water of adequate quality is an important basis for maintaining a good living and business climate in the Netherlands, now and in the future. Improving water quality is an entirely distinct policy area and, as such, it is not included in the Delta Programme's objectives. However, where possible, the Delta Programme raises the issue of, and supports, the need *and* the options for improving water quality because of the close relationship with water quantity.

Work in progress in the Delta

Schouwen-Duiveland living lab: action-based collaboration on freshwater innovations

Photo: Marcel Kentin

On the island of Schouwen-Duiveland, farmers depend on rainwater for their fresh water. Extreme dry periods have a major impact. Government authorities, farmers and knowledge organisations are therefore working together in a living lab to retain fresh water better and use the available water more efficiently. Water agendas and agriculture meet here. Meanwhile, the results are literally taking shape on the island. Small dams are being installed and innovative drainage systems are being built and monitored. Moreover, thanks to the living lab, more and more farmers are in a position to purchase machines for working the soil with minimal disturbance.

What is the strength of the living lab? A combination of action and learning. On the one hand, the focus in the collaboration is on action to put measures into practice. Concrete steps are being made to actually tackle the problems. On the other hand, a lot of practical knowledge is being acquired and shared with each other. Demonstration projects are providing an insight into the functionality of advanced drainage systems, their effect on fresh and salt groundwater, and the options provided by the subsurface to increase freshwater stocks. Studies are also being conducted to determine whether these systems are cost-effective in practice. There is also a focus on ways in which freshwater measures can be combined with upgrading soils, other agricultural methods and improving biodiversity.

With new knowledge and experience, advances are being made step by step. An exciting phase is now beginning. The Schouwen-Duiveland living lab does not fit in with the sectoral structures of policy, programmes and funding. The power of the alliance is now being harnessed to develop a programme for the years ahead. That programme will prolong the action-oriented alliance, seek to establish connections with other agendas and make the step from pilot projects to a new normal.

Chapter 3
Flood risk management

Dike upgrade in Zwolle. Photo: Jos van Alphen

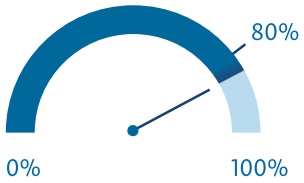
Flood risk management is about flood protection

Flooding from the sea, the large lakes and the large rivers

Overarching goal

By 2050, everyone will have the base level of protection. The likelihood of large groups of victims and major economic damage will therefore be very low.

We will achieve this with dike upgrades, coastal management and river widening.

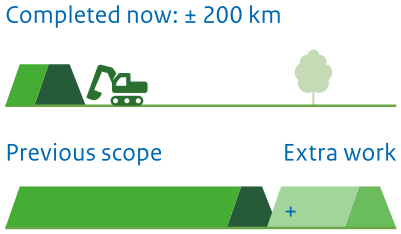


In 2020, 80% had the base protection level; by 2029 this will increase to 82%.

More dike upgrades

More dike upgrades will be needed until 2050. The pace has to pick up.

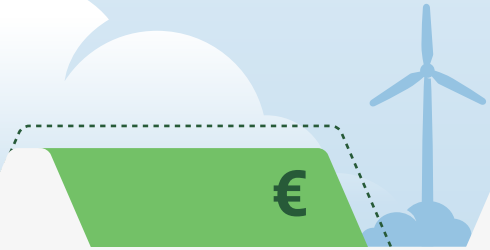
The assessment of the flood defences was completed in 2022: dike upgrades are needed in more places.



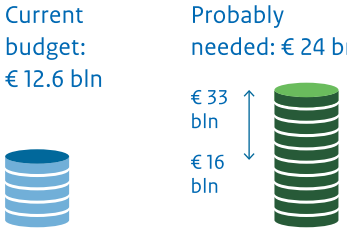
The previous scope was 1500km. An additional 500 km may now be required.

Higher costs

The dike upgrades required will cost more money than previously estimated.



More upgrades are needed and the implementation costs have increased.

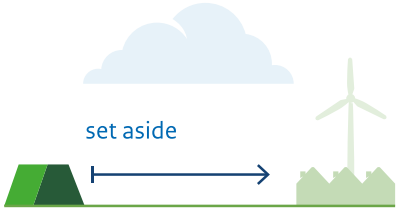


It is still very uncertain how high the costs will be. The additional costs will be known in 2025.

Setting space aside

We need to set aside more space for future dike upgrades.

For example, no new building in zones near dikes.



The space required for future dike upgrades varies from area to area.

The Delta Programme for Flood Risk Management contributes to the ambition of ensuring that the Netherlands will remain the best protected delta in the world. One goal is that everyone living behind a primary flood defence must have at least the base level of protection by 2050. The Flood Protection Programme (HWBP) and the National Flood Defences Programme are therefore upgrading the primary defences. The management authorities concerned estimate that the amount of work needed in terms of number of kilometres and euros between now and 2050 will be larger than thought at the outset of the Flood Protection Programme. The agenda will be defined more clearly in the years ahead. It is clear is that more dike upgrades will be needed and that the pace will have to pick up in order to attain the objective. The Delta Programme for Flood Risk Management is also looking further ahead. Space is needed around dikes for future dike upgrades. The partners will be making arrangements about how to address this issue.

3.1 Perspective for 2050 and later

Everyone in the Netherlands who lives behind a primary flood defence must have at least a base level of protection of 1 in 100,000 annually by 2050 at the latest. That means that the probability of a fatal casualty as a result of a flood must not exceed 0.001% per year. Extra protection will be provided in locations where there is a possibility of large numbers of fatal casualties, and/or substantial economic damage and/or serious damage due to the failure of vital and vulnerable infrastructure of national importance (such as the Borssele nuclear power plant).
To achieve this goal, new safety standards for primary flood defences (dikes, dunes and storm surge barriers) have been in place since 1 January 2017.

Towards 82% by 2029

Of the approximately 9 million people living behind a primary flood defence in our country, about 80% already had the base level of protection in 2020. The completion of dike upgrades will raise this percentage to 100% on the road to 2050. Many dike upgrades are in the planning stage; they will reach the operational stage in the years ahead. By 2029, the percentage of inhabitants with the base level of protection will have increased to about 82%.

3.2 Developments

National safety

Sixty-two percent of the primary flood defences do not yet comply with the standards that have been applicable since 2017. That is as expected because the standards are based on the conditions (such as the number of inhabitants and the economy) foreseen for 2050.
From the more detailed picture in the National Safety Assessment of Primary Defences 2023 and the Global Cost Estimate based on that assessment, it follows that the relevant authorities estimate that the work needed (in kilometres and euros) will be larger than thought at the outset of the Flood Protection Programme (HWBP).

The authorities responsible for managing the defences now estimate that approximately 2,000 km of dike upgrades will be needed and that the costs between now and 2050 will be between € 15.7 billion and € 32.9 billion, with a median of some € 24 billion. This is emphatically an estimate that still involves many uncertainties but it is clear that it represents a challenge. At the same time, implementation is currently lagging behind schedule. There is also 'under-utilisation' at present, while programming shows that there is a risk of a shortfall from 2031 onwards. The administrative agreement (BAW 2011) is that the contribution to the Flood Protection Programme by water authorities and the national government will not increase until 2028 and that there will be a review in 2023 to determine whether additional agreements are needed. In order to make it possible to update the agreements (including the financial agreements) from the BAW 2011 with respect to the Flood Protection Programme, a review will be conducted through to year-end 2025 to determine how a clear picture can be established of the work required and the costs, which policy decisions are relevant and which new agreements are necessary and possible.

3.3 Connections

Space for dikes, water defences and our coast

Enough space is needed around dikes, dams, dunes and water-defence structures for upgrade operations, even after 2050. Working with water authorities, provinces and municipalities, the Ministry of Infrastructure and Water Management is therefore updating the current earmarked zones around primary flood defences. In practice, there are differences in how different government authorities work with earmarked zones (which are also referred to as *profiles of free space*). The aim is that the update will make the approach to these zones more consistent and include the latest insights in the determination of their size, for example on the basis of the Sea Level Rise Knowledge Programme.

The objective of the administrative process initiated by the Ministry and umbrella organisations (the Union of Netherlands Municipalities, the Association of Provincial Authorities and the Union of Water Authorities) is to establish administrative agreements by year-end 2024 that the various government authorities will then anchor in their own policies. It is important, also during any expansion, to look at the earmarked zones in conjunction with other agendas in the living environment, such as nature and agriculture, the urban environment and cultural heritage.

No new construction in the riverbed

The regulations for building in the floodplains covered by the Major Rivers Policy (BGR) are being made stricter so that enough storage and discharge capacity will continue to be available for these rivers. In concrete terms, this also means that new construction in the flowing and storage areas of the riverbed will no longer be allowed. Room will be maintained for river-related activities such as rowing. The existing regulations for the demolition of existing buildings and rebuilding them will also continue to apply. Furthermore, the new regulations will not apply to advanced projects and those covered by administrative agreements with the national government. For the latter category, tailored solutions will be sought with the regional authorities that will include assessment on the basis of factors such as climate resilience, and pluvial and river flooding. The amendments to the BGR took effect in early April 2024. Their implementation in the spatial track in the Quality of the Living Environment Decree (BKL), the Activities in the Living Environment Decree (BAL) and the Environmental Regulation (OR) involves a longer lead time and completion will be in late 2025 or early 2026.

3.4 Delta Plan for Flood Risk Management

Flood protection programme

Progress and programming

The programme for the Flood Protection Programme (HWBP: the alliance of the water authorities and Rijkswaterstaat) for 2025-2036 can be found in Annex 1. The HWBP 2025-2036 draft programme lists 110 dike upgrade projects to be executed by water authorities. Together, they include 887 kilometres of dikes and 261 engineering structures. Sixty of the 110 projects in the programme have begun. This means that some 580 kilometres of dike upgrades are being implemented and have reached one of the project stages: exploration, planning or implementation. Between the start of the HWBP in 2014 and year-end 2023, 219 kilometres of dikes and 138 engineering structures were upgraded or declared safe.

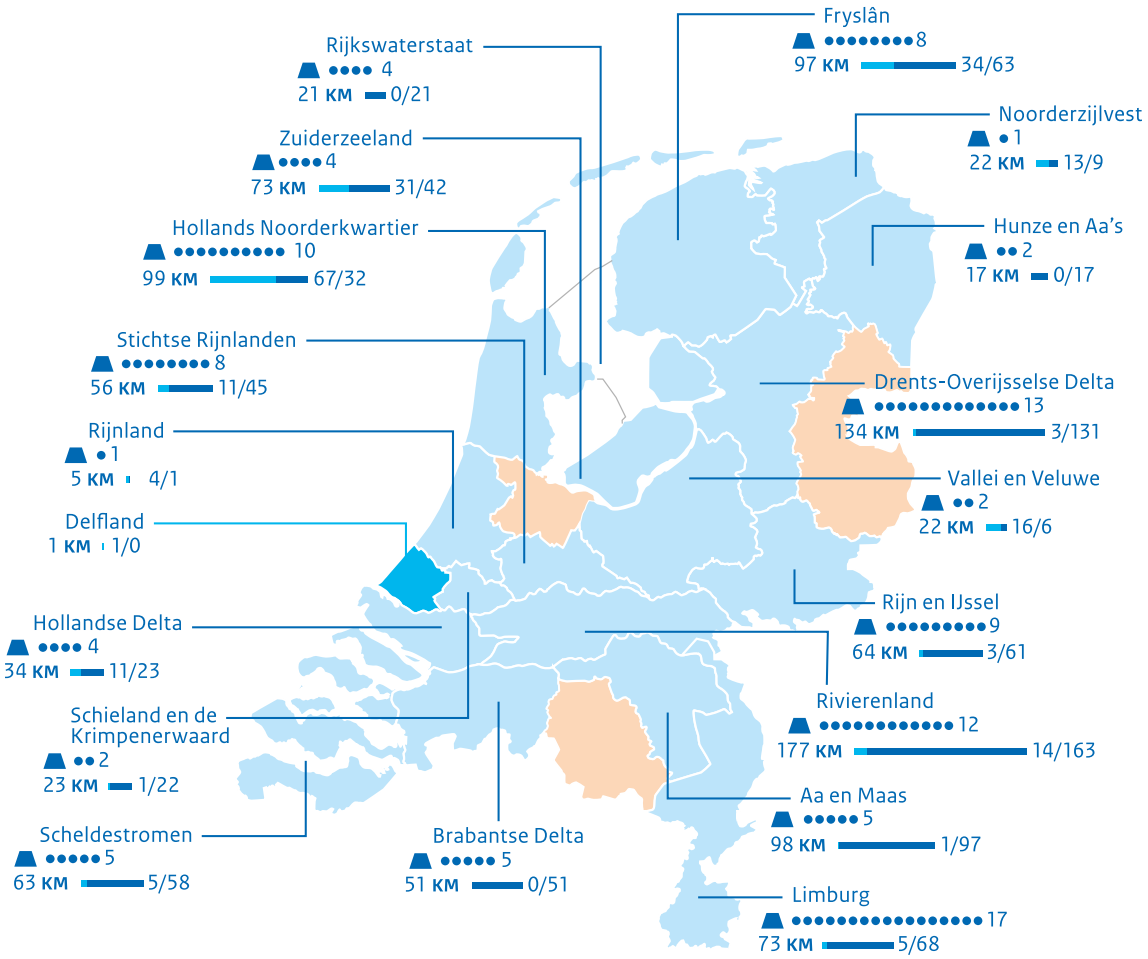
Signals and insights

The objective of the HWBP is, despite the work that can be seen in parts of the country, under increasing pressure. There are several reasons:

- More upgrade work will be needed than previously thought.
- There is a risk of a major financial shortfall for the programme as a whole, and that in the medium term.
- The pace of implementation continues to lag behind schedule and projects are becoming more complex, for example due to factors such as the locality.
- Exogenous risks, such as developments relating to nitrogen deposition.

In 2023, it became clear that the management authorities believe that more upgrade work will be required than previously thought (see Section 3.2 for figures). This increase was investigated as part of the 2023 National Safety Assessment of Primary Defences, which was drafted after the completion of the first National Flood Probability Assessment Round (LBO1) by the water authorities. The years ahead will be needed to establish a clearer picture of the actual upgrade agenda and, at the same time, to review the administrative and policy decisions relating to the HWBP.

Figure 1 Current status of HWBP projects as at 31-12-2023



Objective

All primary dikes, dams and dunes and engineering structures must meet the standard stipulated by the Water Act so that the inhabitants of the Netherlands are protected against high water.

Programme budget 14.6 billion

Programme estimate 24.1 billion

Dikes 2,000 km

Engineering structures 400

Financing of the programme

In the medium and long term, the cost developments in the projects and the expected overall upgrade agenda constitute an obstacle to the financing of the programme. The increasing complexity also plays a role here. In addition to price increases, more work will also be required to implement the agenda. The available data on cost developments still involve uncertainties and require further analysis (see also Section 3.2).

Impact of nitrogen measures on the Flood Protection Programme

To limit major impacts on the programme, the projects will also have to make agreements with other sources to cut nitrogen emissions (temporarily or otherwise), in an approach referred to as *external offsetting*. This means that a project must arrive at agreements with the provincial authorities and demonstrate that the temporary deposition of nitrogen by a project will at least not lead to any deterioration in the condition of nature or that nature will even be in a better condition after completion. At the request of the Flood Protection Programme (HWBP), the Minister of Infrastructure and Water Management is talking to the provincial authorities about permit procedures for this approach.

Innovations

Over the course of a decade, water authorities, Rijkswaterstaat, the market and knowledge institutes developed more than thirty innovations and new methods which can be used to save money, emissions and space. Each euro invested yields nearly € 3. An average of € 10 million a year is available for scaling-up and new innovation proposals. Innovation contributes to the pace, adaptability and feasibility of the HWBP. Examples can be found in the HWBP Knowledge & Innovation Portfolio.

Linking sustainability and spatial quality agendas

The HWBP is working on the implementation of the principle of Water and Soil as Leading Factors from the perspective of flood risk management. The HWBP projects can drive that process of concrete implementation at the regional level. Before the projects start, the HWBP is therefore seeking to establish connections with the Programmatic Approach for the Main Water System (PAGW), Integrated River Management (IRM), the Water Framework Directive (WFD) and the National Programme for Rural Areas (NPLG). The collaboration with PAGW in particular will produce potential solutions, including measures that can be put into place in the short term (see also Perspectief voor een veilige en natuurlijke Nederlandse Delta and pagw.nl/english. The approach here is based on water, soil, ecology and cultural history as leading factors, joint design and early reconnaissance at the regional level. It is already in place for the IJssel-Vecht delta. Another example is the HWBP Schiermonnikoog project, in which the long term and adaptation are being included in the design work for the preferred alternative for the dike (see the inset on page 45).

National water defences

The upgrade agenda for the primary national defences (excluding the storm surge barriers) can be completed before 2050 with the available budget. It includes the Oester Dam, connected earth bodies at the Ramspol and Maeslant storm surge barriers, the dune water defence on Ameland and six locks. The six storm surge barriers still comply with the standard at present but a substantial and growing backlog of major maintenance has developed. That has to be tackled in order to continue complying with the standard. Some 57 kilometres of the national water defences (mainly consisting of canal dikes) require upgrading. In order to meet the deadline of 1 January 2032, the elaboration of the plans must begin in 2024.

HBWP-2

The latest project in the Second Flood Protection Programme (HWBP-2; the predecessor to the current HWBP) is very much in the operational phase. This is the upgrade of the Markermeerdijk Hoorn-Edam-Amsterdam dike over a distance of 31 kilometres. The entire project is expected to be completed by late 2027.[14] At that time, HWBP-2 will have completed the upgrade of 362 kilometres in total.

14 More information can be found in the 25th progress report for HWBP-2. Parliamentary Paper 32698, no. 85

Work in progress in the Delta

Future-resilient Schiermonnikoog

Photo: Tineke Dijkstra

The primary water defence has to be upgraded on the island of Schiermonnikoog. This work will be done in the HWBP project Schiermonnikoog Dike and Dune Upgrade. Investments like these affect spatial planning in the future. The water and soil system is an important component underpinning the shaping of the island, now and in the future. Climate change is putting pressure on that system.

It is uncertain how much and how quickly the climate is changing. This very uncertainty makes it necessary to look ahead: what are the possible futures and how can we keep the space needed to adapt? To establish a clear picture, strategies have been described for Schiermonnikoog to keep the island liveable in the future as well in the context of climate change. The Fryslân water authority is working with the HWBP, the Ministry of Infrastructure and Water Management, and regional partners in the Delta Programme to bring this into focus. With national experts and specialists from the region and the island, and on the basis of bottlenecks and possible measures, three adaptive strategies have been outlined and elaborated in adaptation pathway maps. These strategies are linked to absolute sea level rise. This is the most dominant climate factor for Schiermonnikoog and it affects flood risk management and freshwater availability. On the basis of various KNMI climate scenarios, a timeline has been linked to the adaptive strategies.

The adaptive strategies result in a number of 'no-regret' measures that will work out well in the distant future in all cases. Some of these scenarios have been included in the preferred alternative for the Schiermonnikoog Dike and Dune Upgrade project.

Decisions will be made in consultation about which of the measures that are not linked to the Schiermonnikoog Dike and Dune Upgrade project will be implemented and, if so, who will do what and when. Here, it is advisable to conduct regular assessments of the various strategies and decide whether they still fit in with the expectations relating to the future at the time of those assessments. In this way, it will be possible to keep Schiermonnikoog resilient and sustainable now, in the years ahead and in the distant future.

Chapter 4
Fresh water

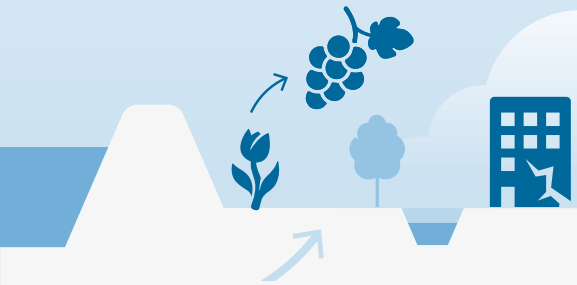
Delta Commissioner Co Verdaas on a working visit in Zeeland discussing freshwater availability and innovative water retention measures. May 2024. Photo: Marcel Kentin

The freshwater agenda is about resilience to water shortages

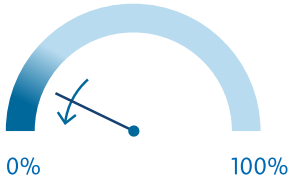
Coping with too little and too salty water

Overarching goal

The Netherlands will be resilient to water shortages by 2050.



We are working hard to achieve this but the work required is increasing in the meantime. On balance, we are behind schedule.

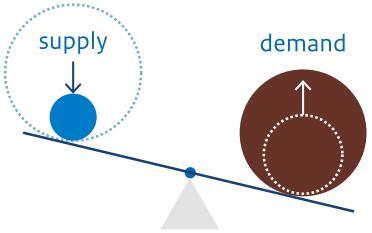


The objective is becoming increasingly difficult to achieve. The water system, land use and operations must change.

Even more frequent water shortages

The shortfall in freshwater increases dramatically in the summer.

The river influx falls, evaporation increases sharply and there is salinisation due to sea level rise.



Meanwhile, demand is actually increasing. Water shortages could increase by as much as 80% by 2100.

Be prepared

Increasingly, there is not enough fresh water for everyone. All sectors must be prepared for regular water shortages and more salinisation.

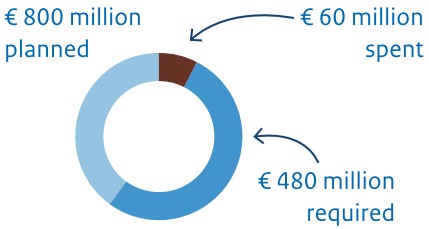
Water buffers and smart distribution will not help enough. More economical water use and transformations are also needed.

Governments must anticipate and set priorities (for example in the National Spatial Policy Document, Provincial Programmes for Rural Areas, Novex and the National Water Plan)

Maintain the pace

The pace of implementation is slowing. We have to keep moving.

More human resources are needed. As well as fast decisions about Provincial Programmes for Rural Areas.



Implementation is significantly behind schedule. 60% of the budget has been allocated, but only 8% has been spent.

The objective of the Freshwater Delta Decision is for the Netherlands to be resilient to water shortages by 2050. 'Resilient' means that we will have a healthy and balanced water system, that critical user functions will be protected and that water will be used carefully. It also means that users will be aware of, and able to cope with, freshwater shortages.

The climate is changing faster than expected. Water shortages have become an almost annual phenomenon, particularly in the High-Lying Areas with Sandy Soils. The measures taken by the national government and the freshwater regions to make the Netherlands resilient to freshwater shortages by 2050 have been set out in detail in the second phase of the Freshwater Delta Plan: 2022-2027. The pace of implementation of the agreed measures will have to pick up in order to address the growing challenges in time. All the partners will have to roll up their sleeves and not shy away from difficult decisions for the years after 2027. Freshwater shortages are an urgent reality. Postponement is not an option.

4.1 Perspective for 2050 and later

2024 delta scenarios

The outlook as 2050 approaches is cause for concern. The delta scenarios show that less water will be available in summer, while water demand will increase sharply, resulting in more frequent droughts and water shortages. In the driest scenario, an average summer in the future will be about as dry as an extremely dry summer now. The precipitation deficit in the 5% of driest years will be up to 200 mm larger than in 2018 and 2022. The average and seven-day lowest discharges in the Rhine and Meuse in the summer half-year will be 10 to 30% lower in 2100. Sea level rise will lead to the salinisation of groundwater and salt intrusion at sea entrances, reducing the availability of fresh water (and fresh groundwater) and causing more brackish seepage.
Freshwater demand will increase due to high temperatures (leading to additional evaporation and heat stress), population growth, economic growth and the intensification of land use. Evaporation will lead to a rise in the amount of water needed for managing water levels. Pushing back increasing salinisation will require larger quantities of water, which will not always be available everywhere because river discharges will not be adequate in the summer. Raising the water table in low-lying peatland areas to combat land subsidence and carbon emissions requires a lot of water. In addition, there will be more water consumers, such as large-scale hydrogen production plants.

Increasing freshwater challenge

In short, the freshwater agenda in the run-up to 2050 and 2100 is becoming much more challenging. If policy remains unchanged, the balance between water demand and supply in the summer half-year will be increasingly disturbed. As a result, water shortages will be more frequent in the summer, triggering the priority sequence and leading to bans on the extraction of groundwater and surface water. That will lead to social damage and disruption because it will not be possible to supply all sectors with water. In addition, lower river discharges and higher water temperatures will lead to problems with water quality.

Current freshwater strategy less sustainable in the long term

The delta scenarios show that the current freshwater strategy, as set out in the 2022-2027 National Water Programme (NWP), cannot be maintained as long as previously thought. Optimising the current water system is no longer an adequate strategy, which means that all sectors must adapt their water use to cope with drier and/or more saline conditions. This also means that some current functions will have to be moved. This confirms and intensifies the importance and urgency of putting the planning decisions from the Parliamentary Letter on Water and Soil as Leading Factors into practice and making a clear decision to stop passing on problems to other regions and future generations, and from the private to the public sphere. The required change in water management and land use must also be seen in the spatial plans developed nationally and in the regions. The urgency and

spatial consequences prompted the Minister of Infrastructure and Water Management to inform Parliament in a Letter to Parliament (May 2024),[15] which was also discussed in the Delta Programme Steering Group. The Delta Commissioner will present the re-evaluated delta decisions, including the freshwater strategy, in 2026. They will be included in 2027 in the 2028-2033 NWP and the regional water programmes.

4.2 Developments

Freshwater objectives

The Freshwater Delta Programme uses the 2024 delta scenarios to quantify bottlenecks in the main water system, in the freshwater regions and by sector in detail and over time, and to assess ambitions in terms of robustness and feasibility. In doing so, it is essential for the regions to state their future water needs and their plans to resolve bottlenecks effectively and in good time. The Freshwater Delta Programme will adopt concrete and realistic freshwater objectives in 2025, set out development pathways, develop measures and assess them in terms of achieving the objective for 2050 while looking ahead to 2100. The Climate-Resilient Freshwater Strategy for the Main Water System programme (KZH, part of the Freshwater Delta Programme) will describe the options at year-end 2025: to what extent and until when can the current optimised main water system meet freshwater demand from the different regions?

Discharge distribution in the rivers when water levels are low

In 2025 and 2026, the Freshwater Delta Programme and the Integrated River Management (IRM) Programme, in consultation with the relevant regional sub-programmes, will work on a proposal for the national discharge distribution of the rivers when water levels are low. Improved and sustainable discharge distribution at the bifurcations of the Rhine is an essential prerequisite in this respect. (See also Section 6.4.1.)

Well-founded decisions

In this way, the Freshwater Delta Programme provides a basis for the decisions in the re-evaluated Freshwater Delta Decision 2026. The Freshwater Delta Programme will also establish the definitive package of measures for the third phase of the Freshwater Delta Plan in 2026. It will run from 2028 to 2033. When assessing the strategy and measures, important criteria are the scope, social costs and benefits, and the principles set out in the Parliamentary Paper on Water and Soil as Leading Factors relating to not passing on problems.

4.3 Connections

A resilient and balanced water system should be the guiding principle for spatial planning. Water availability is an important pre-condition for agriculture, the urbanisation agenda, energy and drinking water supplies. For nature, hydrological restoration is a boundary condition. The restoration of water storage areas and wet conditions from the past can combine freshwater objectives with spatial quality.

The Freshwater Delta Programme is seeking intensive national and regional coordination with, inter alia, the National Spatial Policy Document, the Provincial Programmes for Rural Areas (PPLGs), the Main Energy Structure Programme (PEH) and the regional Delta Programmes such as those for the IJsselmeer area and Southwest Delta. Particular attention is being paid to the connection with the Delta Programme for Spatial Adaptation, for example in the new generation of stress tests, which assess problems with too much and too little water in conjunction. That is because measures to manage water shortages by retaining water may exacerbate the risk of problems with excessive water. In the case of measures in the main water system, the Freshwater Delta Programme is seeking synergy between the agendas for fresh water, problems with excessive water and accessibility through the main waterway network.

Increasing salinisation

The Sea Level Rise Knowledge Programme has shown that sea locks lead to increased salinisation. The Freshwater Delta Programme aims to reduce salt intrusion as much as possible during the construction, replacement or renovation of sea locks (such as those in the Afsluitdijk and at Delfzijl). That is good for freshwater availability and it reduces the restrictions on opening locks for shipping. However, the knowledge programme has also shown that these optimisation measures are not adequate and that coastal areas must take increasing salinisation into account.

15 Parliamentary Paper 27625 no. 669

Retaining and saving water

The large-scale raising of the water table in low-lying peatland areas to reduce land subsidence and carbon emissions puts additional pressure on freshwater availability. This may have consequences for other areas and sectors, intensifying the urgency of local water retention and a more stringent regulation of extraction. In areas without incoming water or areas that rely on rainwater such as the High-Lying Areas with Sandy Soils, and the Wadden and Zeeland islands, the problem is already acute. Measures to increase water supplies are impossible here, and the natural buffering capacity of the subsurface must be restored and groundwater levels raised. This means that more measures will be required in addition to those in the Freshwater Delta Plan. A transformation is needed to establish future-resilient land use that is tailored to natural variations in groundwater levels, and salinity conditions where applicable. Water demand will have to be reduced by all sectors, including society at large and major consumers.

4.4 Freshwater Delta Plan

The national government and the freshwater regions are continuing to work on the Freshwater Delta Plan. They are doing this in phases. The first phase was from 2015 to 2021, the second phase is from 2022 to 2027, and the third will be from 2028 to 2033.

First phase: completion of final projects

Two large, complex projects from the first phase of the Freshwater Delta Plan are still in progress. They involve the strengthening of the Frisian IJsselmeer coast and the inflow from the Noordervaart. These projects will be completed no later than 2027.

Second phase: completion slower than planned

The measures from the second phase of the Freshwater Delta Plan amount to about € 800 million and they are in full swing. In 2022 and 2023, the national government and regions used about 62% of the programme budget. However, completion is proceeding slower than planned. Although a number of projects will start on schedule in 2024 as soon as regional co-financing is in place, the scope of other projects is being revised as a result of recently completed studies. In addition, a number of projects are facing delays due to complex land acquisition and permit procedures. The execution of some large, complex projects, such as measures to combat salinisation in Den Oever, will also continue after 2027. Other concerns include additional costs due to inflation and pressure on planning due to shortages in the labour market, as well as uncertainties about the outcomes of the PPLG area processes.

The regions and Rijkswaterstaat are exploring options for additional funding, the adaptation of measures and phasing, with some of the measures possibly being carried forward to the third phase of the Freshwater Delta Plan. For more information, see Annex 2 and the DPZW 2023 Progress Report (Background Document C).

Preparations for third phase: tough choices

The regions are facing tough choices. A new start is needed in the elaboration of concrete regional goals for the third phase of the Freshwater Delta Plan. This will require an intensification of administrative and official capacity and decisiveness in 2025, and later during the implementation of the agreements.

Work in progress in the Delta

The climate already requires changes in farming

Photo: Marcel Kentin

Gillis Klompe is an eighth-generation arable farmer on the island of Schouwen. The ninth generation is being trained in Wageningen and Den Bosch. For Gillis, climate change is not something from a model or stress test, but a daily reality on his farm for years. More than a decade ago, he was forced to conclude that the risk exposure for growing bulbs was too high because of the inadequate availability of fresh water. As an entrepreneur, he started trying out other crops: first Brussel sprouts and then beans and potatoes. Increasingly wet winters and dry summers challenged him to take steps to enhance the robustness of his business further in order to safeguard adequate yields.

He is therefore working actively on restoring the vitality of the soil by working it with minimal disturbance, and using less pesticides and a regenerative approach where possible. During that process, he runs into all kinds of difficulties for which he finds solutions on the basis of creativity and his relationship with the land.

For Gillis, responding to adapting to climate change is not a future scenario but a daily reality that he tackles with entrepreneurship, and dedication to his land and business. His business has proven for generations that it is able to adapt. He also needs clear and consistent policies from government authorities to achieve that. With a vision for the future and transparency about water availability to provide prospects for the ninth and tenth generations.

Chapter 5
Spatial adaptation

Facade Gardens in Rotterdam Noord, September 2020. Photo: Tineke Dijkstra

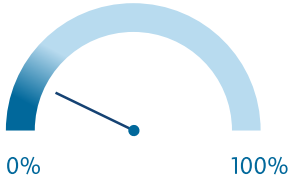
Spatial adaptation is about climate-resilient spatial planning

Resilience to damage as a result of problems with surplus water, drought, heat and the effects of flooding

Overarching goal

The Netherlands will be climate-resilient by 2050.

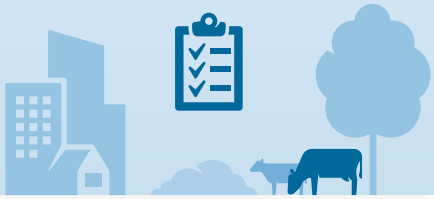
Measures to deal with problems with surplus water, heat, drought and flooding are being implemented everywhere.



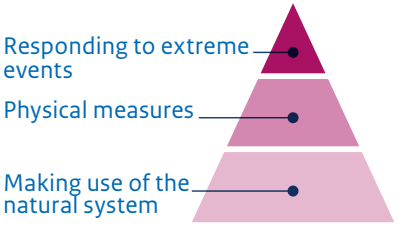
It is difficult to determine the level of climate resilience in planning at present. What is certain is that we are only at the beginning.

Substantive goals

We will give climate-resilient planning a boost with substantive goals and frameworks.



For climate-resilient planning, we must work on three levels:

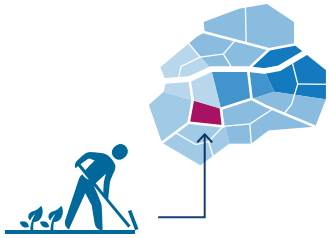


There will be concrete objectives for these three levels. That also helps to monitor how climate-resilient we are.

Everyone in action

Many more parties need to act: the financial sector, corporations, vital networks (energy, drinking water, telecom), local residents etc.

We all have a responsibility to make the Netherlands climate-resilient and more attractive.

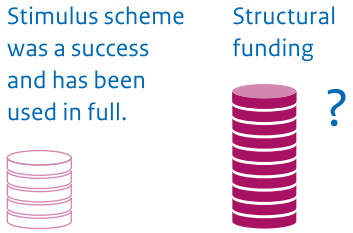


Pioneers show that working together to improve your own locality generates energy.

Anchoring

A range of studies have shown that making the Netherlands climate-resilient is going to cost tens of billions.

The costs are offset by even greater benefits: society is the winner.



We are now going to explore the sructural embedding of spatial adaptation including governance and financing.

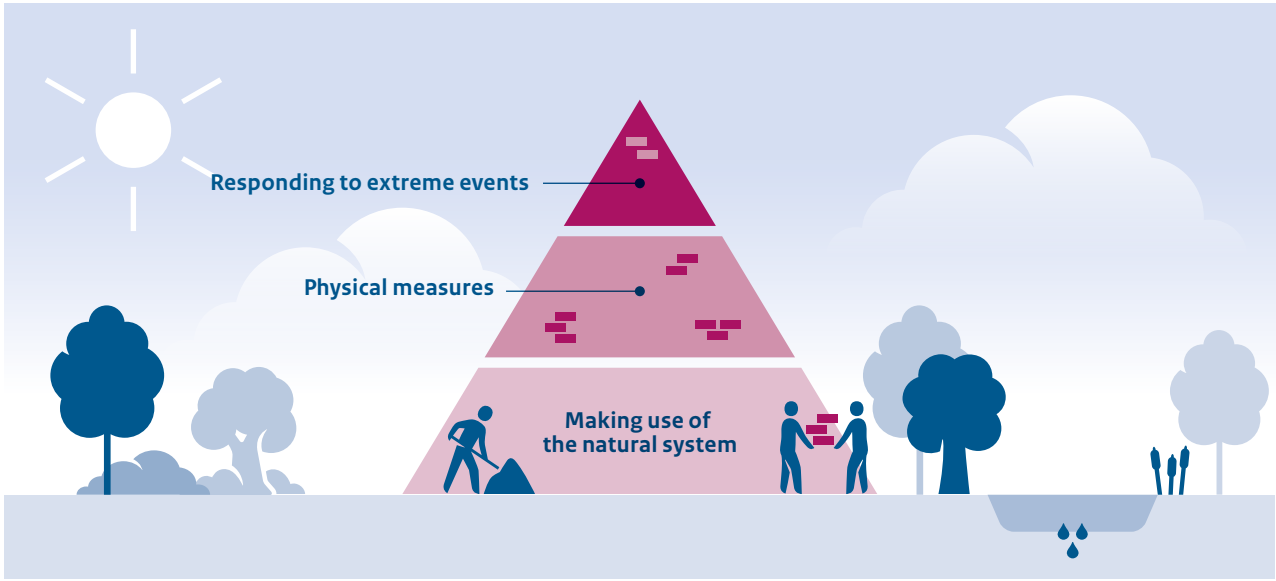
Municipal and provincial authorities, water authorities and the national government are using the Delta Plan for Spatial Adaptation to work on climate-resilient and water-robust planning for the Netherlands. A non-committal approach to spatial adaptation is no longer an option. Anchoring goals with the associated funding will be needed to fulfil the ambition for 2050. Frameworks for activities such as climate-adaptive building are being developed at the national level, and the principle of Water and Soil as Leading Factors is being worked up into, among other things, a spatial assessment framework for location selection. A new cycle began in 2024 for the Delta Programme for Spatial Adaptation, with updates to guidelines, stress tests, risk dialogues and implementation agendas. That is very much needed given the increasing impact of weather extremes.[16]

5.1 Perspective for 2050 and later

The ambition of the Delta Programme for Spatial Adaptation (DPRA) is that, by 2050, the Netherlands should be resilient to heat, water shortages and problems with excessive water, and the effects of flooding. Increasingly, the 45 working regions of the DPRA , network organisations and private parties are also turning their attention to the time horizon of 2100. The KNMI'23 climate scenarios, which are reflected in updates to maps from the Climate Impact Atlas, are important for the DPRA.

The results of the Sea Level Rise Knowledge Programme, the supra-regional stress tests for problems with excessive water and studies of water availability during dry periods show that it is important to start earmarking space now for things like water storage.
The DPRA is introducing more depth to its approach in three areas: formulating objectives in concrete terms, monitoring the progress of climate adaptation and structural financing for measures. Linking an integrated approach and agendas is still the guiding principle here. The goals are elaborated using three layers from the adaptation pyramid: the natural system is leading, adapt spatial planning as best as possible and be prepared for crisis situations.

Figure 2 The adaptation pyramid. Source: Climate Adaptation Services (CAS) in cooperation with Vallei and Veluwe Climate-Resilient and Delfland Klimaatkrachtig



16 See background document D: Progress Report on Spatial Adaptation for 2023 for more information about the progress made by the Delta Programme for Spatial Adaptation in 2023 (in Dutch).

5.2 Developments

Temporary Stimulus Scheme for Climate Adaptation

On 31 December 2023, the application period ended for co-financing from the Temporary Stimulus Scheme for Climate Adaptation. The national government made € 200 million available for co-financing from the Delta Fund. The region matched that with at least € 400 million. This scheme has helped to make many projects possible. The available national budget has been used almost in its entirety. Climate adaptation measures can be implemented until year-end 2027. Before 1 July 2025, the Stimulus Scheme for Climate Adaptation will be evaluated in accordance with the agreement with the Dutch House of Representatives.

DPRA working groups

In preparation for the post-2027 period, the DPRA set up several new working groups in 2023-2024. They are working in a coordinated way to develop the programme further. Until now, the DPRA had process goals only. In preparation for the periodical evaluation, the DPRA is active at the working region level to formulate substantive objectives in concrete terms.
A working group is updating the standardised Stress Test Instructions for stress tests. The Regional Climate Adaptation Monitor working group is targeting support for regional monitoring. The Dialogue working group is reviewing the existing Risk Dialogue Roadmap, which addresses the connections with the DPRA stress tests and supra-regional stress tests. The Structural Funding Working Group is conducting a parallel study of options for the structural safeguarding of spatial adaptation, including governance and funding.

Pluvial and River Flooding Policy Platform: supra-regional stress tests for pluvial flooding and risk dialogues

After the floods in Limburg in 2021, the Pluvial and River Flooding Policy Platform drafted recommendations targeting multi-layer risk management (until now usually referred to as 'multi-layer safety') to reduce the impact of extreme or prolonged rainfall. In addition to focusing on prevention through measures in the water system, it is also essential to look at spatial solutions to reduce the impact. The link with the work of the DPRA is obvious here. In line with the recommendations of the policy platform, supra-regional stress tests for problems with pluvial flooding will also be conducted from 2024 onwards in addition to the existing local and regional DPRA stress tests. They should provide a clearer national picture of the risks associated with large-scale extreme precipitation events and the possible cascade effects. This will therefore be at a higher level than the one targeted by the DPRA until now. The insights generated by stress tests at both levels will be combined in risk dialogues in the DPRA. All the climate impacts (problems with excessive water, dry periods, heat, damage caused by flooding) must be considered in conjunction to determine whether spatial choices and measures are needed, and which possible solutions are available.

Water and Soil as Leading Factors

The parliamentary letter on Water and Soil as Leading Factors is an important policy framework for the DPRA. The elaboration of one of the planning decisions led to the Spatial Assessment Framework for a Climate-Adaptive Built Environment. This will allow local government authorities to make an assessment of what is needed for climate-resilient location selection for different functions. In combination with the National Yardstick, they can describe what climate-resilient and water-robust building means. An example of regional elaboration is the spatial assessment framework of the Noord-Brabant provincial authority for the Stedelijk-Brabant NOVEX (see insert). Inclusion in the spatial proposals and Provincial Programmes for Rural Areas (PPLGs) of the provincial authorities is needed for the purposes of climate-resilient spatial planning for both the built environment and rural areas, and their coordination.

5.3 Connections

Relationship with Freshwater Delta Programme

In the spatial domain, the themes of drought and flooding require intensive collaboration with the Freshwater Delta Programme. The programmes conduct joint discussions, for example about drought, the importance of water balances for urban areas, the approach to peatland areas and the formulation of goals from both subprogrammes in concrete terms. The programmes work together to open up knowledge and develop new knowledge, as in the NWA programme Drought in the Built Environment.

Relationship with Delta Programme for Flood Risk Management
The DPRA also looks at the agenda for mitigating the consequences of floods. It looks at what spatial measures are needed to reduce the 'residual risk' of flooding. These are important factors for the risk dialogues conducted as part of the cyclical DPRA approach.

National Adaptation Strategy
The DPRA provided input for the National Climate Adaptation Implementation Programme (NUPKA), which was published in 2023. A review will begin in 2024 of the National Adaptation Strategy (NAS), in which new policy goals and instruments will be developed that are relevant for spatial adaptation, for example to tackle heat stress and focus on equity (see Section 2.4.1. for more information).

National approach to Climate Adaptation in the Built Environment
The Ministries of the Interior and Kingdom Relations (BZK), Infrastructure and Water Management (I&W) and Agriculture, Nature and Fisheries (LNV) published the National Approach to Climate Adaptation in the Built Environment in 2022. The aim is to establish an inter-administrative national approach based on this document starting in 2026. Work began in this respect in 2023. This process takes the step to making goals concrete. In 2023, it was decided to align these goals with those of the DPRA. As part of this national approach, a study was conducted with the Union of Netherlands Municipalities looking at the progress made on climate adaptation in the built environment at the municipal level.

National Spatial Policy Document
The National Spatial Policy Document is a national strategy for spatial planning and the environment. It is important for the DPRA in view of the guiding decisions for spatial planning, particularly on the basis of the principle of Water and Soil as Leading Factors and the earmarking of space for climate-adaptive measures. The aim is for the contents of the National Spatial Policy Document to be included in national and regional policy decisions.

Dutch Caribbean
A separate climate adaptation approach is being developed in climate platforms for the three Caribbean islands of Bonaire, Sint Eustatius and Saba. The DPRA provides input about the approach where possible. A first version of the Climate Impact Atlas has been developed for these islands. The Climate Adaptation Knowledge Portal contains climate information about the Dutch Caribbean.

Financial sector
The financial sector is doing more to draw the attention of the customers of banks and insurers to climate risks. In addition to the risk assessments, an exploration is being conducted of how to finance the adaptation agendas and the role of the private sector in that respect (see also Section 2.3). The DPRA is involved in this work and is seeking to establish connections between these initiatives and the question of structural financing for climate adaptation, and how the financial sector can contribute to climate-resilient spatial planning for the Netherlands.

Vital functions and networks
The DPRA pays considerable attention to making vital processes and networks climate-resilient at the local and regional scales.[17] Any failure or disruption of these functions can involve significant risks for society. The Ministry of I&W is working at the national level with, among others, the National Coordinator for Counterterrorism and Security and other departments on legislation and regulations to increase the resilience to climate risks of vital processes and networks. In addition, concrete goals are being developed for climate adaptation in the networks managed by Rijkswaterstaat and ProRail, as is the financial basis for the measures required.

5.4 Delta Plan for Spatial Adaptation

The Delta Plan for Spatial Adaptation includes seven ambitions that, in combination, provide direction in phases for a climate-resilient and water-robust Netherlands by 2050. A new cycle will begin in 2024-2025. It will include adding to or renewing implementation agendas with climate adaptation measures.

1, 2 and 3: Stress tests, risk dialogues/determining ambitions and implementation agendas
2024 is the year in which preparations will be made for new or in-depth stress tests. The Stress Tests working group is updating the standardised Stress Test Instructions. The Stress Test Assessment Framework helps the working regions to determine which parts of the stress test require updating. The Stress Tests Monitoring Map

17 See https://www.nctv.nl/onderwerpen/vitale-infrastructuur/overzicht-vitale-processen for an overview of vital processes.

provides an overview of stress tests conducted at the municipality, water authority, working region and provincial levels. In addition, a guideline for supra-regional stress tests is available and a guideline is being developed for risk dialogues in 2024-2025. First of all, risk dialogues provide the momentum to define a joint ambition that will then be anchored in strategic policy. Stress tests are indispensable for determining ambitions and the measures needed to achieve them. On the basis of a nationally developed, substantive, framework, the working regions can establish concrete, substantive, regional objectives that can also be monitored. On that basis, it is possible to determine which measures should be programmed. The Monitoring map for strategies and implementation agendas shows which municipalities, water authorities, working regions and provinces have already drawn up an adaptation strategy and/or implementation agenda.

4: Exploiting synergy opportunities

The DPRA is looking at how it will be possible to make the most of synergy opportunities involving, for example, spatial arrangements, housing deals, the energy transition and connections with the approach to the water, climate and nature agenda (NPLG). In addition to synergy, the aim is for spatial adaptation to be integrated in every spatial plan and every investment: every new development should be climate-adaptive. The DPRA is also actively seeking to establish connections with developments and investments in vital and vulnerable functions such as energy, health care and the chemical industry.

5: Encourage and facilitate

The national government is encouraging climate adaptation through the Temporary Stimulus Scheme for Climate Adaptation. In addition, a range of campaigns, such as a national competition for removing paving stones, are encouraging local residents to make their immediate living environment climate-resilient.
The national government is also facilitating knowledge initiatives. Important support is provided in this respect by the Climate Adaptation Knowledge Portal, the Climate Impact Atlas and the Green-Blue Networks Knowledge Base. The rapidly increasing visitor numbers demonstrate that more and more people are finding their way to these important sources of information: not only professionals working for government, business and stakeholder organisations, but also teachers, students and residents. A knowledge base that connects the themes of climate adaptation, biodiversity, vital soil and health is also being linked to the Knowledge Portal. The Ministries of Infrastructure and Water Management, of the Interior, of Agriculture, Fisheries, Food Security and Nature, and of Health, Welfare and Sport are working together on this initiative. The Climate Impact Atlas also led to the national Climate Risk Scan for Dutch Heritage.
New maps are regularly added to the Climate Impact Atlas, such as Social vulnerability to heat, the Base Map for the Natural System in the Netherlands, a practical interactive map for the application of Water and Soil as Leading Factors, and the Neighbourhood Dashboard. The Climate Impact Atlas will be updated starting in 2024 with the KNMI'23 climate scenarios so that it will be fully updated for a new round of climate stress tests.

6: Regulation and embedding

The DPRA is calling on working regions to start work now wherever possible on including the National Yardstick for a green, climate-adaptive, built environment in their work. In addition, the national government is looking at whether, and how, the National Yardstick can be enshrined in law at the national level. The DPRA is seeking to include administrative agreements about the enshrinement of the Yardstick in the periodical evaluation of the Delta Programme. The consequences for regulations also apply to the standards for work processes that the Consultation Platform for Climate Adaptation Standards (OSKA) wishes to establish. In addition, the updated Guideline for local regulations for climate-adaptive and nature-inclusive construction, planning and management is available.

7: Emergencies

Adequate emergency response continues to be crucial at all times. This factor is also considered when developing substantive objectives. In addition, the safety regions are becoming more closely involved in the work of the DPRA. They have an active role in supra-regional stress tests and they are increasingly including climate adaptation in their risk profiles. Municipal health services are becoming more and more important interlocutors in the DPRA processes because of the potential impact that climate change has on health. They are involved more and more often as partners in the working regions. For example, the Midden-Gelderland municipal health service is an active partner in the LIFE IP Climate Adaptation programme with the aim of anchoring health more strongly in climate adaptation policies.

Work in progress in the Delta

The water and soil system as a basis for urbanisation

In the Noord-Brabant Urbanisation Strategy, Water and Soil as Leading Factors is one of the five development principles. A water signalling map has been developed to put it into practice. The map shows whether an area is suitable for urban expansion from the perspective of the water system. This involves the use of three indicators: flood risk management, problems with excessive water and space for a robust water system (water storage and water storage areas). Planned expansion locations are compared with the water signalling map and are labelled red (not suitable), orange (limited suitability) or green (suitable for consideration).
Four impact tests were conducted in the first six months of 2023 to see whether the water signalling map can be used in practice. They involved specific expansion locations in Helmond, Hilvarenbeek, Moerdijk and Oss. These four locations adequately reflect the diversity of the Brabant landscape and its specific problems.
The impact tests show that the map works as it is meant to. It provides a clear warning in advance: where is safe and reliable construction possible? This makes it possible to anticipate bottlenecks and research questions in decision-making relating to site selection and the design agenda.
The map also raises awareness that actual construction in designated expansion locations is not a given. As a result, water issues are firmly anchored in discussions, providing opportunities to involve them in the early stages of decision-making.

The water signalling map has been given a legal position in the provincial environmental regulations in the form of instructions issued to municipal authorities. In addition, the water signalling map is included in the procedures of water authorities for the assessment of interests related to water.
Following the successful impact tests, the water signalling map is being extended for use as a water and soil signalling map. Where necessary, the map will be supplemented with new indicators and updated on the basis of the KNMI'23 climate scenarios.

Go to klimaatadaptatiebrabant.nl for more information about the water signalling map.

Chapter 6

Progress by area

Wadden area near Terschelling, Photo: Mischa Keijser.

What will have to change to achieve the goal?

Work on the agendas of flood risk management, fresh water and spatial adaptation is located in the areas of the Delta Programme. The parties here look for measures that fit in with the established preferred strategy for the area. Increasingly erratic weather and accelerating sea level rise add to the challenges. The periodical evaluation of the Delta Programme in 2026 will lead to changes in the preferred strategies. The areas will take the new delta scenarios and the outcomes of the Sea Level Rise Knowledge Programme into consideration here. This page shows the initial insights for each area.

Coast

Coastal maintenance with sand nourishment would seem to be feasible, even with more sea level rise; implementation does require attention.

Central Holland

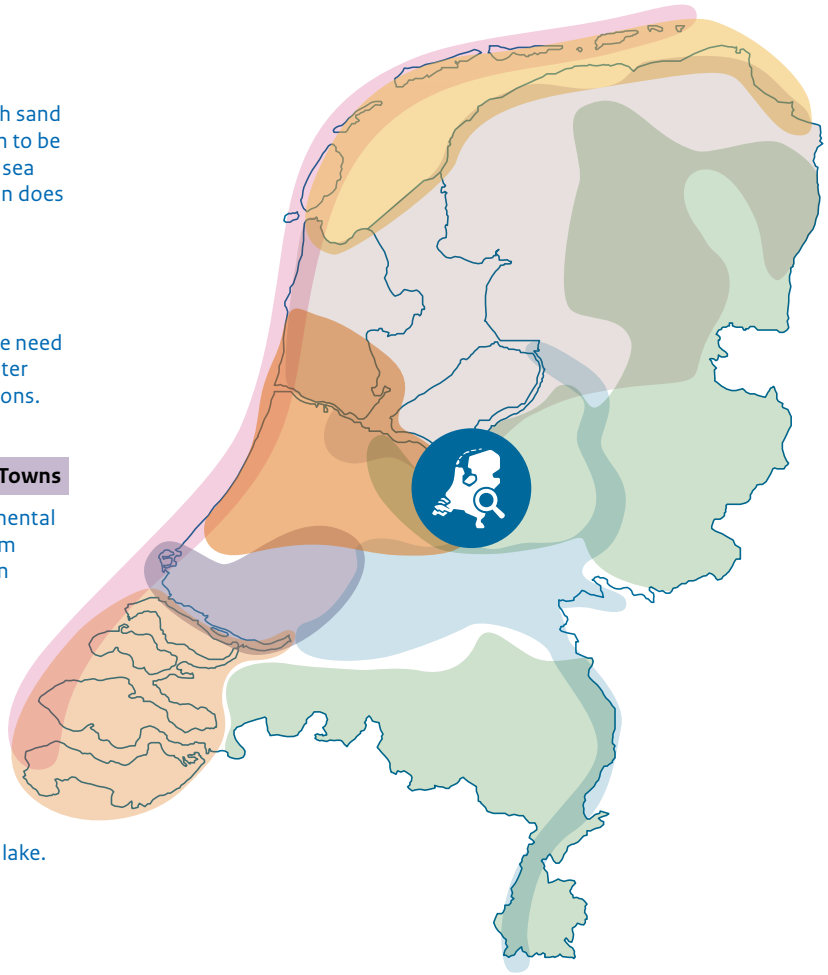
We are *too* vulnerable. We need pumping stations *and* water storage *and* spatial decisions.

Rhine Estuary - Drecht Towns

We are preparing fundamental decisions about long-term flood risk management in conjunction with nature and fresh water.

Southwest Delta

In an area process, we are optimising the freshwater function and ecological quality of the Volkerak-Zoommeer lake.



Wadden area

Work on flood risk management landscapes, and identify combinations with spatial adaptation and fresh water.

IJsselmeer area

New climate scenarios: *either* more pumping *or* a rise in water levels with consequences for dikes, nature and user functions.

High-Lying Areas with Sandy Soils

Commit to the societal and administrative willingness to make genuine change: without transitions, we will not be resilient.

Rhine and Meuse

In 2050, we will not be able to serve all functions equally well; choices are needed: for example with respect to freshwater distribution, the type of nature and the type of shipping.

What is needed for sustainable water-robust planning?

The water agendas are becoming increasingly interwoven with other spatial agendas, for example in the areas of housing construction, agriculture and nature. Problems with surplus water, water shortages and flood protection can no longer be solved in the water domain alone. Spatial planning must be more in line with what the water and soil system can handle. That is the essence of Water and Soil as Leading Factors. This plays a role in all areas.

Coast

Attention should be given to combining spatial agendas with flood risk management agendas.

Central Holland

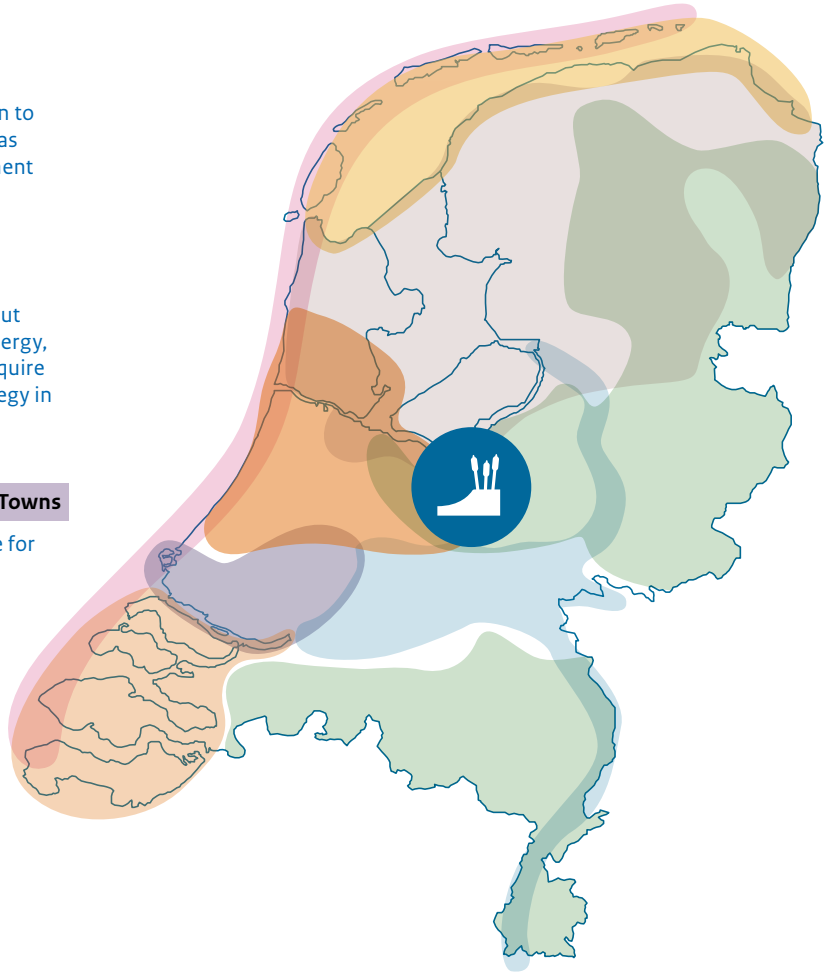
Long-term decisions about housing construction, energy, peatland and the port require a shared vision and strategy in the short term.

Rhine Estuary - Drecht Towns

We are earmarking space for dike upgrades.

Southwest Delta

Climate-resilient land use requires tailored approaches for each subarea for a connected delta with a mosaic of water and land uses.



Wadden area

Look in an integrated way at flood risk management and problems with surplus water for the main water system and the regional water system.

IJsselmeer area

More space is needed for fresh water.

High-Lying Areas with Sandy Soils

Land users must prepare for water shortages. This means knowing how much water will be available in the long term.

Rhine and Meuse

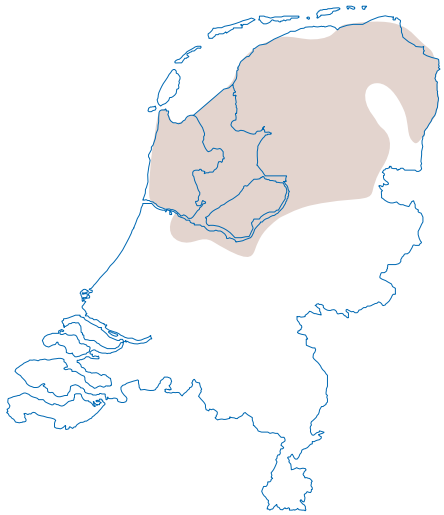
In time, more space will be needed behind the dikes for flood risk management and water availability, in combination with water-related functions.

6.1 Introduction

The partners in the Delta Programme are working in separate areas to implement the preferred strategy for the three agendas of the Delta Programme: flood risk management, fresh water and spatial adaptation. This chapter describes the progress that has been made. The extension of the agendas due to more erratic weather, the accelerating sea level rise, increasing salinisation, larger freshwater shortages and more problems with excessive water only adds to the challenges facing the areas. Every effort must be made to achieve the set targets by 2050. The figure 'Implementation in the areas | Periodical evaluation' on page 61 shows what is already required in terms of changes in the approach from the various government authorities and the insights produced by the areas, now and also after 2050. What is needed to further elaborate the principles of Water and Soil as Leading Factors and achieve sustainable water-robust planning for the area can be seen in the figure 'Implementation in the Areas | Water and Soil as Leading Factors' on page 62.

The agendas for fresh water are implemented through the freshwater regions; the spatial adaptation agendas are implemented through the working regions. The demarcation of these areas varies in some respects from that for flood risk management. Progress in the Western Netherlands freshwater region is described in Section 6.4 under Rhine Estuary-Drecht Towns.

6.2 IJsselmeer area



New climate scenarios: *either* more pumping *or* a rise in water levels with consequences for dikes, nature and user functions.

More space is needed for fresh water.

Flood risk management and freshwater availability, along with healthy aquatic ecosystems, a dynamic economy and a world-class landscape, are essential for the Blue Heart of the Netherlands. Water and spatial agendas cannot be viewed separately: water connects the locations of Almere and Drenthe, and drinking water to shipping. The IJsselmeer Delta Programme is therefore working with numerous parties on integrated assessments for both the present and the future of the IJsselmeer area.

6.2.1 Perspective for 2050 and later

Flood risk management and discharge capacity

To drain away enough water, Rijkswaterstaat is building new discharge sluices and pumping stations in the Afsluitdijk barrier dam. They are expected to be completed by 2026 and they have been designed to maintain the winter level until at least 2050. Meanwhile, expectations relating to sea level rise, increases in river discharge and precipitation have been revised upwards (see Section 2.2.3). As a result, discharge capacity in the Afsluitdijk is expected to be inadequate as early as around 2040. The government is initiating research into the further expansion of discharge capacity and is exploring other possible solutions with partners in the IJsselmeer area such as allowing the winter level to rise in line with the sea level.

Managing lake levels

The Water Level Decree for the IJsselmeer Area (2018) states the ideal bandwidth for the water levels in the main water system: low enough to accommodate high water discharges and high levels of precipitation in winter, and high enough to have enough fresh water available in summer. In practice, it is not always possible to maintain the desired levels. If the early part of the year is relatively dry, the desired level – and therefore the desired freshwater buffer – can sometimes be difficult to attain. If it is very wet in the autumn and winter, it can be difficult to achieve or maintain the winter level. The Level Decree will be evaluated in 2025.

Water allocation during water shortages

If not enough fresh water is available to meet all needs, the statutory priority sequence in the event of water scarcity comes into effect. Rijkswaterstaat, water authorities and provincial authorities made further agreements for the IJsselmeer area in 2022 about water allocation during periods of scarcity.[18] These agreements, which will be evaluated in 2024, have led to, among other things, more intensive consultation with water consumers. For example, the Hoogheemraadschap Hollands Noorderkwartier water authority established the Agricultural Advisory Committee, which successfully coordinates water distribution. Regional freshwater demand and the options for meeting it by drawing on resources in the IJsselmeer area are also being identified.

New water consumers

In 2023, the water authorities in the IJsselmeer area and Rijkswaterstaat updated the uniform working method for dealings with new water consumers, allowing for a standardised assessment of new water consumers in the IJsselmeer area. In addition, this approach is intended to prevent increases in water demand as much as possible. The Freshwater Delta Programme will use the approach as a point of departure for national agreements, and provincial authorities and water authorities will explore the impact in their regulations.

6.2.2 Developments

Water shortages and surpluses

The KNMI'23 climate scenarios show that a number of trends are already affecting the IJsselmeer area earlier than expected. Conditions are getting drier *and* wetter. As a result, the discharge capacity on the Afsluitdijk is expected to be inadequate, even before 2050. In addition, higher peak discharges and the change to more pumping than gravity discharge in the winter period may mean that flood defences in the IJsselmeer area will no longer comply with standards before we reach 2050.
At higher temperatures, freshwater demand and evaporation increase. At the same time, the IJssel River brings in less water to the IJsselmeer area. Water shortages will therefore be more frequent and longer.

High water in 2023-2024

During the period of high water in 2023-2024, water levels in the IJsselmeer and the Markermeer lakes reached record highs due to a combination of rain, IJssel discharges, and winds that reduced discharge capacity. The highest water level in the IJsselmeer was +0.57 m NAP on 26 December 2023. The old record from 1998 was +0.52 m NAP. Although flood risk management was not an issue, there were problems with flooding and damage, particularly in areas outside the dikes around the Markermeer. The water authorities and Rijkswaterstaat did everything possible: pumping stations worked overtime, other pumping stations were actually not used in order to prevent any further burden on the drainage waters, water storage areas were used, dike inspections were conducted and the Reevediep was used for some of the IJssel discharge for the first time. This prevented more severe consequences.

The events demonstrated how vulnerable our water systems are. It has also become apparent that homes and businesses outside the dikes can be seriously affected by flooding.

Salinisation of the IJsselmeer

Managing the salinisation of the IJsselmeer already requires extra efforts and considerable amounts of water. With faster sea level rise, the risk of salinisation increases in dry periods, resulting in exceedances of drinking water standards. The main sources of salinisation are the locks in the Afsluitdijk. After the monitoring of salinisation

18 Dutch House of Representatives, 2023-2024, 27 625, no. 654

since the dry summer of 2018, management was optimised in 2022 and 2023. The national government is looking at which further measures are possible to reduce salinisation via discharge sluices and locks in the Afsluitdijk. Increasing salinisation due to the construction of a larger lock at the Kornwerderzand location and the deepening of shipping channels in the IJsselmeer also requires action to be taken. The results for Den Oever are expected in 2024; the results for Kornwerderzand in 2025.

6.2.3 Connections

IJsselmeer Compass

Administrative and societal actors work together in the IJsselmeer area platform. The platform has formulated objectives for the area and recorded them in a cooperation agreement. In addition, a method has been developed to assess initiatives that affect the goals of the IJsselmeer area for the area as a whole: the IJsselmeer Compass. It will better enable the numerous actors involved in the area to monitor the objectives and consistency in the Blue Heart, and to make the appropriate recommendations. The IJsselmeer Compass will also be applied to issues in the Delta Programme.

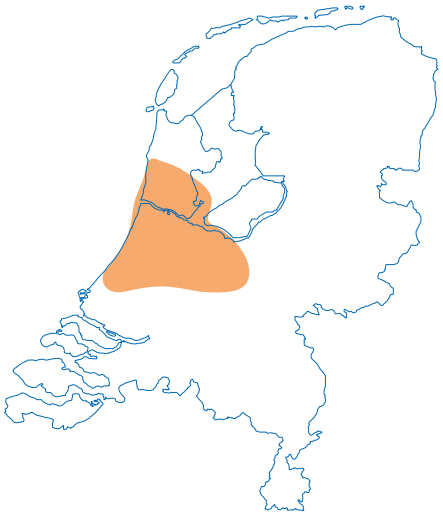
Building outside dikes

Building outside the dikes results in less room for water. Current regulations (the Quality of the Living Environment Decree (BKL)) under the Environment Act) generally do not allow land reclamation and construction outside the dikes, barring some exceptions. This policy is being made stricter. The Parliamentary Letter on Water and Soil as Leading Factors states that new land reclamation in the IJsselmeer area will no longer be allowed, except for floodable nature and in order to comply with Natura 2000 targets and the Water Framework Directive (WFD). Existing advanced agreements relating to expansion projects will be respected. The conditions for building outside dikes on existing land will also be made stricter.

The Minister of Infrastructure and Water Management provided a more detailed picture in the letter Building outside the dikes in the Markermeer and IJsselmeer area.[19] The idea is that what can be located behind the dikes, such as housing and non-water-related activities, should actually be located there. There will still be space for small-scale water-related activities on the edges of the lakes. The national government and the regions are looking for tailored solutions for advanced projects and projects for which administrative agreements have been made with the national government. Furthermore, the letter reaffirms that users of areas outside the dikes are, and remain, responsible for damage caused by high or low water. The line of reasoning presented will be enshrined in regulations in 2026.

19 The focus is on the financial agendas of the Delta Programme for the national government and on the entire HWBP, in other words including the contributions of the water authorities.

6.3 Central Holland



We have proven to be *too* vulnerable. We need pumping stations *and* water storage *and* spatial decisions.

Long-term decisions about housing construction, energy, peatland and the port require a shared vision and strategy in the short term.

Urgent water, spatial and social agendas are presenting Central Holland with major challenges. The area is densely populated, and it is home to a variety of economic drivers, including Schiphol Airport, the port of Amsterdam and several Greenports. About a quarter of all new homes in the Netherlands are being built in Central Holland.
The North Sea Canal area is a landfall for wind energy from the sea and it will be a hub for hydrogen production and distribution. In the Green Heart and the Utrechtse Heuvelrug, there are major challenges in the areas of drinking water shortages, nature and agriculture.
At the same time, Central Holland is vulnerable. The sea level is rising and the land is subsiding. The limits of the water system have been reached. The area is already very vulnerable to problems with excessive water *and* water shortages.

The sum total of agendas provides Central Holland, the latest area to be added to the Delta Programme, with the opportunity to actually connect water and space. For example, the Amsterdam-Rhine Canal/North Sea Canal system connects five different areas covered by the programme for the execution of the National Strategy on Spatial Planning and the Environment (NOVEX). Collaboration in the NOVEX areas is already showing the usefulness and necessity of an integrated view. Because of the urgent agendas, it is important for partners from the national government and the regions, and from the spatial and water domains, to join forces and work together towards a preferred strategy for Central Holland.

6.3.1 Perspective for 2050 and later

Central Holland's ambition is: a future-resilient, liveable , dynamic and water-robust area, where the soil absorbs water like a sponge. An area where essential functions are protected from extreme weather events and flooding, with new, climate-adaptive housing in future-resilient locations. An area where all sectors (industry, agriculture and the economy) are clearly reducing their freshwater consumption and dependence on the main water system. An area where urban and rural land use is aligned with the soil and water system, and developments contribute to future-resilience. This requires an interplay between the water system and spatial planning, both in new developments and in the existing surroundings.

Interdependence

Research by design has produced valuable insights. We now know more about the interdependence of the main and regional water systems in Central Holland, and the current emphasis on draining water away rather than water retention and storage. But it has also become clear that more and more water will be needed to combat salinisation and the lack of physical space for all spatial ambitions. The current soil and water system cannot sustain all these ambitions. Choices will therefore have to be made.

Different functions

All stakeholders in Central Holland will have to answer difficult questions about development and various functions in the area. In Noord-Holland, the ambitions are increasing in the areas of energy and the hydrogen

economy, and area processes relating to the peatland areas are progressing in Utrecht, Zuid-Holland and Noord-Holland. Both developments require fresh water. The challenge is to encourage the energy transition, prevent land subsidence, reduce carbon emissions and cut water demand at the same time. Despite all the uncertainties, answers are already needed now. Can shipping traffic grow if that will result in more salinisation? Where and how is building possible in climate-resilient ways? Is there room for retaining and storing water? One thing is certain: an appealing perspective should be the basis for a joint strategy and orchestrated decisions for the long term.

6.3.2 Developments

Working on a liveable and dynamic future is possible only if the basics are in order. On 2 November 2023, Central Holland did not have the luxury of looking ahead. The water system was severely tested on that day. A malfunction at the IJmuiden pumping and sluice complex meant that water levels in the North Sea Canal and the IJ rose at lightning speed. Amsterdam's drainage system had to be closed off from the IJ; the open connection between Amsterdam's canals and the Amsterdam-Rhine Canal/North Sea Canal was closed, stopping shipping traffic between the canals and the main water system. The residents of Amsterdam's Houthavens saw the water level rise up to their windows. A larger catastrophe was averted, in part because of the professional teamwork from all the water management authorities. But the conclusion was crystal clear: the region is too vulnerable.

Unless action is taken, that vulnerability in Central Holland will increase further. By 2050, it is expected that it will only be possible to discharge water in IJmuiden to the sea using pumps. A supra-regional stress test will provide a picture of the consequences of large-scale rainfall. Insights from a previous study indicate that a downpour of the sort seen in Limburg could also result in water covering polders and streets in parts of Central Holland for a longer period of time, with potential damage to crops, and disruption to road traffic and sewer systems. This vulnerability cannot be solved by measures in the water system alone. Increasingly, water managers and spatial planners in Central Holland are realising that solutions must be sought in each other's systems.

Four-track approach

A four-track approach is needed. It should consist of (1) technical measures in the main water system and interconnected regional water systems where necessary. The water also needs (2) more room. In addition, (3) boundary conditions are needed for space use based on the possibilities and restrictions of the water and soil system. Finally, (4) every development and investment should contribute to a dynamic water and soil system. The success of this approach requires clear choices from society about the use of space, now and in the future. Not everything is possible everywhere. Several steps will be required between now, 2030, 2050, 2100 and beyond. The limits of the water and soil system have already been reached. Looking ahead to 2030, technical measures are called for that will further expand and optimise the current system. The NOVEX areas are focusing on 2050.

The interaction between water and spatial agendas is being discussed in, for example, the North Sea Canal area, the Amsterdam and Utrecht metropolitan regions and the Green Heart. A joint, climate-resilient guide is being developed for the construction of 70,000 homes in the Amsterdam Port-City, which will still be in place in 2100. Future scenarios after 2100 will be addressed in the Sea Level Rise Knowledge Programme.

Systemic decisions are needed

Establishing a future-resilient area requires clarity with respect to national systemic decisions. Decisions about national water distribution and the water level in the IJsselmeer, for example, directly affect Central Holland. Furthermore, additional pumping capacity will very probably be needed in the Amsterdam-Rhine Canal/North Sea Canal system so that the basics are in order and there is time to look ahead. Agreements are also needed between the national government and the regions about the acceptable extent and frequency of problems with excessive water. That involves discussions with provincial and municipal authorities, and water authorities, about setting aside areas that will eventually be needed for water storage to prevent possible problems with excessive water or manage water shortages. The wider application of the guideline for climate-resilient building is also needed. And last but not least, all sectors (agriculture, industry and energy) must reduce water consumption and get used to higher salt concentrations. Looking ahead to 2100 makes it clear what needs to be done now and what is required to avoid regret, disinvestment and passing on problems to future generations.

6.3.3 Connections

In the periodical evaluation of the Delta Programme, Central Holland is looking at coordination with the themes of Fresh Water, Spatial Adaptation and Flood Risk Management and, in terms of areas, at the IJsselmeer area, the Rhine Estuary-Drecht Towns, Coast and Rivers.
In Central Holland itself, there are connections to spatial processes such as the Provincial Programmes for Rural Areas (PPLGs), NOVEX development perspectives and Spatial Proposals from the provincial authorities.
To ensure coordination and connections, it will be necessary to switch between levels – local, regional and supra-regional – and between water and space.
The same change in governance is needed at the official, director and administrative levels. Administrative partners are therefore working together towards a preferred strategy for Central Holland as a roadmap for a future-resilient, dynamic and liveable area.

6.4 Rivers

In 2050, we will not be able to serve all functions equally; choices are needed, for example with respect to freshwater distribution, the type of nature and the type of shipping.

In time, more space will be needed behind the dikes for flood risk management and water availability, in combination with water-related functions.

A future-resilient river area requires an integrated approach that, even during periods with extremely high or extremely low water, makes it possible to provide the best possible support for the five river functions: flood risk management, nature and water quality, navigability, freshwater availability, and regional economic development and spatial quality.

6.4.1 Perspective for 2050 and later

The agenda: coping with extremes

There have been noticeable effects in recent years: very hot, very wet and very dry periods, with extremely high or extremely low water as a result. Coping with these extremes, which will become more frequent in the future, requires an integrated approach. Changes to rivers in recent centuries for the purposes of flood risk management and navigation have led to the erosion of the riverbeds and ongoing land subsidence. As a result, the water level is falling and the floodplains are drying up. In dry periods, there are already problems with freshwater supplies, shipping and nature. In addition, less and less water goes to the IJssel river in dry periods and so the desired discharge distribution cannot be achieved at low water. In the longer term, the fall in the riverbeds will lead to increasing aridification in the floodplains and the hinterland. Furthermore, adequate discharge and storage capacity will be needed to accommodate higher river discharges at a later stage. In the context of sea level rise, storm surges when the wind is north- or south-westerly may mean that water has to be kept in the rivers for longer. In addition, sea level rise in the context of low discharges leads to salt water intruding upstream.

An integrated approach for 2050

A future-resilient river basin that works well as a system and that can be used for multiple functions: that is the goal of the Integrated River Management (IRM) programme. This national programme, in collaboration with a range of actors in the river area, pursues the following policy goals:

1. For riverbed location and sediment management: a sufficiently stable and manageable location of the summer bed that contributes to the restoration of the natural river dynamics and provides good navigability and water distribution across the Netherlands when river discharges are low.
2. For drainage and storage capacity: adequate capacity to cope with the higher river discharges expected during the course of this century and to facilitate spatial developments, nature, riverbed location and other agendas.

IRM has an integrated approach to the five river functions. This approach requires ground rules for integrated programming, for appropriate and, as far as possible, uniform and synchronised financing arrangements and decision-making and accountability processes, and for the associated governance and mandates. The national government and the regions are developing these ground rules together. They are also working together closely on the periodical evaluation of the preferred river strategy and the subsequent elaboration of IRM.

Choices are required

In the IRM programme, the government authorities work together to plan the river area in a way that facilitates the various river functions as much as possible. The policy goal for riverbed location and sediment management has been formulated in terms of a number of concrete policy decisions for each river section, ranging from maintaining the bed location to raising the bed where required. In 2025 and 2026, the Freshwater Delta Programme and IRM, in consultation with the relevant regional sub-programmes, will work on a proposal for the national discharge distribution of the rivers when water levels are low. Improved and sustainable discharge distribution at the bifurcations of the Rhine is an essential prerequisite in this respect. An investigation is also being conducted into what space inside and outside the dikes is needed for drainage and storage capacity. An important decision here is whether, in time, the discharge distribution to the Rhine branches should be adjusted during high water. In consultation with parties from the river area, the national government will formulate the policy decisions as concrete packages of measures, including the necessary funding. The options for establishing synergy between functions will be used: *building with nature* for example, which uses natural processes and materials, or the use of the structures in place. It will not be possible to serve all river functions equally well in 2050: orchestrated decisions will be required.

Space will have to be set aside

There is a shared responsibility to plan a future-resilient river area without passing on the effects of that planning to the future. The national government, in line with the principle of Water and Soil as Leading Factors, is taking steps to ensure that areas outside the dikes are not permanently occupied by activities that can also be located behind the dikes. It is also taking steps to set aside areas behind the dikes for future dike upgrades and/or river widening. This ensures that space will not be taken up by functions that do not directly serve the purposes of flood risk management, water availability and other river-related agendas and functions.

6.4.2 Developments

New delta scenarios

It is possible to derive new boundary conditions and, ultimately, the agendas for the river branches which are included in IRM from the updated delta scenarios (see Section 2.2.2).

Increasing demand for space

The IRM programme added up the space needed for all river functions. The result can be seen in the map Spatial consequences of policy choices until 2050. The map shows the river sections where the required space outside the dikes is adequate but results in a significant spatial agenda. Furthermore, it shows where space behind the dikes is also expected to be needed, with the specific locations that still have to be determined. The space required for the river functions has not yet been looked at in conjunction with the spatial consequences of other

agendas such as urbanisation, nature and the energy transition. That process takes place in part in spatial programmes such as the programme for the execution of the National Strategy on Spatial Planning and the Environment (NOVEX) and the drafting of the new National Spatial Policy Document.

Weather extremes and the confluence of water systems

The KNMI'23 climate scenarios predict both drier summers and wetter winters as a result of ongoing global warming. Recent summers have already confirmed this trend but the high water in December 2023 also showed that the threat from heavy rainfall is also real. It led to problems in urban locations in several places, including the IJssel-Vecht Delta. Discharge from the regional system into the main water system, in combination with storms and/or the level of water in the IJsselmeer, led to problems in Overijssel. The high water and floods in southern Limburg in the summer of 2021 also confirmed this trend. These weather extremes raise social awareness and contribute to the sense of urgency. Plans for building outside the dikes are facing increased scrutiny from the perspective of flood risk management (Chapter 3) and spatial adaptation (Chapter 5). This was one reason for the recommendation to update the Major Rivers Policy (Bgr). In the regional system as well, the water authorities are, for example, anticipating weather extremes by taking measures to tackle problems with excessive water and flooding, and prolonged drought. Supra-regional stress tests will provide a clear insight of where extreme precipitation leads to bottlenecks, including bottlenecks between water systems.

6.4.3 Connections

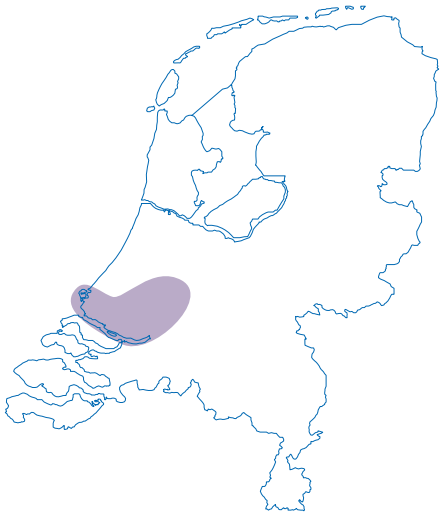
Combining agendas

In integrated area projects, the national government and the regions are working together on projects with a range of agendas and interests: flood risk management, nature, shipping, freshwater availability and other spatial developments. These efforts potentially increase support from both residents and businesses in the local area, partly because there will be reconstruction work in an area only once instead of several times in quick succession. An example is the Zuidelijk Maasdal project. The Ministry of Infrastructure and Water Management, the Limburg port authority, the provincial authority of Limburg and the municipalities of Maastricht, Eijsden-Margraten and Meerssen are working together in this project on flood risk management, shipping, freshwater availability, spatial development and upgrading nature. Along the Rhine branches, the integrated agendas will converge in the time to come in four focus projects (Gelderse Poort, IJssel-Vecht Delta, HBFO and Midden-Waal) and their area-specific elaboration for the *splitsingspuntengebied* (the area enclosed by the Rhine branches and the Border Meuse to the east of Nijmegen). In the Heritage Deal project 'Polder Rijnbroek: New Drassig Land' in the municipality of Voorst, heritage serves as the link between sustainable raising of the water table and the agricultural transition. Rivers do not stop at national borders. International collaboration is therefore important as well (see Section 2.4.2).

Water as a spatial agenda

As a result of the elaboration work done by the Pluvial and River Flooding Policy Platform, the national government, provincial authorities and water authorities are looking much beyond the boundaries of their own agendas and areas, for example by conducting supra-regional stress tests. On the basis of Water and Soil as Leading Factors, the soil and water system is setting the boundary conditions for developments even more than is usual at present. This approach also increasingly determines where each function is most appropriate, allowing the natural system to regain its equilibrium. During this process, the water agenda will become more and more explicitly a spatial agenda with implications that extend to soil use. An example is the restoration of the sponginess of soils in rural and built-up areas further away from the rivers. This also means looking back to the past. Historical knowledge and data show how this sponge effect used to be seen regionally. Water authorities, provincial authorities and Rijkswaterstaat should jointly address these objectives. This is already happening in the Limburg Flood Risk Management and Space Programme (WRL).

6.5 Rhine Estuary-Drecht Towns



We are preparing fundamental decisions about long-term flood risk management in conjunction with nature and fresh water.

We are earmarking space for dike upgrades.

We are anticipating increasing salinisation and the decreasing availability of fresh water by focusing on storage and water conservation.

The spatial puzzle in the Rhine Estuary-Drecht Towns region is challenging. There are major ambitions for housing, work, accessibility, economic growth, nature, prosperity, health and liveability. At the same time, the limits to the coping capacity of the water and soil system are becoming apparent. The changing climate is making these challenges clearer. The availability of fresh water, the water storage capacity needed to manage problems with excessive water and, in time, sea level rise require responsible decision-making. The region is a hotspot where all these water agendas meet.
The challenge will be to align the various ambitions with the measures needed to make the region water-secure and more climate-resilient.

6.5.1 Perspective for 2050 and later

Flood risk management

Protection from flooding in the Rhine Estuary-Drecht Towns will be safeguarded until well after 2050 by the system of dikes and storm surge barriers. The Maeslant barrier proved its worth by closing automatically for the first time in December 2023 in response to high water. Here, it is essential for the additional work required to upgrade dikes in the Flood Protection Programme (HWBP) to be completed. Even for the longer term (after 2050), it is necessary to set aside space now for the dike upgrades required in the future. In addition, the Rhine Estuary-Drecht Towns Delta Programme is developing alternative strategies for the eventuality of the current strategy no longer being tenable, including the space required for these strategies. This process generates information about the desirability, or not, of short-term spatial investments covering the different areas. The periodical evaluation is also looking at the tenability and flexibility of the current system of a closable water system using storm surge barriers and dikes. This includes assessing the impacts of accelerated sea level rise on the region. This will make it possible to determine in a timely manner what will be needed to address the period after 2050 and decisions can be made accordingly. Finally, the Rhine Estuary-Drecht Towns Delta Programme makes layers two and three from multi-layer safety concrete by elaborating them in greater detail in a number of areas.

Fresh water

The objective of the Freshwater Delta Programme is to make the Netherlands resilient to freshwater shortages. The insights from the delta scenarios show that this agenda is becoming increasingly challenging.
The Western Netherlands freshwater region has formulated a strategy and set of measures with three pillars:

- The optimisation of the freshwater supply from the large rivers, including during periods when river discharges are low. An example is the establishment of a supply route through the Krimpenerwaard and improvements to the Kromme Rijn inlet.
- Innovative solutions such as using the subsurface and reusing effluent. Examples include brackish water extraction in the dunes. In this way, Dunea is establishing an additional source for drinking water production and enlarging the freshwater stocks below the dunes.
- Enhancing the robustness of the regional system. This can include economical use, smarter flushing to combat salinisation, buffering in the subsurface,

flexible water levels, taking water availability into consideration more in spatial planning and taking increasing salinisation into account more in crop selection.

This strategy is expected to remain tenable, although efforts to enhance individual resilience will become more important over time. Water management authorities will not always be able to serve all functions and so user functions must have the capacity to cope autonomously with variations in in supplies of fresh water.

Spatial adaptation

The KNMI'23 climate scenarios make it clear that climate change will not stop in 2050. Some changes, such as sea level rise, will continue to have an effect for years to come. The expected climate effects must therefore be included in the formulation of options, plans and investment decisions. The perspective for spatial adaptation should shift to Water and Soil as Leading Factors. This means extra attention will have to be paid to the approach to construction, including in deep polders, to the tenability of existing facilities and to the climate-adaptive planning of public space. It is important to look beyond the results of the current stress tests for problems with excessive water. The supra-regional stress test conducted for Zuid-Holland provides a picture of the damage and nuisance flooding as a result rainfall similar to that seen in Limburg in 2021. Other courses of action and even more cooperation with municipal authorities, safety regions and municipal health services, are required.

6.5.2 Developments

Flood risk management

The most important development for the Rhine Estuary-Drecht Towns region is the expected sea level rise. The Interim Report for the Sea Level Rise Knowledge Programme confirms that the current strategy is sustainable until at least 2070. At the same time, the high demand for new housing is putting more pressure on the available space, and therefore resulting in more claims on space. The port of Rotterdam is also developing rapidly, in part in response to the energy transition and its designation as an area in the programme for the execution of the National Strategy on Spatial Planning and the Environment (NOVEX). An adaptation strategy has been developed for the port that provides opportunities to keep it water-secure during this transition. Flood risk management measures will have to be taken in good time for this purpose.

The Rhine Estuary-Drecht Towns Delta Programme is actively committed to establishing the appropriate structures and boundary conditions for area development. The Parliamentary Letter on Water and Soil as Leading Factors provides direction but it is important for it to become more binding in nature. That will also provide openings for engaging in dialogue with partners in the area of spatial planning. The latest important development is the ever-increasing importance of natural assets. The Rhine Estuary-Drecht Towns Delta Programme explicitly considers this factor in its plans and projects for flood risk management.

Fresh water

The KNMI'23 climate scenarios and the delta scenarios show that increasing water shortages are expected during the summer months. In addition, water demand will rise due to factors such as population growth and large-scale measures to combat land subsidence in peatland areas. This will require extra efforts to enhance the resilience of the regional system and to make drinking water supplies future-resilient. In addition, water-dependent functions will increasingly need to account for both temporary and permanent salinisation and freshwater shortages. The parliamentary letter on Water and Soil as Leading Factors and the National Programme for Rural Areas (NPLG) provide an additional stimulus to work on resilience to freshwater shortages through the spatial domain and area processes. In the area-specific approaches for the NPLG, the provincial authorities are including not only the knowledge from the bottleneck analysis but also the strategy and set of measures of the Western Netherlands freshwater region.

Spatial adaptation

The province of Zuid-Holland has commissioned a report detailing the measures needed for climate adaptation for climate adaptation in the existing Zuid-Holland urban area, along with the associated costs. The report provides municipalities with an indication of costs depending on the type of area. Municipalities can use it to determine which measures are needed and to develop plans for the long term, for example by adapting budgets for sewage systems, green space and roads in good time. The Rhine Estuary-Drecht Towns Delta Programme,

in collaboration with the water authorities, will be conducting a supra-regional stress test for the region in the near future.

6.5.3 Connections

Flood risk management

In the context of the periodical evaluation, the Rhine Estuary-Drecht Towns Delta Programme is actively seeking to establish connections with the other themes of the Delta Programme (fresh water and spatial adaptation) and with external developments such as housing construction, the energy transition, land subsidence and nature development. This process is already under way in the form of discussions about overlaps and synergy opportunities with initiatives in society, NOVEX areas and adjacent areas in the Delta Programme.

Fresh water

The partners in the West Netherlands freshwater region bring their knowledge and insights to the area processes for the elaboration of the NPLG and the spatial puzzle. This helps to take freshwater availability and the climate resilience of functions into account more in spatial planning. Users are already anticipating changing conditions themselves: drinking water companies are exploring new sources (such as drinking water production from brackish groundwater), initiatives for underground rainwater storage are underway in Boskoop and the Westland area, and the agricultural sector is conducting research into crops that are less sensitive to salt or drought. The Western Netherlands Freshwater Region is also establishing active connections with other programmes that may affect water availability, such as the elaboration of the Climate-Resilient Freshwater Supplies in the Main Water System (KZH) programme, the implementation of the decision to open the Haringvliet locks involving learning from experience, and tackling land subsidence in the peatland areas. Knowledge is also being developed about the availability of water in the context of the Sea Level Rise Knowledge Programme. The Interim Report shows that, up to 1 metre of sea level rise, the impact of changing river discharges on water availability is larger than the effect of sea level rise.

Spatial adaptation

With the Climate Cartography Set for spatial planning, connections are being established in Zuid-Holland between spatial adaptation, flood risk management and the freshwater agendas. This process is part of the provincial area-specific approaches in the NPLG, the construction agenda and a range of spatial/economic considerations. This set of maps describes the tensions between water/soil/climate and building/agriculture/nature on the basis of the latest knowledge. Some parts of Zuid-Holland are, because of the changing conditions in the future, suitable for certain functions to a greater or lesser degree. Alternatively, adaptations may be needed in order for them to stay future-resilient. The province and the water authorities are continuing to develop the Climate Cartography Set on the basis of discussions with municipalities and other stakeholders about the urbanisation agenda, the spatial-planning puzzle and the Provincial Programme for Rural Areas (PPLG).

6.6 Southwest Delta

In an area process, we are optimising the freshwater function and ecological quality of the Volkerak-Zoommeer lake.

Climate-resilient land use requires tailored approaches for each subarea to create a connected delta with a mosaic of water and land uses.

An integrated preferred strategy for the Delta Programme for the Southwest Delta will be developed in the years ahead. It will involve linking the periodical evaluation of the Delta Programme for the Southwest Delta to the concrete elaboration of the action perspectives from the 2050 Southwest Delta Area Agenda. This will lead to an implementation programme in which regional agendas and national agendas are combined as much as possible to establish climate-resilient, innovative area concepts. Pilot projects are also being initiated for this purpose, such as the pilot project in the Schorer and Welzinge polder, which combines the agendas of climate-resilient flood risk management, robust Scheldt nature and sustainable agriculture. The Southwest Delta faces several complex challenges related to the availability of drinking water and fresh water, flood risk management, water quality and nature, and spatial planning. The partners in the Southwest Delta are working together in the Southwest Delta Area Consultation Platform with the ambition to be the first region in the world to have fully conceived, developed and initiated all actions necessary to be climate-resilient by 2050.

6.6.1 Perspective for 2050 and later

Availability of drinking water and fresh water

The new climate scenarios require an updated vision of the Southwest Delta's drinking-water and freshwater supplies that looks ahead to the long term after 2050. An analysis of the water system will have to identify measures that will result in realistically achievable, robust drinking-water and freshwater supplies. Critical tipping points for the water system are projected to occur decades down the line. However, in the areas with no freshwater influx, the situation will worsen immediately as the precipitation deficit increases in summer. Near saline waters, sea level rise will exacerbate the salinisation of rural areas. The recommended approach is to enhance self-sufficiency in the areas bordering on the Southwest Delta. The exploratory system analysis will provide controls and opportunities for the optimisation of freshwater availability in the latter half of 2024.

Nature and ecology

The Southwest Delta is home to major national and international ecological assets but they are under pressure from deteriorating water and nature quality due to human interventions. Although the measures in the Natura 2000 management plans and the Water Management Plans are improving quality, they are still inadequate for the attainment of the Natura 2000 and WFD objectives. An additional impulse is required from national programmes such as the National Programme for Rural Areas (NPLG) and the Programmatic Approach for the Main Water System (PAGW), for through the replenishment of tidal flats in the Eastern Scheldt for foraging birds.

Flood risk management

In response to the results of the first national assessment round, approximately 25% of the dike sections in the Southwest Delta must be upgraded before 2050. Water authorities see both the larger implementation agenda and the difficulties with funding this agenda as particularly challenging. Section 3.2 links to national administrative agreements (BAW 2011) and explores which new agreements are necessary and possible. Space require-

ments and nature legislation (including Natura 2000) therefore make the agendas more complex. In addition, per capita costs in the province of Zeeland are rising disproportionately due to the relatively low number of inhabitants. Opportunities are being sought to combine the agendas for the Flood Protection Programme (HWBP) and the PAGW. This includes looking at broader agendas on the basis of integrated area concepts: flood risk management, nature, water quality, freshwater storage, the relationship with nature, the energy transition, sustainable agriculture, leisure and so on. An exploration is also being conducted of how a joint approach may help to attain economic objectives (for example in the areas of agriculture and leisure). In the case of measures in pilot projects yet to be determined, such as the Schorer and Welzinge polder, the partners involved will be working in implementation-oriented pilot projects with a focus on implementation to see how they can work together effectively and in an area-oriented way while maintaining everyone's responsibilities and agendas.

Water and Soil as Leading Factors

The basic principles and planning decisions in Water and Soil as Leading Factors require further area-specific and local elaboration to show the effect on, for example, climate-robust freshwater supplies and salinisation issues in the long term. What is important here is to strike the right balance with the agendas for water quality and nature. This elaboration is taking place within the framework of the exploratory system analysis for the Southwest Delta. The resulting agendas, control options and opportunities may result in changes to the integrated preferred strategy.

6.6.2 Developments

Interim Report for the Sea Level Rise Knowledge Programme: more work needed

The Interim Report for the Sea Level Rise Knowledge Programme shows the long-term consequences of sea level rise for the region: the primary flood defences must be further raised *and* widened, salinisation pressures are increasing and the availability of fresh water in the summer is declining. So there is an enormous challenge. The consequences vary widely depending on the area. This goes further than the question of whether or not there is a natural influx of fresh water. The Freshwater Bottleneck Analysis, for example, should provide a more detailed picture. The results of the Interim Report emphasise the urgency of thinking in terms of Water and Soil as Leading Factors. This is clearly reflected in the integrated 2050 Implementation Programme for the Southwest Delta.

Periodical evaluation of the preferred strategy

The region initiated an exploratory system analysis in 2023, particularly of the relationship between water systems and specific areas (the islands). That constitutes an important basis for the periodical evaluation of the preferred strategy. An administrative conference (in the spring of 2024) provided building blocks for the ambition and themes of the re-evaluated preferred strategy. Examples are the availability of drinking water and fresh water, water quality and nature, and long-term flood risk management.

Sea level rise tipping point and lifespan of the Eastern Scheldt storm surge barrier

The analysis up to two metres of sea level rise found that the current flood risk management strategy is still tenable for the Southwest Delta area but that the current water management and current hydraulic-engineering arrangements will come under pressure. The tipping points for the vital structural components of the Eastern Scheldt storm surge barrier (including the piers and the gates) and the impact on the ecosystem and other uses of the Eastern Scheldt are still being identified. At 1 to 1.25 meters of sea level rise, there is a tipping point with consequences for increasing salinisation in the Volkerak-Zoommeer lake because the innovative fresh-salt separation system in the Krammer Locks will then no longer work and drainage to the Western Scheldt will come under pressure. New insights relating to compliance with the water quality objectives for the Veerse Meer lake indicate that there are tipping points between 0 and 0.10 metres of sea level rise.

The tipping point for the Eastern Scheldt barrier and the decision on the future structuring of the Eastern Scheldt affect the entire Southwest Delta and national decisions. A decision of that kind must take into account, for example, the lifespan of the Maeslant barrier and the discharge or storage of river water via the Southwest Delta. A possible change to the preferred strategy would be to add the Eastern Scheldt (and the barrier) to the delta decision for the Rhine, Meuse and Scheldt estuary. The Southwest Delta is working with the area and theme programmes and with other countries on the periodical evaluation of this delta decision.

6.6.3 Connections

A single storyline and approach

With the integrated preferred strategy and the 2050 Implementation Programme for the Southwest Delta, the Southwest Delta Area Consultation Platform is working on a unified approach and narrative for the entire area. The Implementation Programme describes the eight water and land areas with the associated area processes. The parties contribute to this by orchestrating the area processes in place and contributing supplementary processes. The main guiding principles of regional and national policy for the sustainable and climate-resilient use of space are being used to develop area concepts for each sub-area. The result: a connected delta in a mosaic of water and land use.

Long-term perspective for the Volkerak-Zoommeer lake

The integrated preferred strategy includes innovative solutions to improve freshwater and drinking-water supplies throughout the region in conjunction with the agendas for climate-resilient flood risk management and resilient ecology. An example is the link between the Volkerak-Zoommeer area process and long-term agendas. The Volkerak-Zoommeer lake connects the Southwest Delta with the rest of the Dutch main water system. With a long-term perspective for this lake, the Southwest Delta can start on the proactive elaboration of the 2050 Area Agenda that was drafted previously, while taking the agendas in the surrounding areas into consideration. Current developments such as Integrated River Management (IRM), the Climate-Resilient Freshwater Supplies in the Main Water System (KZH) and the PAGW affect the Southwest Delta via the Volkerak-Zoommeer. With the long-term perspective for the Volkerak-Zoommeer, the Southwest Delta is establishing a framework for adequate freshwater supplies in terms of quantity and quality, now and in the future. That may involve a revision of the preferred strategy for this theme.

Spatial planning

The spatial arrangements developed by the provincial authorities in question show that spatial planning needs to be given a much more prominent place in the preferred strategy. Many ongoing transitions in the run-up to 2030/2050 will ultimately affect spatial planning, and vice-versa. It is important for these transitions to be addressed and implemented in climate-resilient ways. Administratively, there is also the question of how to take into account the long-term agendas for climate adaptation in these transitions and how to set aside the space for them. The integrated preferred strategy is expected to contribute here. The question is how the preferred strategy can be given the legal or statutory effect necessary to ensure that all spatial transitions are implemented in climate-adaptive ways.

6.7 Coast

Coastal maintenance with sand nourishment would seem to be feasible, even with more sea level rise; implementation does require attention.

Attention should be given to combining spatial agendas with flood risk management agendas.

The objective for 2050 is a safe, appealing and economically strong coast that can withstand sea level rise and its acceleration. This involves taking into consideration other water agendas, transitions (including the energy transition), other spatial ambitions (including nature, leisure and appealing coastal towns) and the reduction of emissions of nitrogen and CO2. Spatial ambitions will take future flood risk management challenges into account. Rijkswaterstaat will maintain the sandy coast annually – where necessary – with sand nourishment.

6.7.1 Perspective for 2050 and later

A safe, appealing and economically strong coast: attention should be given to combining major spatial agendas with, where possible, flood risk management agendas. This means that, when looking to the future, spatial agendas and transitions need to be included increasingly in the future perspective for the coast, including the hinterland.

For the coast, it is important to anticipate the effects of sea level rise on the basis of insights from the Sea Level Rise Knowledge Programme. Safeguarding flood risk management, both now and in the long term, is entirely feasible with the current approach of sand nourishment. This requires large amounts of sand and the availability of suitable sand from the North Sea will have to be safeguarded. The Sea Level Rise Knowledge Programme is therefore investigating how the sand can be secured. In addition, the Sea Level Rise Knowledge Programme describes how the current approach can be optimised for the long term so that sand can be applied efficiently to the coast, even if sea level rise continues.

6.7.2 Developments

Interim Report for the Sea Level Rise Knowledge Programme

The Interim Review for the Sea Level Rise Knowledge Programme shows that the current approach continues to be feasible. However, with rapid sea level rise, the required volumes will increase significantly, making the implementation of the current strategy (through nourishment) more challenging.

Transitions, spatial ambitions and agendas also place claims on the coast

Numerous agendas converge around the coast. This is not just a question of preparing properly for sea level rise, but also of how the other spatial transitions, agendas and ambitions can be given a place around the coast. Increasingly, an integrated area approach is required. Consideration is being given to how the Coast Delta Programme can respond in the right way.

6.8 Wadden area

Work on flood risk management landscapes, and identify combinations with spatial adaptation and fresh water.

Look in an integrated way at flood risk management and problems with excessive water for the main water system and the regional water system.

The preferred strategy adopted in 2014 and confirmed in 2024 for the Wadden Area Delta Programme can be maintained until 2050. The Delta Programme is making progress through innovative and integrated dike upgrades and sand nourishment operations. It is also developing an integrated strategy for flood risk management for each island.

6.8.1 Perspective for 2050 and later

The implementation of the current preferred strategy is on schedule. Flood risk management in the Wadden area is safeguarded by maintaining the current buffering effect of the islands and the intertidal zone as much as possible, and the further strengthening of the flood defences (layer 1). The strategy of sand nourishment will continue on the islands and the North Sea coast.

Innovative dike upgrades

The required upgrading of primary flood defences in the Wadden area is expected to be completed before 2050. The focus is on *building with nature*. This concept uses natural processes and materials so that dikes are upgraded in sustainable ways and easier to widen and extend. As a result, these dikes can be adapted more easily to sea level rise in the future. Where possible, innovative dike upgrades contribute to broader area objectives such as strengthening natural assets and improving liveability. The principle of the Broad Green Dike, with clay from the local area and a gentle, nature-rich, grassy slope, plays a prominent role in the development of the preferred alternative for the dike upgrades along the Dollard. The 2050 Ems-Dollard programme is developing large-scale clay ripening plants to supply that clay.

For the integrated dike and dune upgrade operations on Schiermonnikoog, a pilot project in the Sea Level Rise Knowledge Programme, the Fryslân water authority is designing a preferred alternative through an area-based approach. The preferred decision will be adopted by the end of 2024, and implementation is planned from 2027 onwards (see also the example on page 45).

Flood risk management strategies for the Wadden Islands

The municipal authorities of the Wadden Islands and the safety regions of Fryslân and Noord-Holland Noord are developing area-specific integrated strategies for flood risk management. In the case of all the islands, the consequences of flooding have been assessed for all vital and vulnerable structures inside and outside the dikes.
The municipality and the safety region on Ameland are developing an action perspective and evacuation plan for floods in a pilot project. The project began in 2024 and it is providing input for possible responses and evacuation plans for each island. On the basis of realistic measures, the islands are establishing their goals for the protection of vital and vulnerable structures. This may lead to changes in environmental policies and/or measures or rules for building in areas inside and outside the dikes, ultimately resulting in an integrated strategy for flood risk management for each island.

The rate of sea level rise will determine the time frame in which administrative decisions will be required for the entire Wadden area. Those decisions may provide direction for explorations of measures for water-robust facilities and disaster management, and ways of enhancing post-flood recovery capacity.

6.8.2 Developments

Transition in the rural area

For the mainland and the Wadden Islands, area processes are elaborating the goals of the National Programme for Rural Areas for, inter alia, nature, water and climate. The planning decisions in Water and Soil as Leading Factors are the guiding principle here. The significance for the implementation of the preferred strategy for the Wadden Area Delta Programme will become clear in the years ahead.

Sea level rise

The Sea Level Rise Knowledge Programme will be exploring through to 2025 how natural dune formation and sand nourishment can allow the islands' coastal foundation to grow with the expected sea level rise. The knowledge programme is also exploring the consequences of possible sea level rises for the buffering effect of the intertidal zone, for the flood defences of the mainland and the Wadden Islands, and for sectors such as drinking water supplies, agriculture, shipping, housing and the economy. The Wadden Area Delta Programme will include the results of this study in the periodical evaluation of the preferred strategy.
The interim results of the knowledge programme show that the current approach to flood risk management in the Wadden area can manage the sea level rise expected in this century. However, if the sea level rises further, the flood risk will increase for the outer areas of the Wadden Islands outside the dikes, including their marinas, tourist and leisure facilities, and utilities. That will be to the detriment of liveability on the islands.

The renovations of all the ferry terminals with the exception of Texel and Den Oever, which will be completed by the national government in 2024, do not take the effects of sea level rise into consideration. This means that, without additional measures, ferry services will be interrupted more often as a result of the flooding of the ferry terminals.

The provincial authority and water authorities in Groningen are working on a joint coastal programme with the aim of establishing a broad coastal zone that will grow in line with sea level rise and soften the transition from sea to land.

Water availability

The Wadden Islands depend on groundwater extraction for drinking water and moisture retention for agricultural land. More sea level rise will reduce the stocks of fresh groundwater on the Wadden islands. The islands are addressing the issue of the freshwater supplies for the Wadden islands with the Freshwater Delta Programme. Freshwater availability for the mainland of the Wadden area can no longer be guaranteed at all times in all locations.

Socio-economic developments

The socio-economic agendas related to demography, the regional economy, the labour market, liveability and interactions between the economy, flood risk management and ecology in fisheries, agriculture, energy and tourism for the Wadden area will be worked out in detail in programmes such as the regional deals.

6.8.3 Connections

2050 Agenda for the Wadden Area

In the 2050 Agenda for the Wadden Area, the national and regional governments are committed to the sustainable protection and development of the Wadden Sea as a nature area, the preservation of the unique open landscape and the creation of a safe and resilient Wadden area that can withstand the impacts of climate change. Additionally, they aim to maintain a vibrant Wadden area that, as an UNESCO World Heritage Site, is attractive for living and working.
The intensification of the collaboration in the 2021-2026 Implementation Programme for the Wadden Area and the development of knowledge relating to the consequences of climate change are resulting in an integrated approach. Examples include the Eemszijlen and Future-Resilient Lauwersmeer Area projects and integrated projects in the Flood Protection Programme (HWBP), as well as the Programmatic Approach for the Main Water System (PAGW). These initiatives address flood risk management, improvements to freshwater and saltwater connections, and nature and leisure objectives.
An analysis of the various agendas and their overlaps, along with an understanding of the consequences of the choices to be made and the organisation of a careful stakeholder process, is essential.

Nature

The Wadden Sea Nature policy framework formulates in concrete terms the boundary conditions for use to align it with the nature agenda. This includes the interaction

between improving natural assets and measures for flood risk management in relation to the creation of gradual transitions between water and land. It is currently unclear what the exact consequences of the nature policy will be for flood risk management in the Wadden area.

Spatial track

It is important to include earmarked zones for future dike upgrades and the adaptation of the coastal zone to sea level rise in the spatial planning of regional environmental policy. This is needed to ensure that area decisions, for example for Provincial Programmes for Rural Areas (PPLGs), do not throw up obstacles, and also to provide space for the integrated implementation of other area agendas.

In mid-2023, the Wadden Area Delta Programme made working agreements with the Freshwater and Spatial Adaptation Delta Programmes and the Regional Administrative Consultation Platform, North (RBO Noord) on how to include freshwater and spatial adaptation agendas for the Wadden islands.

6.9 High-Lying Areas with Sandy Soils

Commit to the societal and administrative willingness to make genuine change: without transitions, we will not be resilient.

Land users must prepare for water shortages. This means knowing how much water will be available in the long term.

It is important for the High-Lying Areas with Sandy Soils to use water more sparingly, to prepare the area and its users for water shortages, and to make the water system and land use resilient to water shortages. Large sections of these areas are almost entirely dependent on annual precipitation for freshwater supplies. Against the backdrop of hotter and drier summers, the Delta Programme for High-Lying Areas with Sandy Soils is focusing on replenishing groundwater stocks, retaining water for longer periods and allocating it more intelligently.

6.9.1 Perspective for 2050 and later

To be prepared in 2050 for longer dry periods with higher temperatures and therefore more evaporation, the water system needs to be reconfigured. This means striking a new balance between year-round water retention (and managing stocks) and the sustainable use of fresh water. In winter and spring, it means higher groundwater levels, and therefore a higher probability of problems with excessive water and groundwater, a reduction in the bearing capacity of the soil, and the soil warming up later. This will lead to use restrictions in some parts of the area. On the other hand, more water will be available during the growing season for the area as a whole. This requires more space for water and all users will have to accept the consequences of higher groundwater levels in spring and winter. For the High-Lying Areas with Sandy Soils, the societal and administrative willingness to make genuine change is crucial: without transitions, the area will not be resilient.

Groundwater

Groundwater availability in the High-Lying Areas with Sandy Soils is limited. The joint actors are working on agreements to set limits for groundwater use. They are establishing an overview of the available, usable groundwater stocks and they will be monitoring them to prevent deterioration.

Feasibility

The ambition for 2050 will be maintained: to make the High-Lying Areas with Sandy Soils in the North, East and South of the Netherlands climate-resilient and water-robust so that the regions can cope with extreme weather, water shortages or excessive water. Calculations for drought measures in the Achterhoek and Liemers areas show that responses are possible but that the spatial impact and technical costs are substantially higher than the current scope of the implementation programme for the High-Lying Areas with Sandy Soils. The regions are therefore interested in funding from the Rural Area Transition Fund.

Implementation costs have risen sharply due to material costs and inflation. As a result, fewer measures can be implemented in the 2022-2027 planning period with the budgets of the Delta Programme for High-Lying Areas with Sandy Soils. In addition, the KNMI'23 climate scenarios show that the challenges are growing. Dry summers are already demonstrating that the groundwater system can no longer be taken for granted. To restore groundwater stocks, precipitation must be retained as much as possible and given the opportunity to infiltrate.

6.9.2 Developments

The decisions for the second phase of the Freshwater Delta Plan (2022-2027) were published between late 2022 and mid-2023. Many measures, such as brook restoration, adjustable drainage and the disconnection of paved surfaces, are now being implemented. The implementation of phase 2 is threatened by delays due to a lack of capacity and cost increases. The lack of clarity about the national approach to the rural transition, the National Programme for Rural Areas (NPLG), represents an obstacle to the implementation of its own freshwater measures (see Section 6.9.3).

2040 drought agenda in Noord-Brabant

On the basis of the final report presented by the independent Drought advisory committee 'No water, no later', the joint parties in Noord-Brabant have extended the 2021-2027 Groundwater Covenant to produce the 2040 Drought Agenda. The guiding principle is that a structural increase in spring groundwater levels is needed for a robust climate-resilient groundwater system in 2040. The Drought Agenda states that it will be necessary to work simultaneously on three pillars that are inextricably linked: 1) improving groundwater replenishment by 150 million m3/year, 2) reducing extraction by 100 million m 3 /year and 3) 'rebuilding' the water system with the aim of reducing drainage (also known as land planning 2.0). The publication of the report and the way in which administrative support was established through collaboration also provide insights for the other High-Lying Regions with Sandy Soils.

6.9.3 Connections

In the High-Lying Areas with Sandy Soils, freshwater supplies cannot be viewed in isolation from agricultural and nature agendas, drinking water extraction, urban development, cultural history or agendas in rural areas. Measures often serve multiple objectives. In built-up areas, the connections with the Delta Programme on Spatial Adaptation (DPRA) require attention. In 2024, the Delta Programme for High-Lying Areas with Sandy Soils conducted a study on whether and how to prevent water demand increasing as a result of measures in the Delta Programme for Spatial Adaptation. Exploratory studies are also being conducted with the drinking water sector.

National Programme for Rural Areas (NPLG)

With the NPLG, the Dutch cabinet wants to combine nitrogen measures in intelligent ways with other measures to improve nature, soil and water quality, and implement the climate agenda. Area-based processes provide synergy opportunities for the freshwater agenda. A substantial contribution from the Rural Area Transition Fund is needed to shape the transition. Given the urgency of the agenda, political clarity is needed in the short term about the direction of the NPLG and the contribution from the Transition Fund. Currently, projects are hampered by the uncertainty about the transition in the rural area through the NPLG. There is also the risk that many measures on the High-Lying Areas with Sandy Soils depend on the ambition of the Provincial Programme for Rural Areas (PPLGs) and that the use of steering instruments and provincial/regional funding is a provincial policy decision.

Water and Soil as Leading Factors

The Parliamentary Letter on Water and Soil as Leading Factors provides support for the High-Lying Areas with Sandy Soils. The effective use of the 33 planning decisions is a major focus in spatial planning and in urban and rural areas. The principle of Water and Soil as Leading Factors fits in well with the approach to the sandy areas, for example in the case of the implementation of the Blue Agenda, which was administratively adopted in April 2023. The joint actors are therefore working to make the Utrechtse Heuvelrug's water system robust and future-resilient, with a sustainable place being granted to all water functions. This is done by retaining water for longer and infiltrating more water.

Chapter 7
Delta Fund

The weir at Driel supplies fresh water to the IJsselmeer via the IJssel River, May 2024. Photo: Jos van Alphen.

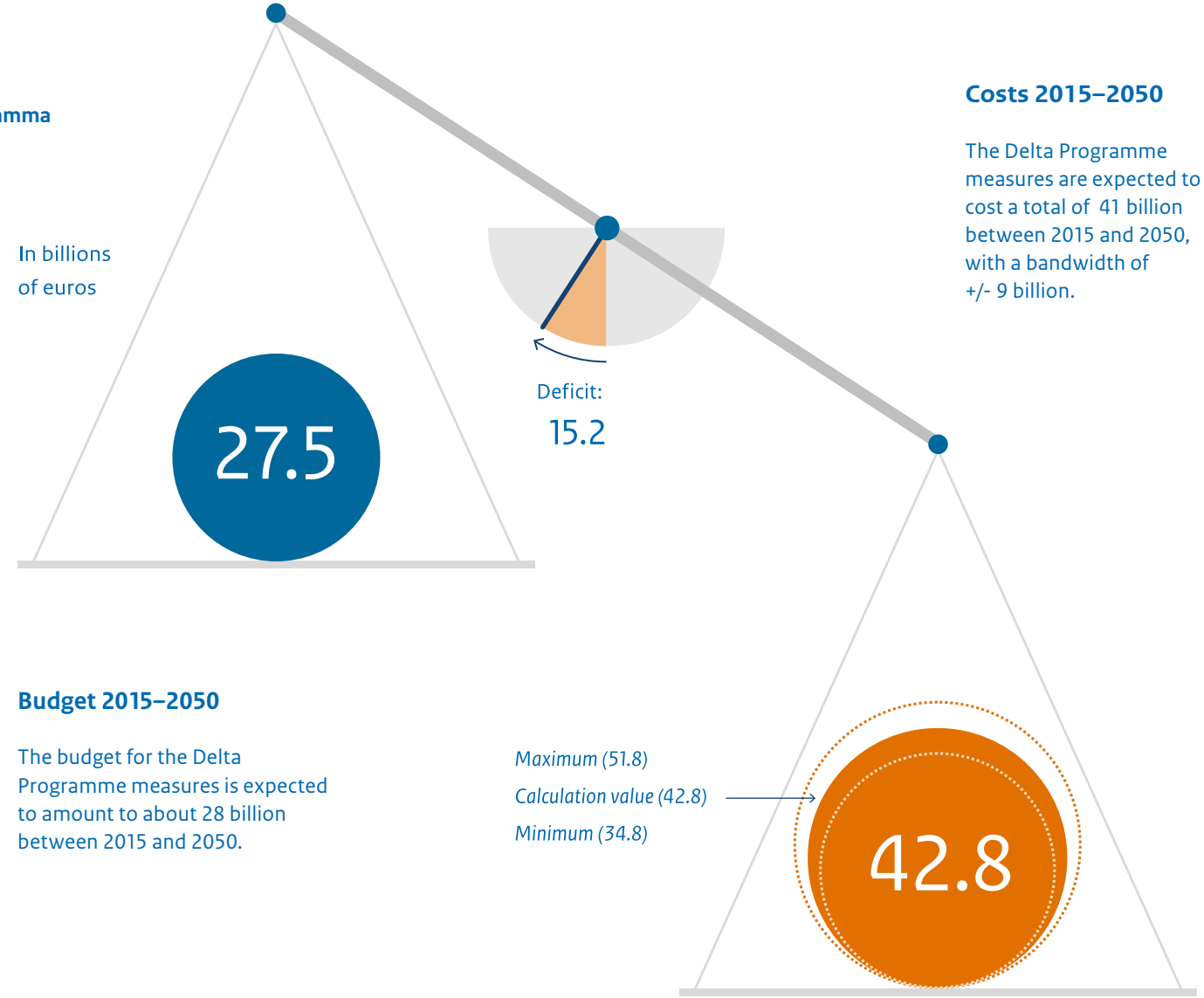
DELTA FUND OUTLINES

The Delta Fund

The financial cornerstone of the Delta Programma

The Delta Fund contains the financing provided by the national government to pay for some of the measures in the Delta Programme. Other government authorities contribute as well. In 2025, € 1.7 billion will be available in the Delta Fund, of which € 0.7 billion of that amount being available for the objectives of the Delta Programme.

A total of € 28 billion – for the entire duration of the Delta Programme between 2015 and 2050 – is expected to be available for the measures. That is not enough. This is mainly because it became clear in late 2023 that much more work will be needed to upgrade the dikes than was estimated at the start of the Delta Programme.



Budget 2015–2050

The budget for the Delta Programme measures is expected to amount to about 28 billion between 2015 and 2050.

Costs 2015–2050

The Delta Programme measures are expected to cost a total of 41 billion between 2015 and 2050, with a bandwidth of +/- 9 billion.

This chapter provides a picture of the financial underpinning of the Delta Programme by comparing the available budgets in the Delta Fund with the expected financial scope of the agendas in the Delta Programme.

The Delta Programme describes measures relating to flood risk management and fresh water for which the national government has shared or exclusive responsibility. This measures are financed in whole or in part from the Delta Fund. The related costs and budgets are compared in order to establish a picture of the financial underpinning of the Delta Programme, the degree to which financing is available and the expected costs of the measures.

In addition, the Delta Programme includes measures for which the national government has no responsibility, such as measures taken by provincial and municipal authorities, and water authorities, in the regional water system. These measures are not paid for from the Delta Fund but they will be described in this chapter because they contribute to the objectives of the Delta Programme.

Spending is also financed by the Delta Fund that is not covered by the Delta Programme, such as spending for Operations, Maintenance and Renewal (Item 3) and the operating expenses of Rijkswaterstaat that come under the goals of the Delta Fund. Those are not part of the financial underpinning of the Delta Programme.

Guide to Chapter 7

This chapter looks at the developments in the Delta Fund, the resources of the other partners in the Delta Programme, the financial agendas of the Delta Programme through to 2050[20] and the conclusions of the Delta Commissioner regarding the financial underpinning of the Delta Programme.

The Delta Fund is adopted for a period of fourteen years as part of the national budget. To make an assessment of the financial underpinning of the Delta Programme, it is necessary to look further ahead to year-end 2050. This chapter therefore describes the budget available for the Delta Programme in the Delta Fund in two steps: Section 7.1 describes the adopted budget for 2025-2038 and Section 7.2 looks at, among other things, the expected budget for 2039-2050.

7.1 Delta Fund developments

7.1.1 Delta Fund Budgets

For 2025-2038, some € 26.7 billion is available in the Delta Fund, and the annual budget is therefore an average of € 1.9 billion. This can be seen in Table 1, which lists Delta Fund budgets item by item and in total for the fiscal year 2025 and the period 2025-2038. Figure 3 shows changes in the budgets by item through to year-end 2038.

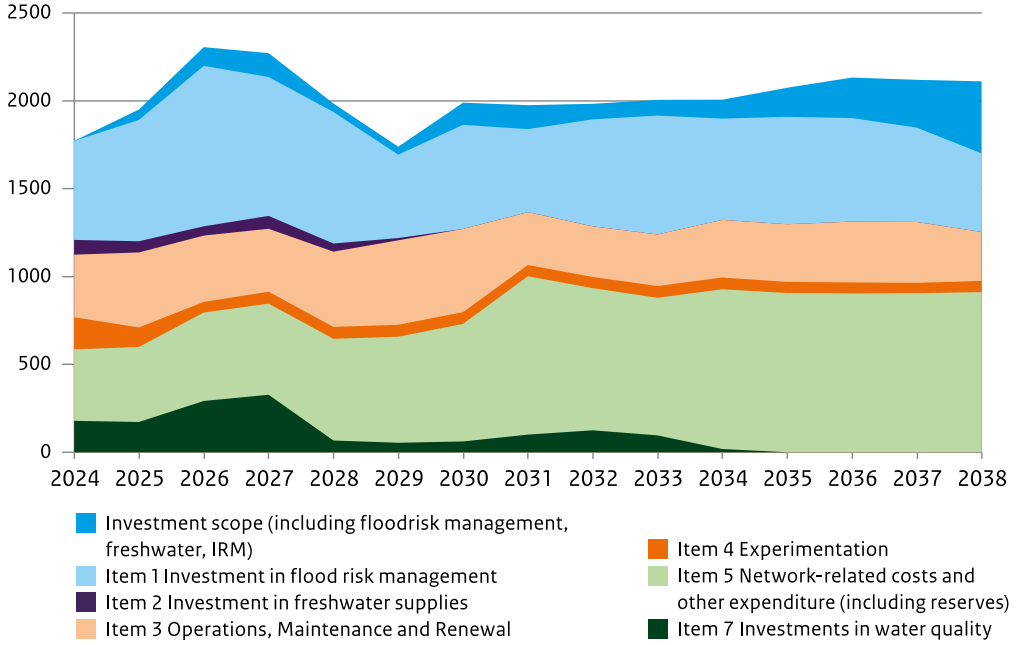
In accordance with the agreed system, the Delta Fund will be prolonged on each occasion by one year up to and including 2038. This results, after adjustment for wage and price increases and the deduction of the ongoing commitments (primarily consisting of management, maintenance and replacement, the network costs of Rijkswaterstaat and the contribution of national governments to the Flood Protection Programme), in new scope for investment ('Scope for investment' in Figure 3). A part of the investment scope is added directly to revolving reserves.

In 2038, a balance of € 0.4 billion will be available for priority policy tasks for water. In the years ahead, these investment resources will be programmed in greater detail on the basis of ongoing processes such as the assessment of primary flood defences, the Integrated River Management Programme, the Freshwater Delta Plan and the Delta Approach for Water Quality and Fresh Water. The total scope for investment will be € 1.9 million in the period 2025-2038 (Source: Ontwerpbegroting Delta-fonds 2025).

Table 1 Delta Fund Budgets in 2025 and in total (2025-2038) on the basis of the draft budget for 2025 (in millions of euros)

	2025	Total (2025-2038)
Item 1 Investment in flood risk management	560.5	8,084.6
Item 2 Investment in freshwater supplies	59.2	233.4
Item 3 Operations, Maintenance and Renewal	397.2	5,022.6
Item 4 Experimentation	96.6	913.2
Item 5 Network-related costs and other expenditure	449.7	11,179.1
of which scope for investment	55.4	1,878.4
of which policy reservations	4.9	3,417.3
Item 6 Contribution from other national budgets	-	-
Item 7 Investments in water quality	159.8	1,219.6
Total Delta Fund expenditure	**1,723.0**	**26,652.5**

Figure 3 Delta Fund budgets, itemised and total (2024-2038) based on 2025 draft budget (in milions of euros)



7.1.2 Policy reservations

For foreseen future expenditure on programmes and projects for which a go decision has not yet been made, policy reserves have been included under Item 5 of the Delta Fund. Sometimes subject to co-financing by other parties. The 2025 draft budget of the Delta Fund now includes policy reservations of which a large proportion is relevant for the Delta Programme. Examples include reservations for Integrated River Management (IRM), the Freshwater Delta Programme, the national flood defences and the Programmatic Approach to Large Waters (PAGW).

7.2 The financial underpinning of the Delta Programme

This section describes the financial underpinning of the Delta Programme by comparing the available resources in the Delta Fund with the expected financial scope of the agendas in the Delta Programme. The expected financial scope of the Delta Programme is periodically evaluated every six years and corrected annually.
The annual correction is based on an inflation adjustment developed for the Delta Programme.
The cost estimates given in this 2025 Delta Programme are based on 2024 prices.

7.2.1 Available budgets in the Delta Fund for the Delta Programme

Assuming the Delta Fund is extrapolated by some € 2.0 billion annually, approximately € 23.6 billion will be available in the Delta Fund in the period 2039-2050. Some of these resources are available for projects considered to be part of the Delta Programme, but not all (see also Figure 4).
The tentative extrapolation in Figure 4 is based on the year 2038. The Delta Commissioner has assumed here that the earmarked budgets for new flood protection measures at the water authorities will be continued after 2028 in accordance with the agreements between the national government and the water authorities as anchored in the Water Act.

The extrapolation shows that some € 1.3 billion a year has been set aside for operations, maintenance and renewal (Item 3) and network-related and other expenditure (Item 5). In terms of investment budget, this means that approximately € 0.9 billion a year is available in the period 2039-2050 for the Delta Programme, including the contribution from the water authorities to the Flood Protection Programme of € 0.2 billion a year. This is the budget for the available or earmarked series for new flood risk management measures (Item 1), fresh water (Item 2) and the policy reservations relevant to the Delta Programme (Item 5).

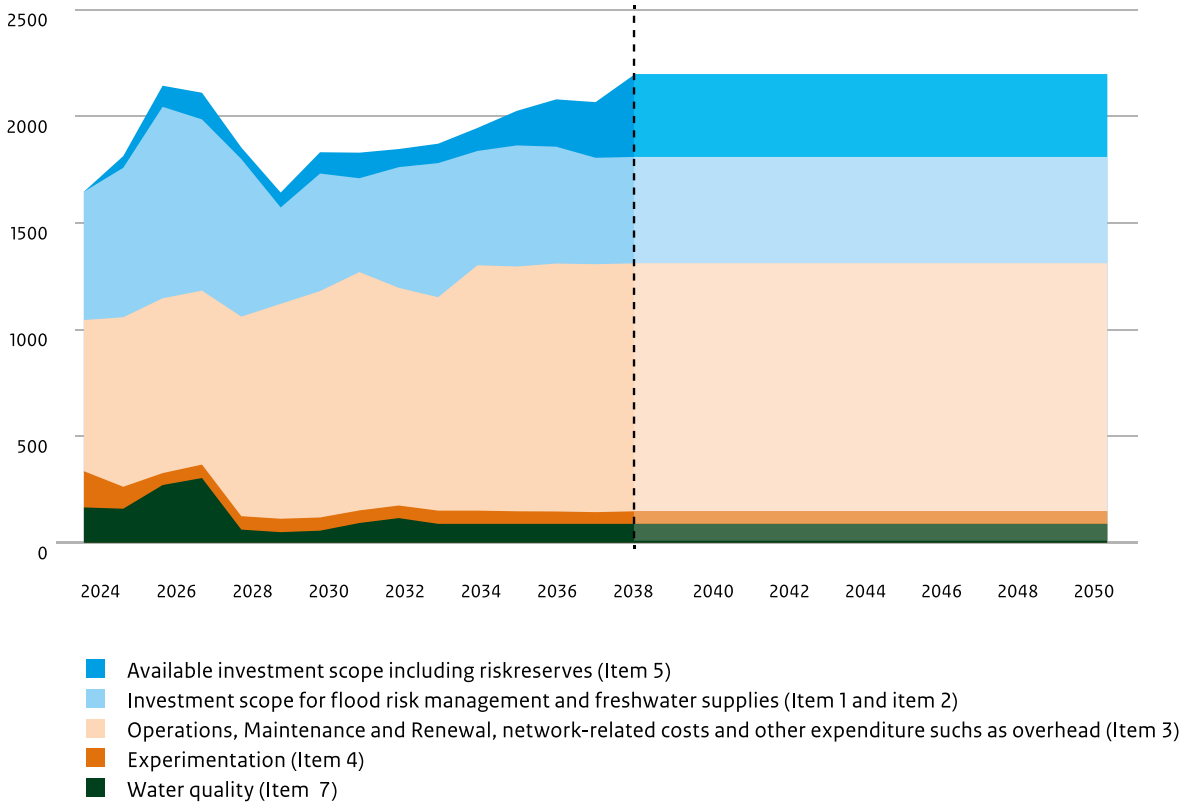
A total of € 13.5 billion in investment budget is expected to be released for the Delta Programme for 2039-2050. Some € 6.0 billion of that sum will be invested in flood risk management and fresh water.
In the period 2015 through to 2038, on the basis of actual and budgeted budgets, approximately € 14.5 billion will be available for the Delta Programme. This means that, calculated from the start of the Delta Programme in 2015, a total of approximately € 28.0 billion will be available through to the end of 2050 for the flood risk management and freshwater agendas of national importance. In addition, resources are expected to come from partners in the Delta Programme other than the national government and the water authorities, such as the provincial and municipal authorities (see also Section 7.4).[21]

7.2.2 Expected financial magnitude of the Delta Programme agendas

Cost estimate for Delta Programme and Flood Protection Programme
The cost estimate for the Delta Programme was drawn up in DP2015 and re-evaluated in DP2021. This process will be repeated in DP2027 in accordance with the system of the second six-yearly periodical evaluation. In the intermediate years, the cabinet adjusts the budgets in the Delta Fund for inflation by correcting for wages and prices.
The cost estimate is also adjusted annually for inflation in order to have as well-founded a picture as possible of

21 These resources make a crucial contribution to achieving the goals of the Delta Programme, such as other governments' investments in spatial adaptation. See also Section 7.3. For the assessment of whether the resources in the Delta Fund are sufficient to cover the estimated costs of the measures in the Delta Programme, however, they have not been taken into consideration here (either in terms of the budgets assumed to be available or in terms of the cost estimate for the agenda). The exception is the Flood Protection Programme, where contributions from the water authorities and cost estimates have been included.

Figure 4 Tentative extrapolation for Delta Fund



the financial underpinning of the Delta Programme. The uncertainty relating to both the financing that is assumed to be available and the cost estimate for the Delta Programme through to year-end 2050 is inherently significant.
DP2024 noted a budgetary pressure of 3.4 billion, which was described by the Delta Commissioner as 'a concern, but manageable'. At the time, the results of the Overall Cost Estimate of the Flood Protection Programme drafted pursuant to the assessment round for all defences were not yet available. In November 2024, the Minister of Infrastructure and Water Management informed parliament about the results of this Global Cost Estimate[22]. The consequences of the sizeable cost increase discussed in that letter have been included in this DP2025. Once again, the uncertain nature of this cost estimate should be emphasised here. A process is underway to work with all managers of flood defences to produce more accurate cost estimates.

Including the higher costs for the Flood Protection Programme, the total for the entire Delta Programme amounts to an estimated € 41 billion, with the current bandwidth being +/- 9 billion. That is € 13 billion more than the assumed available budget of € 28 billion (based on a median value for the bandwidth).

7.2.3 Assessment of Flood Protection Programme (HWBP)

In order to draw a proper conclusion about the significance of a shortfall of this magnitude for the Delta Programme's goals, it is necessary to also make an assessment of the performance of the underlying programmes and the pace of the implementation of projects, and in this case the Flood Protection Programme in particular.
The overview below shows changes in the use of HWBP budgets in recent years.

Regular subsidies for dike reinforcement projects carried out under the HWBP are lagging behind the available budgets. In order to maintain a good pace of implementation (in terms of kilometres of dike upgrades) and improve the use of the budgets made available by the

22 National Safety Assessment Primary Flood Defences, letter from the Minister of Infrastructure and Water Management, session 2023-2024, Parliamentary Paper 31710 no. 82.

Table 2 Underutilisation of budgets for Flood Protection Programme

Underutilisation of budgets	2018	2019	2020	2021	2022	2023
Budget after indexation	117	187	250	420	384	426
Expenditure without measures	73	110	148	179	251	261
Expenditure after measures	148	183	210	288	359	400
Under-use after measures	**31**	**-4**	**-40**	**-132**	**-25**	**-26**
Percentage spending on budget after indexation after measures	126%	98%	84%	69%	94%	94%

national government and all the water authorities, water authorities that have, for example, pre-financed projects from their own resources are already receiving (partial) subsidies earlier than anticipated in the HWBP project programming. The table above clearly shows that these measures have proven effective in largely preventing the under-use of budgets. This does not apply to the corona years 2020 and 2021, when the resources available from the HWBP were severely under-used.

In terms of the numbers of kilometres of the completion of 'safe dikes', however, the picture is less positive. Between the start of the HWBP in 2014 and year-end 2023, 219 kilometres of dikes were declared safe, of which 53 kilometres were actually strengthened. The HWBP started with the most urgent projects, which are often large and complex. There were delays again in 2024, for example due to the complexity, and exogenous factors such as new laws and regulations relating to nitrogen deposition, and capacity shortages. And because of endogenous factors such as overly optimistic planning and the underestimation of the effect on planning of risk factors. The percentage of delays increased from 49% in 2022 to 59% in 2023[23]. Give the fact that we know that an estimated 2,000 kilometres currently require action, the speed of implementation needs to increase substantially to approximately 75 kilometres a year on average. The estimated number of kilometres requiring action may, incidentally, be lower because it may emerge from the further determination of the scope that entire dike sections may not require upgrading in all cases.

As explained in Chapter 3, work is currently underway to establish a better understanding of the actual upgrade work required. Administrative and policy decisions relating to the HWBP are also being drafted at the same time in order to improve performance, in conjunction with preparations for decisions by the water authorities and the national government relating to the financial requirements. All these things will come together in the periodical evaluation which will be reported on in DP2027.

7.2.4 Conclusion of the Delta Commissioner relating to the financial underpinning of the Delta Programme

All in all, the Delta Commissioner arrives at the following assessment of the financial underpinning of the Delta Programme. On the basis of the current median value for the cost estimate for the HWBP, the shortfall for the Delta Programme – over € 13 billion until 2050 given current knowledge – is too large. However, the cost estimate for the HWBP is still very uncertain. A major reduction of the current bandwidth is the first priority. The Delta Commissioner is assuming that a well-substantiated estimate of the budget requirements of the HWBP will be available in the short term and he will keep a close eye on whether an adequate solution is found for the expected shortfall, at the latest in the periodical evaluation of the HWBP and the Delta Programme. He therefore sent a recommendation in this respect to the Dutch House of Representatives in his November 2023 letter. Operational capacity, and therefore the feasibility, of the Delta Programme is also a source of concern. In line with the ongoing periodical evaluation of the Delta Programme, there will also be an

23 Based on the overall review of milestones, see 2023 Annual Report. Not all changes in the milestones affect the 'dike safe' milestone or cash depletion.

evaluation of the HWBP, in line with the Outline Agreement, which will also address performance. The Delta Commissioner has taken note of the actions and initiatives that have been initiated in the Alliance context to improve the performance of the HWBP. He will keep his finger firmly on the pulse and, where necessary, take further initiatives in line with his statutory duties.

7.3 Resources from other partners

In addition, the water authorities, and the provincial and municipal authorities, invest in the agendas of the Delta Programme, just as the national government does. Working with the national government, they rely on co-financing to implement measures from the Flood Risk Management, Spatial Adaptation and Freshwater Delta Plans.

The working regions for spatial adaptation, in which water authorities, provincial and municipal authorities work together, contribute two-thirds of the co-financing for the packages of measures they submit for a contribution from the Climate Adaptation Stimulus Scheme. That contribution is limited to a maximum of the amount determined by the distribution key for each working region.

7.3.1 Water authorities

Investments

The water authorities invest in measures in the regional water system and contribute half of the funding for the Flood Protection Programme.

Water authorities focus on establishing and maintaining the quality of flood defences and managing watercourses, and work to ensure that there is always enough good-quality water (not too much and not too little). They do this with pumping stations and with tens of thousands of smaller water-based engineering structures and all kinds of planning measures. In addition, water authorities treat waste water from businesses and households in waste-water treatment plants.

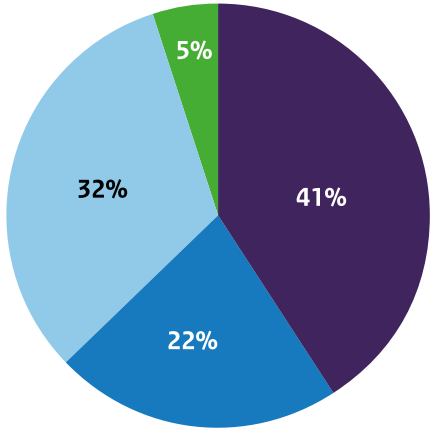
The water authorities have to invest heavily in this infrastructure, in part because of climate change, salinisation, sea level rise, land subsidence, urbanisation, stricter environmental standards, the energy transition required and the closing of commodity cycles. The water authorities' investment agendas for the coming years show that they will together invest an average of € 2.7 billion a year in the period 2024-2027. Figure 5 shows how this annual amount is allocated to the different agendas of the water authorities. Figure 6 shows how the total amount for these four years is allocated to the agendas for each water authority.

Flood Protection Programme (HWBP)

Investments in flood defences account for the largest share of total investments made by the water authorities (see Figure 5). These are mainly investments in the primary flood defences. Since 2011, the water authorities have participated in the HWBP and the financing of the upgrade of the primary flood defences is the joint responsibility of the water authorities and the national government. Since 2014, this financing has consisted of equal contributions from the water authorities and the national government. This contribution is recorded as a receipt to the Delta Fund and has also been included in Figure 3. The amount has been indexed annually since 2016. In 2024, the water authorities will contribute over € 230 million to the financing of the HWBP (2024 price level).

Figure 5 The average annual investment expenditure of the water authorities in the period 2024-2027, broken down according to activity. *Source: Unie van Waterschappen, May 2024*

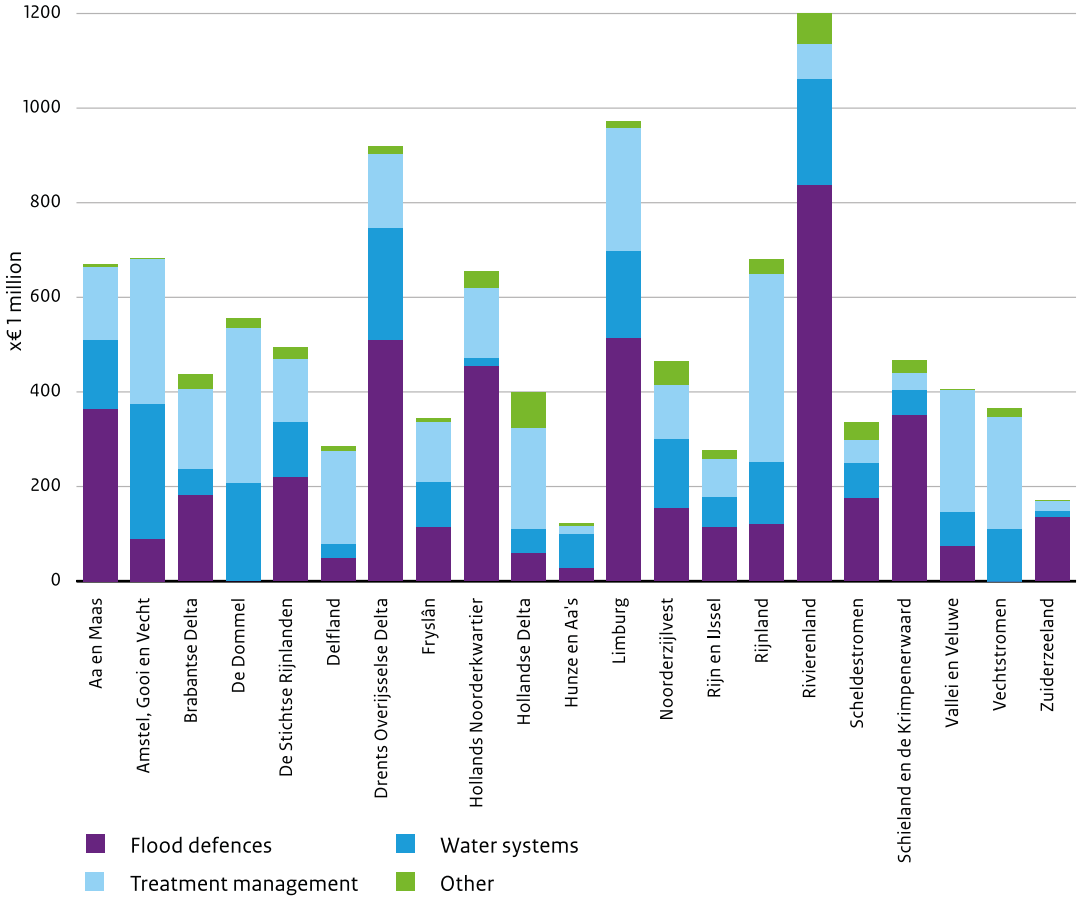
Investment expenditure of the water authorities 2024-2027
(average per year € 2.7 bn.)



- Flood defences € 1,130 mln.
- Water systems € 600 mln.
- Wastewater treatment € 870 mln.
- Other € 130 mln.

Figuur 6 Planned total capital expenditure by water authority in the period 2027-2025, broken down according to activity.[24] *Source: Unie van Waterschappen, May 2024*

Estimated investment expenditure 2024-2027



24 This does not include any future increase in HWBP financing still to be agreed upon (see Section 7.2.3) to cover cost increases.

7.3.2 Provincial authorities

The provincial authorities contribute to the Delta Programme in several ways: by providing staff for the various programme teams or their own organisations, financial contributions to sub-programmes, or contributions to research or measures. The provincial authorities work in particular on coordinating the various agendas in their areas in line with the agendas of the Delta Programme. Examples are the linkage between agriculture, nature and freshwater supplies or linking dike upgrades with improving the quality of the surrounding area.

The scope of their efforts - in terms of staffing and funding - differs from one region to the next and depends on the provincial agendas in the region concerned. Concrete examples are provided in Chapters 3 to 6 inclusive.
In flood risk management projects, the provincial authorities invest in synergy opportunities and area developments that further spatial development and spatial quality in the area concerned.

The provinces play a coordinating role in respect of water availability. That involves local processes in collaboration with water authorities and farmers (represented by LTO). Water availability and water quality are addressed in conjunction in groundwater protection areas and in the regional drinking water dossiers and the associated implementation programmes.[25] Through the National Programme for Rural Areas, provincial authorities will be making large-scale investments in the years ahead in area processes where the agendas relating to nitrogen deposition, water quality (WFD), climate and other synergy benefits meet. In addition, programmes are in place with measures for brook restoration, water conservation in areas of the country with sandy soils, studies of the optimisation of water systems and making public drinking-water supplies future-resilient, such as the periodic evaluation of the flood protection policy. In the Drought Policy Platform, the provincial authorities have contributed to shaping the policy recommendations regarding groundwater and vulnerable nature; they are currently engaged in the implementation of the follow-up to these recommendations.

In the area of spatial adaptation, the challenge for provincial authorities lies primarily in linking climate adaptation to major spatial agendas such as housing construction, the energy transition and regional spatial planning.
In working regions and freshwater regions, provincial authorities, working with the partners in the region, are using stress tests (regional and otherwise) to identify spatial adaptation agendas and making agreements about the necessary measures through risk dialogues. They record the outcomes in implementation agendas (see also concrete examples in Chapter 5). In the years ahead, the provincial authorities - working alongside municipal authorities, water authorities and the central government - will provide an additional impetus for work on climate adaptation and the implementation of measures, as stipulated by the Administrative Agreement on Climate Adaptation.

7.3.3 Municipal authorities

Municipal authorities fulfil a range of roles in terms of addressing climate change and urban water management. As policymakers and regulators, the authorities work on areas such as embedding climate adaptation in the municipal environmental vision documents, sector programmes, and environmental plans. In addition, they determine the approach to rainwater and groundwater in drainage plans. Rainwater is increasingly stored or drained above ground, for example using swales, green strips, and roads designed for that purpose. As owners, many authorities are investing in making public properties (such as schools) and public areas climate-resilient, for example by introducing height differences or by creating more greenery and open water. Many municipalities are also adopting an initiator role, taking the lead in new initiatives with several parties, such as corporations and water authorities. Here, they can also act as co-financiers to get initiatives on the move and maintain momentum. At the working region level, municipal authorities and regional partners are mapping out spatial adaptation agendas on the basis of stress tests and drawing up agreements about the measures required through implementation agendas.

According to figures from Statistics Netherlands, the budgeted income from the sewage rates will increase by 6.6% to almost € 2 billion in 2024. The increase in the rates is related to, among other things, the increased costs of maintenance, the management of the drains system and the expansion of the area covered. Municipal authorities are allowed to spend the revenue on municipal water activities only and they must not exceed the level needed to cover costs.

25 Example see Rivierdossier waterwinningen Rijndelta.

Annex 1 Programming tables for Delta Plan for Flood Risk Management

Tables B1.1 to B1.7 (inclusive) in this annex show the programme for the Flood Protection Programme (HWBP) for the period 2025-2036.[26]
A description of the HWBP projects can be found on the website and in the project book to be published in the autumn of 2025.

Table B1.1 Knowledge and innovation agenda

Code	Management Authority	Project name	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
	Programme directorate	Reservation for innovation														
	Programme directorate	Knowledge and Innovation Programme (KIA)														
	Rijkswaterstaat	Embankment Suite-GEOLIB														
33T	Hollands Noorderkwartier	POS Kunstwerken														
33M	Amstel, Gooi en Vecht	JLD Dijkstabilisator (POV-Macrostabiliteit) Nastel- en monitoringsfase														
33Q	Drents Overijsselse Delta	Onderzoek Gras op Zand														
33X	Drents Overijsselse Delta	Dijken en Natuur - een symbiose														
33Z	Drents Overijsselse Delta	Praktijkonderzoek opbarsten bij dijken														
33AH	Drents Overijsselse Delta	Waterveiligheidslandschappen														
33AI	Drents Overijsselse Delta	Veiligheidsrendement														
33AF	Drents Overijsselse Delta	Sterkte onverzadigde zone														
33N	Fryslan	Onderzoek Asfaltbekleding (POV-W)														
33N	Fryslan	Continuering monitoring degeneratie asfalt														
33AJ	Fryslan	Golfreductie Kwelders														
33S	Hollandse Delta	Proef Piping Hedwigepolder														

Legend: Innovation

26

Table B1.1 Knowledge and innovation agenda

Code	Management Authority	Project name	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
17D	Hunze en Aa's	Pilot Kerkhovenpolder- Duitsland (Brede groene dijk)														
33I	Hunze en Aa's	Monitoring Gras- en Kleibekleding fase D POV-W														
19D	Limburg	Tranche 2 innovatie Steyl Maashoek														
19I, 19N, 19P, 19Q	Limburg	Tranche 1 Planuitwerking innovatief														
33L	Limburg	POV Dijkversterking Gebiedseigen Grond														
18A	Noorderzijlvest	Eemshaven-Delfzijl - MJVM														
33AB	Noorderzijlvest	Erosiebestendigheid klei buitenkant dijk														
33AG	Noorderzijlvest	Laadinfrastructuur														
22E	Rivierenland	Gameren innovatie GZB														
33U	Rivierenland	Duurzamere en vergunbare HWBP dijkversterkingen														
33V	Rivierenland	De Innovatieversneller														
33Y	Rivierenland	Future dikes														
33AA	Rivierenland	Pilot Soilmix Heaveschermen														
	Rivierenland	Stabiliteit bij golfoverslag														
24AG	Scheldestromen	Zuid-Beveland West, Westerschelde Hansweert - innovatie -														
33R	Vallei en Veluwe	POS HEEL														
25P	Vallei en Veluwe	Grebbedijk innovatie PU														
33AC	Zuiderzeeland	Dashboard Duurzaamheid														
33AD	Zuiderzeeland	Erosiebestendigheid overgangen dijkbekleding														

Legend: Innovation

Table B1.2 Programming of measures for Flood Protection Programme 2025-2036

Code	Management Authority	Project name	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
02D	De Stichtse Rijnlanden	Wijk bij Duurstede Amerongen (WAM)														
02E	De Stichtse Rijnlanden	Salmsteke														
02F	De Stichtse Rijnlanden	Culemborgse Veer-Beatrix Sluis (CUB)														
02C	De Stichtse Rijnlanden	Versterking voormalige C-kering HDSR (GHIJ)														
02G	De Stichtse Rijnlanden	Salmsteke Schoonhoven (SAS)														
02H	De Stichtse Rijnlanden	Jaarsveld-Klaphek (JAK)														
02I	De Stichtse Rijnlanden	Irenesluis - Culemborgse Veer														
02L	De Stichtse Rijnlanden	Nieuwegein Irenesluis Culemborgse Veer (NIC)														
03S	Hollands Noorderkwartier	Koppelstuk Markermeerdijk														
03O	Hollands Noorderkwartier	Den Oever - Den Helder DODH														
03Y	Hollands Noorderkwartier	Koppelstuk Durgerdam														
03E	Hollands Noorderkwartier	Wieringermeer C kering														
03L	Hollands Noorderkwartier	Helderse Zeewering														
03Z	Hollands Noorderkwartier	Haven dijk														
05E	Rijnland	IJsseldijk Gouda (VIJG) spoor 2														
05C	Rijnland	Verbetering IJsseldijk Gouda Veerstal & Havensluis spoor 3														
05G	Rijnland	IJsseldijk Gouda (VIJG) spoor 4 (GHIJ)														
05F	Rijnland	Kunstwerken Spaarndammerdijk														
06K	Schieland en de Krimpener-waard	Krachtige IJsseldijken Krimpener-waard (KIJK)														
06D	Schieland en de Krimpener-waard	Capelle-Zuidplas														
13D	Aa en Maas	Ravenstein - Lith														
13K	Aa en Maas	Cuijk - Ravenstein, excl. uitwisselingsbijdr dijkversterking rivierverruiming														

Legend: Preliminary study Planning Implementation Fast Lane

Table B1.2 Programming of measures for Flood Protection Programme 2025-2036

Code	Management Authority	Project name	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
13Z	Aa en Maas	Doeveren														
13Y	Aa en Maas	Lith - Bokhoven														
13H	Aa en Maas	Vierlingsbeek - Cuijk														
14F	Brabantse Delta	Standhazense Dijk														
14E	Brabantse Delta	Moerdijk - Drimmelen														
14I	Brabantse Delta	Wilhelminakanaal Amertak Dongen (WAD)														
25L	Drents Overijsselse Delta	Noordelijke Randmeerdijk DOD														
34AK	Drents Overijsselse Delta	Vecht - Stenendijk Hasselt														
34M	Drents Overijsselse Delta	Stadsdijken Zwolle (15E)														
34U	Drents Overijsselse Delta	Zwolle-Olst														
34AT	Drents Overijsselse Delta	Galgenrak en Streukelerzijl														
34AN-34AQ	Drents Overijsselse Delta	Veilige Vecht														
34O	Drents Overijsselse Delta	Mastenbroek IJssel														
34L	Drents Overijsselse Delta	Genemuiden														
34R	Drents Overijsselse Delta	Keersluis Zwolle														
34AU	Drents Overijsselse Delta	Mastenbroek – Stadshagen														
34AR +34AS	Drents Overijsselse Delta	Vecht-Ommen-Dalfsen														
34Q	Drents Overijsselse Delta	Mastenbroek Zwarte Water														
34AL +34AM	Drents Overijsselse Delta	Hasselt - Zwartsluis														
15K	Drents Overijsselse Delta	IJsselmuiden - Genemuiden (15K)														
	Fryslan	KLM Koehool – Zwarte Haan														
	Fryslan	KLM Zwarte Haan – Nieuwebildt-zijl														
	Fryslan	KLM Holwerd – Kop WestHolwerderpolder														
	Fryslan	KLM Wierum, Peasens Moddergat														
28F+28G	Fryslan	Koehool- Lauwersmeer														

Legend: Preliminary study Planning Implementation Fast Lane

Table B1.2 Programming of measures for Flood Protection Programme 2025-2036

Code	Management Authority	Project name	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
	Fryslan	KLM Peazemerlannen														
28A	Fryslan	Dijk- en duinversterking Schiermonnikoog														
	Fryslan	Harlingen														
28E	Fryslan	Zurich-Koehool														
16E	Hollandse Delta	Zettingsvloeiing V3T														
16M	Hollandse Delta	Geervliet - Hekelingen 20-3														
16P	Hollandse Delta	Oostmolendijk-Ringdijk Ridderkerk (O.D.O.)														
16R	Hollandse Delta	20-2 Brielse Maasdijk														
17F	Hunze en Aa's	Dollarddijk														
17G	Hunze en Aa's	Groote Polder														
23B	Limburg	Alexanderhaven AB														
60AJ	Limburg	Roerdelta														
	Limburg	Zuidelijk Maasdal														
18D	Noorderzijlvest	Lauwersmeer - Vierhuizergat														
21AT	Rijn en IJssel	Westervoort - Pannerdense Waard														
21BA	Rijn en IJssel	Den Elterweg – Zutphen														
21AU	Rijn en IJssel	Tolkamer - Pannerdense Waard														
21AQ	Rijn en IJssel	Doesburg Rha														
21BB	Rijn en IJssel	Westervoort-Bevermeer														
21AV	Rijn en IJssel	Tolkamer - Spijk														
21AZ	Rijn en IJssel	Bevermeer - Laag Keppel														
22Y	Rivierenland	Tiel - Waardenburg (TiWa)														
22X	Rivierenland	Gorinchem-Waardenburg (GoWa)														
22BX	Rivierenland	Sprok-Sterreschans-Heteren Kruising A15														
22L	Rivierenland	Wolferen-Sprok incl. DTO														

Legend: Preliminary study Planning Implementation Fast Lane

Table B1.2 Programming of measures for Flood Protection Programme 2025-2036

Code	Management Authority	Project name	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
22K	Rivierenland	Stad Tiel excl Fluvia														
22D	Rivierenland	Neder-Betuwe														
22AR and 22AK	Rivierenland	Streefkerk Ameide Fort Everdingen (SAFE)														
	Rivierenland	Beren – Woudrichem														
22AW+22BW	Rivierenland	Sprok-Sterreschans-Heteren														
	Rivierenland	Weurt - Deest														
	Rivierenland	Zaltbommel - Stad														
	Rivierenland	Deest - Boven Leeuwen														
	Rivierenland	Rossum - Zaltbommel														
24AG(24AV-24AM)	Scheldestromen	Zuid-Beveland West, Westerschelde Hansweert														
24BA	Scheldestromen	Zak van Zuid-Beveland														
24R	Scheldestromen	Zuid-Beveland Oost, Westerschelde														
24AE	Scheldestromen	Zuid-Beveland Oost, Oosterschelde														
25I	Vallei en Veluwe	Eemdijk - Spakenburg (deel Westdijk)														
25L1	Vallei en Veluwe	Noordelijke Randmeerdijk VV														
25K	Vallei en Veluwe	Apeldoorns Kanaal														
25P	Vallei en Veluwe	Grebbedijk														
27D	Zuiderzeeland	Zuidermeerdijk-MSNF														
27E	Zuiderzeeland	IJsselmeerdijk														
27C	Zuiderzeeland	Kunstwerken Noordoostpolder														
	Zuiderzeeland	Normtraject 8-4														
27G	Zuiderzeeland	Oostvaardersdijk														

Legend: Preliminary study Planning Implementation Fast Lane

Table B1.3 Measures in Meuse Administrative Agreement

Code	Management Authority	Project name	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
60E	Limburg	Heel (19I)														
60J	Limburg	Nieuw-Bergen (19N)														
60L	Limburg	Beesel (19P)														
60M	Limburg	Belfeld (19Q)														
60N	Limburg	Kessel (19R)														
60AI	Limburg	Willem Alexanderhaven C (23C)														
60B	Limburg	Steyl-Maashoek (19D)														
60K	Limburg	Buggenum (19O)														
60F	Limburg	Arcen (19J)														
60D	Limburg	Thorn (19H)														
60G	Limburg	Well (19K)														
60I	Limburg	Baarlo (19M)														
60O	Limburg	Blerick-Groot Boller (19S)														
60H	Limburg	Venlo Velden (19L)														

Legend: Preliminary study Planning Implementation Fast Lane

Table B1.4 Pre-financing

Code	Management Authority	Project name	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
03AC	Hollands Noorderkwartier	Monnickendam Binnenstedelijk														
11A and 12A	Hollands Noorderkwartier	Katwoude 11a en 12a														
12B	Hollands Noorderkwartier	Katwoude 12b Nieuwendam														
03AA	Hollands Noorderkwartier	Katwoude														
03AD	Hollands Noorderkwartier	Monnickendam Zeedijk														
03AE	Hollands Noorderkwartier	Schellingwoude														
14D	Brabantse Delta	Willemstad - Noordschans														
14A	Brabantse Delta	Geertruidenberg en Amertak														
60AE	Limburg	Lob van Gennep														
60AF	Limburg	Venlo 't Bat														
21A	Rijn en IJssel	Rijnkade Arnhem														
21E	Rijn en IJssel	Industrieterrein Grutbroek														
24AK	Scheldestromen	Sint Annaland														

Legend: Preliminary study Planning Implementation Fast Lane

Table 1.5 Funding transfer, room for the river - dike upgrades

Code	Management Authority	Project name	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
19M	Limburg	SLM Baarlo (19M) - Niet gerealiseerde keringen														
19K	Limburg	SLM Well (19K) Niet aangelegde keringen														
21AI	Rijn en IJssel	WDR IJsselpoort fase 1, uitwisseling dijktraject 48-1														
13H	Aa en Maas	WDR Meanderende Maas bijdrage uit project Boxmeer - Cuijk														
13K	Aa en Maas	WDR Meanderende Maas bijdrage uit project Cuijk - Ravenstein														
13H	Aa en Maas	WDR Oeffelt bijdrage uit Boxmeer - Cuijk														

Legend: Planning Implementation Fast Lane

Table B1.6 Multi-Year Programme for Infrastructure, Space and Transport (MIRT)

Code	Management Authority	Project name	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
60F	Limburg	MIRT Arcen (19J)														
60G	Limburg	MIRT Well (19K)														
60I	Limburg	MIRT Baarlo (19M)														
60H	Limburg	MIRT Venlo Velden (19L)														

Legend: Preliminary study Planning Implementation

Table B1.7 Rijkswaterstaat

Code	Management Authority	Project name	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
	Rijkswaterstaat	Dijkversterking Marken														
	Rijkswaterstaat	IJmuiden Dijk														
	Rijkswaterstaat	IJmuiden kunstwerken														
	Rijkswaterstaat	SVK Hollandse IJsselkering (schuif)														
	Rijkswaterstaat	SVK Hollandse IJsselkering (bestuursovk)														
	Rijkswaterstaat	Vlieland Waddenzeedijk														
	Rijkswaterstaat	Voorhavendijken Noordelijke Lekdijk (bestuursovk HDSR)														
	Rijkswaterstaat	Keerschuif Prs. Marijkesluis														
	Rijkswaterstaat	Middeneiland Ramspol														
	Rijkswaterstaat	Grondlichaam Maeslantkering														
	Rijkswaterstaat	Oesterdam														
	Rijkswaterstaat	Sluis Weurt														
	Rijkswaterstaat	Sluis Farmsum														
	Rijkswaterstaat	Sluizen Houtribdijk														
	Rijkswaterstaat	Wilhelminasluis														
	Rijkswaterstaat	Duinwaterkering Ameland														

Legend: Planning Implementation

Annex 2 Programming tables for Freshwater Delta Plan

Table B2.1 shows the programme for the 2022-2027 Freshwater Delta Plan. Table B2.2 contains the forecast investments for the freshwater regions and the main water system. A more detailed description of project progress can be found in background document C, Freshwater Delta Programme: Progress 2023.

Table B2.1 Programming of measures in Freshwater Delta Plan, second phase

High-Lying Areas with Sandy Soils (North, East & South)	DF total (mln)	2022	2023	2024	2025	2026	2027
Implementation programme, High-Lying Areas with Sandy Soils Northern Netherlands High	15.15						
Implementation programme, High-Lying Areas with Sandy Soils, East	50.00						
Implementation programme, High-Lying Areas with Sandy Soils, South (Noord-Brabant)	27.70						
Implementation programme, High-Lying Areas with Sandy Soils, South (Limburg)	22.30						

Northern Netherlands Low	DF total (mln)	2022	2023	2024	2025	2026	2027
Onderzoek anti-verziltingsmaatregelen Sluis Harlingen	0.025						
Uitbreiding aanvoercapaciteit van kanalen en gemalen naar de oostelijke hoger gelegen regio's Hunze en Aa's en Vechtstromen en DOD	0.05						
Verbetering infrastructuur Noordkop	0.5						
Proeftuin landbouwprojecten: Zoete toekomst Texel (2e fase)	0.2						
Proeftuin landbouwprojecten: Experiment alternatief grondgebruik laag gelegen veengebieden	0.125						
Proeftuin landbouwprojecten: Vervolg Spaarwater Flevoland	0.1						
Proeftuin landbouwprojecten: Stimuleren implementatie Spaarwatermaatregelen + Boeren-Meten-Water	0.15						
FRESHEM-NL	3.9						
Onderzoek: Watervraag en opslagwater door industrie (meerdere projecten: Noord-Holland en Groningen)	0.1						
Ondergrondse drinkwateropslag (pilot + uitvoering)	1.5						
Hergebruik RWZI effluent Garmerwolde)	3.1						
Beekherstel en herprofilering leggerwaterlopen: Inrichting Beekdal Linde	1.1						
Beekherstel en herprofilering leggerwaterlopen: Inrichting Beekdal Koningsdiep	1.1						

Legend: Implementation Research Pilot projects

Table B2.1 Programming of measures in Freshwater Delta Plan, second phase

Northern Netherlands Low	DF total (mln)	2022	2023	2024	2025	2026	2027
Beekherstel en herprofilering leggerwaterlopen: Beekherstel Hunze en Drentsche AA	5.6						
Proeftuin landbouwprojecten: Salfar	0.625						
Proeftuin landbouwprojecten: Zoet op Zout Lau-wersmeer	0.6						

Rivierengebied	DF total (mln)	2022	2023	2024	2025	2026	2027
Verplaatsing inlaat Alblasserwaard	0.8						
Vergroten van de wateraanvoer Bloemers/Ufford	0.176						
Aanpassing gemaal de Pannerling	0.78						

Main water system	DF total (mln)	2022	2023	2024	2025	2026	2027
Waterbesparende maatregelen sluiscomplexen Maas	6.70						
Internationale samenw. Stroomgebied Maas en Roer	0.35						
Voortzetting Slim Watermanagement en beheer	18.30						
KZH odpracht materieel (IK interne kosten gedeelte) KZH odpracht personeel (EPK gedeelte)	7.17						
Beheer maatregelen vergroten debied stuw Hagestein besparen drinkwater	0.53						
Maatregelen beperken verzilting spuisluizen Den Oever	15.40						
Pré-verkenning integrale aanpak verzilting sluizen Kornweerderzand	0.37						
Flexibilisering stuwprogramma Driel	0.49						
Vergroten robuustheid wateraanvoer Twentekanalen (eefde)	2.30						
Ontwikkelen BOS voor Rijntakken inc. Verzilting	1.70						
Verkennen monitoring extra meetpunten	1.50						
Verkennen planuitwerking tegen verzilting kanaal Gent-Terneuzen	1.40						
Maatregelen beperken verzilting zeescheepsluizen Delfzijl	1.20						
Realisatie twee waterbergingslocaties in laagtes Maaswerken	1.50						

Legend: Implementation Research Pilot projects

Table B2.1 Programming of measures in Freshwater Delta Plan, second phase

Western Netherlands	DF total (mln)	2022	2023	2024	2025	2026	2027
Doorvoer Krimpenerwaard	7.5						
Vervolgmaatregel Brielse Meer	0.2						
Inlaatwerk Kromme Rijn	5						
Beter benutten Bergsluis	1.4						
COASTAR pilot brakwaterwinning kust(duinen)	0.6						
COASTAR pilot Rotterdam	0.48						
Temmen brakke kwel	2						
COASTAR pilot Westland	0.75						
COASTAR pilot brakwaterwinning polders (droogmake-rij)	1.05						
Harnaschpolder (Delfland), hergebruik voor gietwater	3.25						

Southwest Delta	DF total (mln)	2022	2023	2024	2025	2026	2027
Slim regionaal waterbeheer	2.00						
Pilots Hergebruik effluent	0.80						
Aanvoer/hergebruik effluent Zeeuws-Vlaanderen	2.30						
Uitrollen Proeftuinen	6.90						
Uitbreiden proeftuin	1.00						
Optimalisatie watersysteem	1.70						
Krekenvisie West-Brabant	2.70						
Grondwatermodellering Zeeland/West Brabant	0.40						
Ondergrondse wateropslag Wolphaartsdijk onderzoek + infiltratie	1.30						
Optimalisatie zoetwatersituatie PAN-polders West-Brabant	0.80						
Optimalisatie benutting landbouwwaterleiding	0.80						
Benutting brak grondwater voor drink- en proceswater	0.30						
Gebruik water Brabantse Wal	2.50						

Legend: Implementation Research Pilot projects

Table B2.2 Forecast investments for measures in Freshwater Delta Plan, second phase. See background document C for the forecast by project.

Forecast total as at 12-6-2024		Total	2022	2023	2024	2025	2026	2027	2028
High-Lying Areas with Sandy Soils Northern Netherlands High	Contribution from Regions	44,849,000	0	3,358,992	14,580,608	8,969,800	8,969,800	8,969,800	0
	Delta Fund contribution	15,150,999	3,340,548	1,456,016	1,456,016	1,941,355	1,941,355	2,229,204	2,786,505
	Total Delta Fund and Regions	59,999,999	3,340,548	4,815,008	16,036,624	10,911,155	10,911,155	11,199,004	2,786,505
High-Lying Areas with Sandy Soils Northern Netherlands layer	Contribution from Regions	48,339,000	0	1,394,000	14,182,500	12,606,000	10,896,500	9,260,000	0
	Delta Fund contribution	18,413,935	0	2,027,915	3,289,872	4,445,872	4,129,830	3,445,659	1,074,787
	Total Delta Fund and Regions	66,752,935	0	3,421,915	17,472,372	17,051,872	15,026,330	12,705,659	1,074,787
High-Lying Areas with Sandy Soils, East	Contribution from Regions	150,000,000	0	30,700,762	20,712,692	30,662,256	30,662,256	37,262,034	0
	Delta Fund contribution	50,000,000	10,640,498	4,707,309	4,707,309	6,276,411	6,276,411	7,729,806	9,662,257
	Total Delta Fund and Regions	200,000,000	10,640,498	35,408,071	25,420,001	36,938,667	36,938,667	44,991,840	9,662,257
High-Lying Areas with Sandy Soils, South	Contribution from Regions	146,772,003	0	4,065,480	50,305,816	47,537,825	7,754,241	7,754,241	29,354,400
	Delta Fund contribution	50,000,000	9,126,480	18,238,624	5,095,856	4,840,747	1,456,747	1,456,747	9,784,800
	Total Delta Fund and Regions	196,772,003	9,126,480	22,304,104	55,401,672	52,378,572	9,210,988	9,210,988	39,139,200
Main water system	Delta Fund contribution	0	0	0	0	0	0	0	0
	Delta Fund contribution	58,674,000	739,000	5,746,000	6,497,000	9,136,000	9,647,000	14,955,000	11,954,000
	Total Delta Fund	58,674,000	739,000	5,746,000	6,497,000	9,136,000	9,647,000	14,955,000	11,954,000
Western Netherlands	Contribution from Regions	46,051,116	1,905,759	4,399,928	3,545,608	7,991,173	20,313,029	7,895,619	0
	Delta Fund contribution	21,188,095	0	1,186,270	1,751,406	7,514,819	6,353,200	2,514,400	1,868,000
	Total Delta Fund	67,239,211	1,905,759	5,586,199	5,297,014	15,505,992	26,666,229	10,410,019	1,868,000
Southwest Delta	Contribution from Regions	72,791,659	6,250,000	2,681,672	4,607,137	27,248,488	23,896,988	8,107,375	0
	Delta Fund contribution	22,403,365	1,000,000	955,615	1,738,696	9,616,933	6,835,495	1,897,427	359,199
	Total Delta Fund	95,195,024	7,250,000	3,637,287	6,345,833	36,865,421	30,732,483	10,004,802	359,199
River Area	Contribution from Regions	5,272,356	0	2,872,356	600,000	1,200,000	600,000	0	0
	Delta Fund contribution	1,757,452	0	765,962	235,241	556,250	200,000	0	0
	Total Delta Fund	7,029,808	0	3,638,318	835,241	1,756,250	800,000	0	0
	Total DF	**237,587,847**	**24,846,526**	**35,083,711**	**24,771,395**	**44,328,387**	**36,840,038**	**34,228,243**	**37,489,548**
	Total region	514,075,134	8,155,759	49,473,190	108,534,361	136,215,541	103,092,814	79,249,069	29,354,400

Overview of background documents (only in Dutch)

A. Report Basis in beweging - An analysis of changing assumptions and their significance for the organisation and working methods of the Delta Programme
B. Advisory document from the Physical Living Environment Consultation for DP 2025 Body and Delta Commissioner's response
C. Freshwater Delta Programme: Progress Report 2023
D. Spatial Adaptation Progress Report for 2023
E. Report Op Waterbasis in de Maasvallei

Credits

The 2025 Delta Programme is a publication of the Ministry of Infrastructure and Water Management, the Ministry of Agriculture, Fisheries, Food Security and Nature, and the Ministry of Housing and Spatial Planning.

Photography

Cover: Bollard indicating the water depth on the road with rising water in the Ooijen-Wanssum high-water channel, September 2021. Photo: Tineke Dijkstra
P. 14: Water Storage area in Haastrecht Hooge Boezem, June 2024. Photo: Jos van Alphen
P. 24: Installation of pumps on the Afsluitdijk, May 2024. Photo: Jos van Alphen
P. 37: Schouwen-Duiveland. Photo: Marcel Kentin
P. 38: Dike upgrade in Zwolle, March 2024. Photo: Jos van Alphen
P. 45: HWBP project, Schiermonnikoog Dike and dune reinforcement, September 2021. Photo: Tineke Dijkstra
P. 46: Delta Commissioner Co Verdaas on a working visit in Zeeland discussing freshwater availability and innovative water retention measures. May 2024. Photo: Marcel Kentin
P. 51: Gillis Klompe's farm in Dreischor. Photo: Marcel Kentin
P. 52: Facade Gardens in Rotterdam Noord, September 2020. Photo: Tineke Dijkstra
P. 60: Wadden area near Terschelling, Photo: Mischa Keijser (via rvo.nl)
P. 84: Weir at Driel open due to high river discharge, December 2023. Photo: Jos van Alphen

Illustrations and text of the outlines for each chapter

Renske Postma, Tekstbureau Met Andere Woorden (www.dekrachtvantaal.nl)
Karin Schwandt, Schwandt Information Design (www.schwandt.nl)

Text and editing (Dutch)

R&Z content makers (www.ravestein-zwart.nl)

Design and coordination

Dutch: VormVijf
English: Things to make and do

Translation

Pete Thomas

The Netherlands is a low-lying country with a lot of water. The national Delta Programme protects the Netherlands against flooding, ensures that there are adequate supplies of fresh water and contributes to climate-resilient and water-robust spatial planning. The website of the national Delta Programme has more information about the work on our delta.

The national Delta Programme brings together the national government, provincial and municipal authorities, and water authorities. Research institutes, stakeholder organisations, the general public and business are also actively involved.

WWW.DELTAPROGRAMMA.NL

This is a publication from:
Ministry of Infrastructure and Water Management
Ministry of Agriculture, Fisheries, Food Security and Nature
Ministry of Housing and Spatial Planning

September 2024

NATIONAL DELTA PROGRAMME

ALL OUT FOR A SAFE AND LIVEABLE DELTA