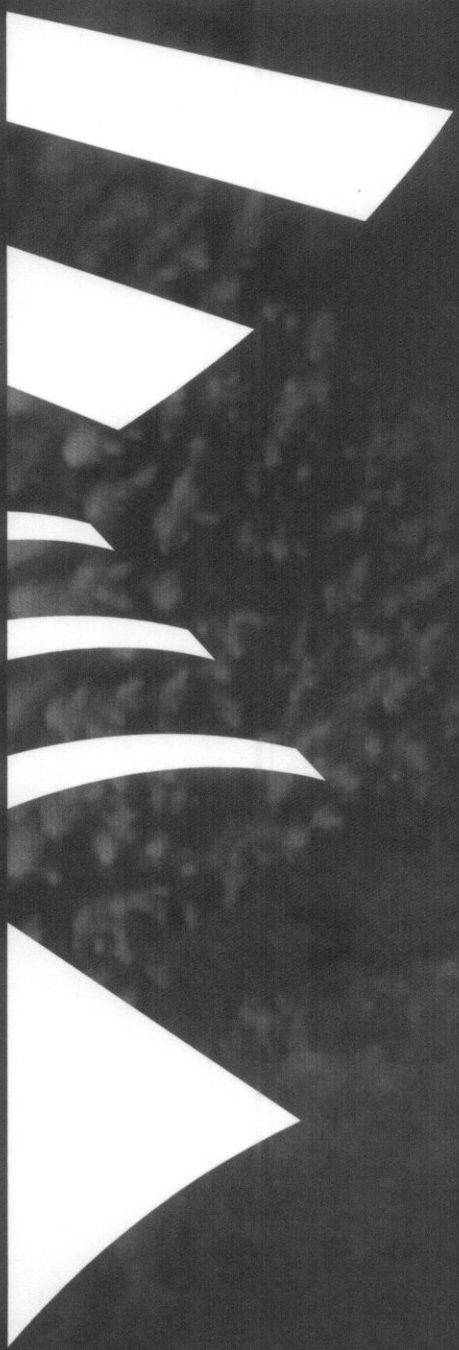

WATER
KADER

Fourth National Policy Document on Water Management Government decision

Abridged version

Ministry of Transport, Public Works and Water Management

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Fourth National Policy Document on Water Management Government decision

Abridged version

Directoraat Generaal Rijkswaterstaat
Informatie en Documentatie
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Colophon

The Fourth National Policy Document on Water Management is the product of close cooperation between the Netherlands Ministry of Transport, Public Works and Water Management, the Ministry of Agriculture, Nature Management and Fisheries, the Ministry of Housing, Spatial Planning and the Environment and the Association of Water Control Boards. It is also the fruit of many contributions from other organisations and individuals.

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Contents

1. Introduction

'A safe and habitable country with healthy and sustainable water systems': this is the aim with which Dutch water management faces the future in 1998, the year which marks the two-hundredth anniversary of the Netherlands Directorate-General for Public Works and Water management ('Rijkswaterstaat'). A new aim? Of course not. The first part of it, to ensure a safe and habitable country, has existed for centuries and is in fact what gave rise to the establishment of Rijkswaterstaat in 1798. After all, the nature of our low-lying, waterlogged country is such that it must constantly be protected against flooding from the sea and the rivers. At the same time, constant effort has had to be invested in the consolidation of the soft subsurface in order to keep the country habitable and cultivable.

Water systems approach

The second part of the aim, to ensure 'healthy and sustainable water systems', has a much shorter history. It was not until the late sixties that the problem of surface water pollution led to systematic action to tackle the main sources of pollution. By that time, the poor quality of the surface water was presenting a threat not only to public health but also to wildlife habitats. The two halves of the aim were initially addressed via a two-track policy approach, but during the eighties there was a growing realisation that the aim of public safety and habitability could not be viewed in isolation from that of healthy and sustainable water systems. Moreover, it became clear that water management could achieve these aims much more effectively and efficiently if the policies directed at them were not only closely interrelated with each other but also carefully coordinated with other relevant areas of policy. In the mid-eighties, this realisation became known as integrated water management.

Integrated water management

This philosophy was developed further in the Third National Policy Document on Water Management (NW3), published in 1989, and integrated water management and the water systems approach have become key concepts in the water management world of the nineties. Thanks to the support the policy document attracted from the various authorities concerned with water management in the Netherlands, much of it has now been translated into concrete measures and the combined aim is somewhat closer to achievement. The policies laid down in NW3 will therefore be maintained and extended unless the present Policy Document specifically states otherwise. The integrated policies and practices outlined in NW3 put us on the right path and the Fourth National Policy Document (NW4) continues in the same general direction. Changes have been made only where it is necessary to modify policies in the light of more recent events (such as the floods of September and October 1998) and factors such as continuing ground subsidence and expected climate change. The results of this process are formulated in the policy directions mapped out in this Fourth National Policy Document on Water Management.

Public consultation process

The Fourth National Policy Document is the result of a public consultation process which gave all those involved in Dutch water management the opportunity to express their views on the future of water management either in person or in writing. In 1996, the project team published two discussion papers to provide a basis for two series of national and regional meetings held in 1996

and 1997. The meetings were attended by over 3000 people and revealed that considerable improvements had been achieved in the internal coherence of water management, in relations between water quality management and water quantity control, and in relations between surface water and groundwater management since the appearance of the Third National Policy Document. They also revealed that important organisational advances had been made with regard to the integrated management of surface waters. However, it also emerged that, despite the greater policy emphasis on coordination with other relevant areas of policy, less practical progress had been made in this direction than in improving the internal coherence of water management. A brief summary of the first series of discussions and written reactions to the 1995 discussion paper appeared in the autumn of 1996.

'Strengthening, broadening and deepening' of existing policy and 'deepening' of management

The 1995 discussion document presented three elements which it was thought might provide a possible structure for the Fourth National Policy Document: strengthening, broadening and deepening. These have had a clear influence on the development of the key policies.

Stengthening of policy implementation:

Both the public discussions and the results of the Dutch Aquatic Outlook project indicated the need to intensify efforts to achieve the objectives and target scenarios of the Third Policy Document. This was particularly true of measures to deal with emissions, aquatic soils, water depletion and flood protection.

Broadening of the policy field:

An efficient and effective approach to water management problems requires closer coordination with other areas of policy. In particular, the public planning process revealed a desire to expand environmental action to include the physical planning, ecology and environmental management policy fields. There also proved to be a need to improve cooperation between water management authorities, municipalities and provinces and to ensure greater coordination between the different types of plans.

Deepening of water management:

In addition to developing the policy directions mapped out in the Third National Policy Document in greater detail and deciding how best to implement them in practice, it is important to create a climate in which new problems and priorities can be speedily identified. The main focus must be on the consequences of possible climate change for the water management field and on the long-term effects of continuing ground subsidence.

Water systems from drainage ditch to deep sea

During the process of public consultation, people frequently asked whether the new policy document would be based on the river basin approach which is now increasingly common in international circles. In response to this question, the policy document focuses on the development of an integrated approach to water systems at various levels of scale, starting close to home and moving gradually outward to the great oceans. The advantage of this approach is not only that it reveals the interrelationship between the various levels of scale, but also that it makes it easier for users and managers to identify with the issues.

Themes

Because the subjects of flood protection, water depletion, emissions and aquatic soils have been regularly in the limelight over the last few years as major policy issues on which the Fourth Policy Document would produce decisions, these themes have been given their own separate section in the policy document, alongside the consideration of the water systems as a whole.

Response to public consultation

Between 30 September 1997 and 1 February 1998, the public had the opportunity to submit written reactions on the government proposals for the new policy document. Reactions were eventually received from 99 organisations, individuals and institutions. The government's responses to these comments are being published separately but concurrently with this policy document. In several cases, the reactions have prompted amendments to the text of the policy document. Other changes have been suggested by policy developments which have occurred since the publication of the government proposals.

The plan period

The policies contained in the Fourth National Policy Document on Water Management encompass the 1998-2006 period, with occasional glimpses into the more distant future.

2. Strategy, key policies and prospects

Integrated water management

The Third National Policy Document on Water Management set out a new strategy under the name of integrated water management. This was based on the view that the aims of water management could only be achieved via an integrated approach. Integrated water management has been a success and the Fourth National Policy Document on Water Management wholeheartedly pursues the same approach. The process of public consultation revealed the need both for more vigorous implementation and for a broader and deeper approach to integrated water management. The Dutch Aquatic Outlook project has demonstrated that a number of NW3 objectives cannot be achieved within the time-limits set for them in the policy document unless policies are modified. In recent years the threat of flooding along the various branches of the Rhine and the actual floods in the Maas basin, as well as flooding caused by heavy rainfall in various other parts of the country in 1998, have made it clear that measures to prevent the repetition of these events will involve more than simply raising the dikes. A strategy directed at a sustainable solution demands measures relating to the wider situation, and not just to the dikes or the river system itself. For this reason, NW4 advocates improved coordination between policies on water management, physical planning and the environment. It argues that the coordinated policies should take account of all the various interests involved, including flood protection, agriculture, ecology, public water supplies, transport, recreation and the fishing industry. At the same time, they should provide scope for tailor-made local solutions, leading to a combination of an integrated generic approach aimed at achieving common countrywide targets and a specific regional elaboration of policies which takes account of local circumstances and opportunities. The Third National Policy Document assigns functions to the various water systems throughout the country. Since there has been no change in these, they are not reiterated in this policy document.

Major economic interests

Water is of great economic significance to the Netherlands: it is a means of transport, a production factor in agriculture and industry, the raw material of public water supplies, a cooling agent, an important factor in recreation and an intrinsic feature in the landscape, ecology, culture and history of the country. Investing in effective water management (protection and exploitation) will lay the basis for the development of a high-quality industrialised society. The replacement value of the investments protected by the flood defences is estimated at over NLG 4,000 billion. Constant consideration and care of the country's water systems is an absolute precondition for the development and preservation of the Netherlands.

A growing economy, an expanding population, the desire to build on and beside the water, the construction of new infrastructure, diffuse forms of pollution and contaminated aquatic soils, continuing ground subsidence and climate change: all these factors demand an anticipatory and proactive stance in the water management field. This can be achieved by basing physical planning not only on economic and social considerations, but also on ecological and hydrological principles. This will take time. It is often a matter of long-term processes aimed at the achievement of sustainable economic development. This is discussed in more detail elsewhere.

Responding to events

Water presents a threat whenever there is too much or too little of it, or when it is too warm or too polluted. For centuries, people in the Netherlands have been constructing and adding to an astonishing infrastructure, from drainage ditch to river system, designed to control the country's water resources and protect it against flooding. The decisions underlying their various contributions reflected the priorities of their day: agriculture, shipping and flood protection, or more recently the environment, landscape and ecology. The increasing intensity of use and contemporary requirements for the protection of property against flooding demand different policy decisions and in the future such decisions will also have to take account of the expected climate changes, rises in sea level and continuing ground subsidence.

The conclusions of the Intergovernmental Panel on Climate Change (IPCC) indicate that the greenhouse effect is already beginning to cause climate change. Though much is still uncertain, it seems likely that changes in temperature and wind patterns, a more rapidly rising sea level and changes in the discharges of the major rivers will in the longer run impose extra demands on the hydrological system of the Netherlands.

Although it is not yet possible to make precise predictions for areas like the North Sea or the Rhine basin, we must expect change and uncertainty. An additional factor is that the ground beneath the Netherlands is changing as a result of both geological processes and human activities. Declining water tables are causing compaction of clay and peat deposits and oxidation of peat. The data on climate change, ground subsidence and increased precipitation do not suggest that the main outline of physical planning as laid down in the Supplement to the Fourth Report (Extra) on Physical Planning (VINEX) and subsequent updates will need to be amended in the short or medium term. Eventually, however, national physical planning policies will have to take account of the effects of the rising sea level, ground subsidence, increased rainfall and heavier river discharges. A long-term strategy will be required to enable us to respond effectively to these developments. Two approaches will be central to this. The first will be based on managing water and water systems in the most natural way possible. Unwittingly opposing natural processes not only damages essential interests and reduces the quality of the water systems, but also demands great effort and generally proves expensive in the end. It increases vulnerability to flooding and eventually reduces the resilience of the system (see under the theme of Flood Protection). The second approach will involve an emphasis on water systems and catchment areas as the basis of policy (at both national and international level). This kind of area-specific approach will ensure coherence within water management and coordination between policies on water management, the environment and physical planning (especially with regard to agriculture, ecology and urban development).

In this policy document, the water systems approach begins with the problems closest to home. Attention focuses first on urban water and regional water management and then moves on to the sea and oceans. Proper management of the lower-level water systems provides a necessary basis for averting problems on a grander scale. Following the flooding in September and October 1998, a countrywide survey is to be conducted to identify necessary changes in water management infrastructure. The survey report is expected to appear in 2000 and will, wherever relevant, take account of gradual processes like ground subsidence and climate change. The Committee on Integrated Water Management will be asked to study the survey report and give its advice.

Main aim of NW4

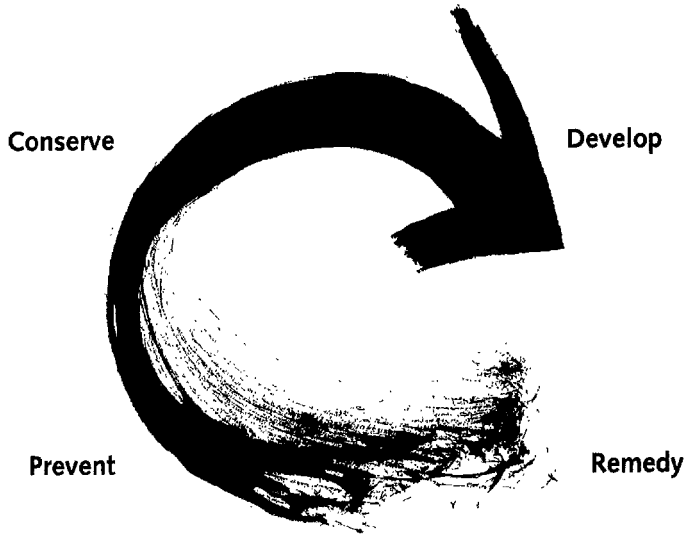
To have and maintain a safe and habitable country and to develop and maintain healthy and resilient water systems which will continue to guarantee sustained use.

Relationship between environmental policy and physical planning policy

Early 1998 saw the publication of the Third National Environmental Policy Plan (NEPP3). The contents of that plan and those of this policy document have been carefully coordinated. Meanwhile preparations have begun for a Fifth Policy Document on Town and Country Planning. This will take account of the physical planning consequences of the water management policies outlined in this document.

Increasing integration and involvement

Over the last 25 years, there have been rapid advances in the Netherlands not only in water management policies but also in policies on the environment, physical planning and ecology. These have helped to guide the development of society in this densely populated, highly developed, low-lying country. Problems have been identified in a wide variety of sectors and many of them have been solved. Unfortunately, there has not always been sufficient recognition of the logical interrelationships between the various policy fields. Greater integration is needed. When problems were identified in the past, the debate has often been diverted from 'how can we all work together to tackle this?' to 'who's to do what?' and, most importantly of all, 'who will pay for it?'. The future water management policy represents a change: a switch from addressing problems as they arise to looking ahead and encouraging positive developments. The water systems need to be flexible and resilient. The diagram below shows how to achieve this.



The arrow indicates the intended order of measures. Instead of constantly remedying deficiencies or mistakes, it will be preferable wherever possible to prevent damage occurring in the first place, to conserve what is good and if possible to create scope for the exploitation of new opportunities. Policy has moved further in some areas than in others. Some areas are currently making the

transition from one stage to another. Each section of this policy document includes an example illustrating how policy is being developed. Water management affects many different interests, involves many different authorities and is important to the whole population of the Netherlands.

As target groups become accustomed to being involved in policy development and implementation, traditional instruments like compulsion and transaction start to evoke resistance. For this reason, it is extremely important to invite different sections of society to get involved and contribute to policy development at an early stage. Arrangements for this will be developed further in the water management field over the coming plan period. The activities in many municipalities surrounding the local implementation of sustainable development (Agenda 21) set an example in this respect.

Increasing resilience

An important principle for future water management is to base measures on natural processes and to restore the resilience of water systems. This can be achieved by:

- Encouraging water conservation and buffering to make areas more self-sufficient. This approach can help to prevent flooding and expand wetland areas. It will ensure that problems are resolved more within catchment areas rather than transferred to adjacent areas. It will also have the additional advantage of alleviating current problems with regard to water depletion and contamination by non-indigenous water.

- Increasing the self-regulatory capacity of water systems by restoring the original dynamic processes to streams, rivers, estuaries and coasts. This means desisting from further artificial constriction of watercourses and ensuring a vigorous follow-up to the cautious experiments so far made with restoration measures. This will also contribute to the expansion of the National Ecological Network of protected areas in the Netherlands.

But this by itself will not be enough. Extreme conditions like storms at sea and peak river discharges demand extra space: room to interrupt the vicious circle of subsiding ground and ever higher dikes, or of urban encroachment in flood-prone areas leading to greater protection against flooding. This calls for a step-by-step approach pursued over many years. Sustainable flood protection policies mean that unnecessary building in river floodplains and coastal dune areas must be prevented. At the same time, the winter beds must be deepened and the flow area expanded in order to reduce the backing up of water at times of peak discharge. Polder collecting systems must be subject to a similar approach. Physical planning authorities at all levels will have to take account of these needs.

In terms of reducing pollution, much has already been achieved, but that is no reason to sit back and rest on our laurels. Use functions are still being restricted and necessary modifications of the hydrological system complicated by continuing diffuse pollution and the legacy of past pollution in the form of contaminated aquatic soils. Pollution prevention, the standstill principle and risk reduction measures in relation to existing pollution will continue to be major policy principles. The problems cannot be solved from one year to the next. They demand a long-term programme including effective action to tackle diffuse sources (not forgetting less well-known micropollutants) and the completion of action to deal with contaminated aquatic soils.

Area-specific policies

The water management policies outlined here can only succeed if they are pursued in cooperation with those directly involved and therefore through measures in their direct vicinity. This means that local and regional problems must be addressed wherever possible at that level. Making room for water also means creating scope for local solutions. The achievement of the objectives demands an area-specific approach permitting action in pursuit of the best possible outcome within the framework of the generic policy. Resilience must be achieved by basing decisions on the use and infrastructure of areas on hydrological principles as well as economic, ecological, social and administrative considerations, and by ensuring that divisions between areas coincide more closely with those between water systems. An area-specific approach of this kind will also create opportunities for tackling the problem of diffuse pollution by seeking to change behaviour through tailor-made solutions and targeted public education.

This means that national objectives and standards must leave scope for area-specific policies at local and regional level. This requires a new approach and the modification of norms and targets set in the Water Evaluation policy document.

As the Netherlands goes into the twenty-first century, it will certainly require new large-scale infrastructure and new areas of urban expansion. These will in every case impact on the hydrological system of the country. Efforts will therefore be made to mitigate the effects or (if necessary) provide compensation for the water systems affected.

A new approach to standards

The Third National Environmental Policy Plan gives details of the national system of environmental standards for substances. The main features of this system and the approach to standards also apply to water management policy.

Most parts of the system of standards will remain at present unchanged. This includes the statutory norms (largely based on EC directives) for the quality of surface water to which specific functions have been assigned (preparation of drinking water, bathing water, fishing, shellfish cultivation), for discharges of black-listed substances, and for discharges of oxygen-absorbent substances and phosphates and nitrogen compounds in urban waste water. Nor will there be any change in the operation of the non-statutory standards given in the CIW/CUWVO guidelines for emissions from various types of companies. The phrase 'at present' is important here, since the EU is currently working on a new structure of water-related regulations, the result of which for national policies is as yet unclear.

The system of non-statutory Dutch standards for the quality of surface water will, however, be subject to some modification. Minimum quality objectives were laid down in NW3 in the form of 'general environmental quality standards (quality objective 2000)' and in the Water Evaluation policy document as 'limit values'.

However, the present limit value is a moving average and therefore does not lend itself easily to prioritisation. The target values for micropollutants are set fairly randomly somewhere between the maximum admissible risk (MAR) and the negligible risk (NR) levels. The variation in the status of individual substances confuses the assessment of the overall quality of the water and aquatic soils

and therefore reduces the usefulness of the limit value in relation to a risk-based prioritisation of emission reductions. In the case of substances which occur naturally in the environment, such as nutrients and heavy metals, there is also a need to take greater account of local natural background levels.

Where micropollutants are concerned, water quality policies will be based on two fixed measures: the MAR level as the basic quality standard and the target value. In the case of nutrients, the only measure will be a basic quality standard. Throughout the country, there must be a degree of freedom to set local priorities for the achievement of these objectives. In this respect, however, account will need to be taken both of national and international agreements on emission reductions and of the requirements of water systems further downstream (i.e. no transfer of problems).

In the case of micropollutants, the basic quality standard will be based on the MAR and the target value on the NR level, with account being taken of the natural background level. The MAR and NR levels will be established scientifically and harmonised across the country. In this respect, due regard will also be paid to international standards frameworks. In order to build in a safety margin allowing for combined toxicity, the NR level will be a factor of 100 below the MAR level. The MAR level will only be adjusted as and when such modification is required by the emergence of new scientific understandings or international harmonisation of standards. In the case of pesticides, the MAR level will be harmonised with licensing policy. The present limit and target values for micropollutants will no longer be water quality objectives.

Water management authorities have a duty to strive to achieve the MAR level. The extent to which that level is exceeded is an important measure in relation to source-oriented policies. Working on the basis of risk assessments, priority will be given to reducing emissions of substances which most seriously exceed the MAR level and which have the greatest impact.

Because of the naturally wide regional and other variations and the large number of water types, standards relating to nutrients and other quality parameters call for an area-specific approach. For stagnant waters vulnerable to eutrophication, the basic quality standard will continue to be the present limit values given in the Water Evaluation policy document as the average summer values for nitrogen and phosphate. In addition, a target value for phosphate will be included for these waters. For other surface waters, these values will merely be guidelines.

Depending on the functions of the individual water system and the natural conditions, standards for other surface waters may vary from these countrywide norms. The only proviso is that the water system must at least be protected at the 'first trophic level' (see CUWVO policy document on ecological standards for surface waters in the Netherlands).

In cutting emissions, priority must be given to those substances which exceed the basic quality standard. In this respect, there is a duty to strive to achieve that level in the course of the plan period. The long-term goal remains the target value. For this reason, there must be no relaxation of effort even where concentrations of substances are below the MAR level. (This is to prevent problems being passed on to other water systems.) Additional requirements and further prioritisation aimed at the eventual achievement of the target value will be decided on an area-specific basis for each individual water system, and will be tailored to its functions. In addition to

laying down standards for substances, it is also important to establish ecological objectives for various waters, related to water quality parameters. For the regional waters, these can be based on the CUWVO policy document on ecological standards. In the case of the government-managed waters, however, the basis will be the AMOEBE diagrams contained in NW3 and the Dutch Aquatic Outlook, and there will be further harmonisation with the model ecosystem types developed as part of nature policy.

Restoration of water systems

As recorded in the Dutch Aquatic Outlook, measures to reduce emissions - in particular those from point sources - are now so far advanced that it is worth making new investments in physical measures to restore the ecology of water systems. These will usually be accompanied by other measures to tackle diffuse pollution and remove contaminated sediments. The restoration of water systems will be placed in a broader context: restoration where pollution has been sufficiently reduced or where water management infrastructure limits resilience, and development in places where new infrastructure is being created.

Prospects

The policies in this document are expected to produce a further improvement in the functioning of water systems. During the lead-up to the policy document, the previous government proposed to make an extra sum of over NLG 3 billion available for flood protection measures in the period through to the end of 2015. This sum is intended to fund the following measures (in descending order of priority): to restore the revetments of the dikes around the coast and the IJsselmeer, to guarantee the safety of areas protected by river dikes and to protect against flooding in the undiked sections of the Maas (Grensmaas and Zandmaas). This financial injection will be sufficient to fund most of the new approach to flood prevention along the major rivers - an approach which will not only provide lasting protection for the areas themselves, but will also have a positive impact on the ecological and recreational value of the river flood plains.

This approach, aimed at increasing the resilience of water systems by basing measures so far as possible on natural processes, can also be translated to other areas. The prime example is the coast, but the approach is also relevant to regional and urban water management. In the latter case, closer cooperation between municipalities and local water control boards will provide opportunities to enhance the various functions of water in the urban area and reduce adverse effects on the surrounding area. In the case of the regional waters, opportunities must be taken to increase the size of collecting and transporting systems.

The new policy of strengthening the relationship between water management and other policy fields - the environment, physical planning and ecology - should prove beneficial to all the policy fields involved. In the physical planning field, the new approach will mean in practice that water is regarded as a basic factor on which to structure planning during the drafting or amendment of regional structure plans and local development plans and during the drafting of the Fifth Policy Document on Town and Country Planning.

Strengthening that relationship (especially at regional level, by creating a heavier emphasis on and greater scope for area-specific policies) will provide opportunities for the regional water systems and hence indirectly for the major waters. In addition, restoration measures and new hydraulic

design measures in the major waters will gradually enhance the sustainability of those systems. Through to the end of 2010, the government will invest extra resources (1999-2003: NLG 56 million; 2004-2010: NLG 700 million) in large-scale habitat creation. The resulting major wildlife areas will be intended to improve amenity in the densely populated western Netherlands conurbation, strengthen the identity of the Netherlands as a country of wetlands and preserve forms of biodiversity typical of the country. Recreational facilities will form a major element in these plans.

Further progress in combating water depletion seems to be achievable through a combination of function modification, water management measures and - in some cases - restricting or reallocating licences for groundwater abstraction. It is still thought feasible to achieve the objective of rehabilitating 40% of the area affected by 2010, although to do so will require considerable effort on the part of the provincial authorities and water control boards.

There is currently particular concern about the contamination of aquatic soils by surface water pollution from diffuse sources. The Action Plan on Diffuse Sources represents a major move in the right direction and is the first step towards the achievement of longer-term water and soil quality goals. Contaminated sediments increase the cost of management and maintenance. There is some prospect of improvement through the use of simple treatment technologies (sand from dredging spoil), but this can cope with only a very small proportion of the total amount of dredgings. The construction of large-scale spoil storage depots in the Ketelmeer and the Hollandsch Diep and the establishment of other depots in Zeeland and Limburg will provide greater capacity for the storage of severely contaminated dredging spoil. This will create new opportunities both for maintenance dredging in navigational waterways and ports and for dredging to remove seriously polluted sediments elsewhere. In some regions, the absence of any prospect of sufficient storage capacity is a problem. On the basis of current budgets, it will be many years before measures to clean up severely contaminated sites and restore functions in various localities can be completed.

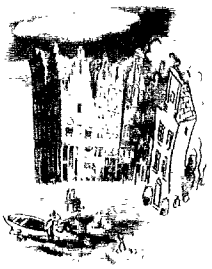
3. Water systems

This section focuses on water systems, starting locally and working outwards. It looks first at the regional waters, beginning with the water in built-up areas. Then it turns to the major rivers, the Blue Heart and the southern delta. Finally, it discusses the coast, the sea and the oceans.

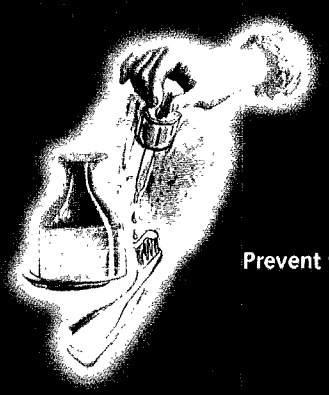
The total amount of water available to the water systems in the Netherlands is determined principally by discharges from the rivers Rhine, Maas and Scheldt and to a lesser extent by the smaller transborder rivers (like the Overijsselse Vecht) and by precipitation. The sea level and river discharges have a major influence on water levels, water movement and salinisation in the lower reaches of the rivers and in the IJsselmeer. There is also a close relationship between the regional systems and the major waters. In periods of wet weather, excess water from drains, ditches, streams, canals and other collecting and transporting systems is discharged into the major waters. In periods of drought, on the other hand, water is fed into these systems from the major waters in many parts of the Netherlands. In areas below sea level this is important not only for agricultural purposes (crop cultivation and watering livestock), but also to maintain the right water levels in the polders (to prevent oxidation and compaction) and to flush away excess salt and nutrients (to prevent salinisation and eutrophication). The IJsselmeer is an important reservoir, supporting water management in the provinces of Friesland, Groningen, Drenthe, Flevoland and North Holland both in excessively wet periods and in times of drought. In addition to the hydrological relationships, there are of course also close links in the ecological field (fish and bird migration) and as regards use functions (navigation and recreation).

Urban water

Preserve water in built-up areas



Base urban landscapes on water



Prevent wastage

Separate urban run-off

Waters in urban areas are an integral part of regional water systems and cannot be viewed in isolation. Nevertheless, there are reasons for devoting a separate part of this document to urban water management. The problems of flooding and groundwater seepage, waste water and water consumption are different from those in rural areas. The ecological potential of the urban water system is under-exploited. Urban water is a hitherto forgotten part of regional water systems. A new appreciation and upgrading can have extremely positive results both for urban waters themselves and for the regional systems.

Over recent years, there have been a number of promising schemes directed at more sustainable management of urban water. Major elements in these are domestic measures to save water, the separation of urban run-off from the sewerage system, the retention of rainwater in ponds and in the ground, and a new appreciation of the value of water systems in relation to the lay-out of new or established residential areas.

What are the aims?

Urban water systems should be an important basic factor underlying urban landscapes. Ecological, landscape and recreational values should provide the basis for high-quality surroundings in which to live and work in urban areas and their direct vicinity. Larger urban waterways and ports will have a transport function.

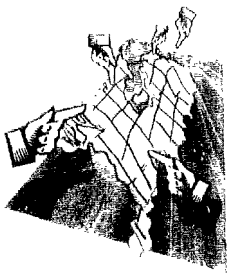
Taken together, the water systems should form a green network of nature areas and ecological corridors between built-up areas and the surrounding countryside. Sources of pollution such as storm overflows (discharges of raw sewage to relieve the system at times of heavy rainfall) and diffuse pollution will be minimised to improve the quality of the water and aquatic soils. A large proportion of rainfall will no longer be drained away immediately, but will be retained in the surface water, infiltrated below the surface, or used for specific purposes. Wherever possible, water will be recycled. Close cooperation between water management authorities and municipalities will be a routine matter.

What are we going to do?

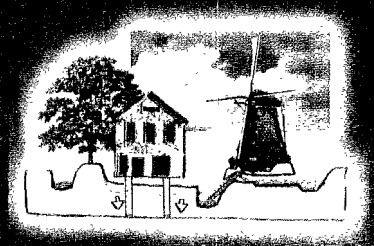
- Analyse the problems of urban water management.
- Develop consensus on water management between municipalities and water control boards and translate this into development plans and water management plans.
- Base planning of new urban developments more firmly on ecological and hydrological features and on amenity value.
- Pay attention to the water cycle (public water supplies, sewerage systems, and wastewater treatment) in relation to sustainable building.
- Continue drafting and implementing municipal sewerage plans, reducing storm overflows and removing contaminated aquatic soils.
- Encourage water conservation and recycling.
- Separate urban run-off from the sewerage system and practice subsurface infiltration.

The regional waters

Retain indigenous water



Tailor-made area-specific policies



Reduce ground subsidence

Restore water systems

Management of the usually small-scale regional water systems will be heavily influenced by the close interaction between land and water. Water management cannot be viewed in isolation from land use. Success will be wholly dependent on the adoption of an integrated approach on a regional scale. There will be a close relationship between ground subsidence and the assignment of functions. An integrated approach will be adopted to water management, physical planning and ecological and environmental policies for the region, and target local groundwater situations will become the basis for regional planning. The idea of water as a basic factor underlying planning will be the linchpin concept in regional water management.

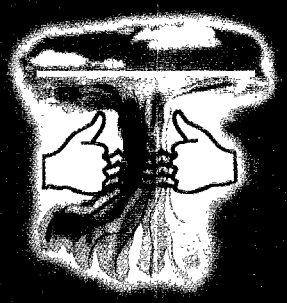
What are the aims?

Eutrophication of natural and man-made lakes will be reduced. More capacity will be created in the collection and transport systems. The natural resilience of water systems will be restored or enhanced. Pollution problems will no longer be passed on from one water system to another. Since aquatic soils will be of good quality, dredging spoil can once again be dispersed on land. Capacity for the retention of water will be increased to combat flooding and water depletion. The water depletion objectives will be achieved and maintained. Policies on water management, physical planning, ecology, the environment and agriculture will all be fully harmonised. Progress will be made in reducing/delaying ground subsidence by changing functions and taking measures, particularly in parts of the Netherlands below sea level.

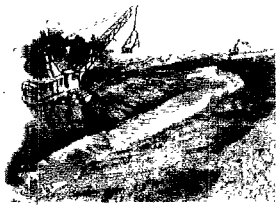
What are we going to do?

- Harmonise regional structure plans, local development plans and water management plans (provinces, municipalities and water control boards).
- Encourage the area-specific approach.
- Base planning more firmly on ecological and hydrological factors. Ecology and hydrology will become basic factors underlying planning and the assignment of functions.
- By 2002, identify goals for the groundwater situation, both to reduce water depletion and to delay the process of ground subsidence (provinces).
- As part of a more integrated approach to management, call attention to the need to include a water quality section in the statutory agreements which water management authorities can make with each other (central government).
- Include in water management plans measures to reduce flooding by designating and engineering water storage areas (water control boards).
- Restore the ecology of drainage ditches (water management authorities and the agricultural sector).
- Increase the resilience of smaller watercourses by restoring natural flow patterns (e.g. natural streams, fewer and shallower drainage channels on higher ground).

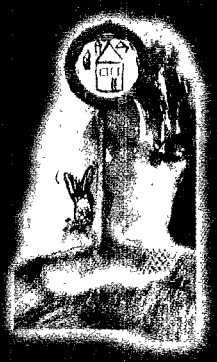
The major rivers



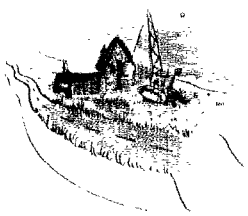
Maintain flood defences



Room for the river



Keep other activities out of winter beds



Remove unnatural obstacles

With regard to the major rivers, the main challenge over the coming decades will be to maintain flood protection in the face of larger design discharges, while at the same time conserving landscape, ecological and historical features, promoting navigational use and creating new wildlife areas. In other words, integrated river management. Sustainable flood protection along the rivers will be achieved through a combination of measures: strengthening the dikes to the agreed levels, retaining the water, giving the rivers more room to expand and taking precautionary measures.

Integrated river management calls for an approach encompassing the entire river basin. Close cooperation with the other riparian states along the Rhine, Scheldt and Maas will be vital. Water management, physical planning and habitat creation will go hand in hand.

What are the aims?

Over the coming decades, the winter beds of the major rivers will undergo dramatic changes. Fifteen years from now, the rivers should be flowing over beds designed to optimise the safe discharge of water and ice. Barges will be able to make their way easily between the seaports and the hinterland. The major rivers will form blue ribbons connecting the North Sea and areas upstream and the winter beds will be closely related in ecological and landscape terms to adjacent areas outside the dikes and beyond. A few polders and other areas will be reserved for temporary storage of water during times of exceptional peak discharges.

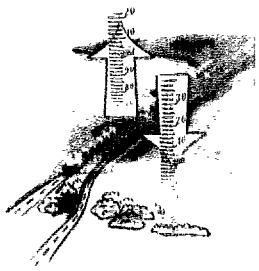
The achievement of this scenario will be associated with a radical reassignment of functions and large-scale engineering works. Rivers will be given room to expand as they did in the past, primarily by making their winter beds broader and deeper. Here and there, a main dike may be moved to landward, but landscape, ecological and historical features will be respected and integrated wherever possible. The river landscape will change, but will remain typically Dutch: small-scale landscapes will open out occasionally into sudden wide panoramas, and riverside towns and villages will not be allowed to expand at the expense of the river, but will retain their links with it. The area around the major rivers will be a splendid place for people to spend their leisure time.

What are we going to do?

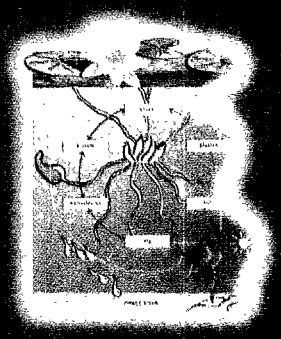
- Allow the rivers more room to expand. Wherever possible, unnatural obstacles will be removed, side-channels will be restored and winter beds will be deepened (central government).
- Draft plans to expand the flow area and storage capacity of the Rhine and the Maas and to reduce peak water levels in these rivers. These plans are to be completed by the year 2001 and implemented by 2015 (central and local government). This will create many opportunities for enhancing the National Ecological Network of protected areas.
- Dike strengthening will become the flood protection measure of last resort.
- Increase coordination between water management, physical planning and habitat creation. The long-term strategy for the major rivers will be rooted in national physical planning policy.
- Encourage the rapid establishment of international action programmes for the protection and exploitation of the major rivers and the achievement of sustainable river flood protection. A high priority will be given to implementing these programmes.
- Promote efficient navigation by dealing with deficiencies in the inland waterway infrastructure.
- Give a high priority within regional and urban water management to more prolonged retention of water within river basins.

The Blue Heart

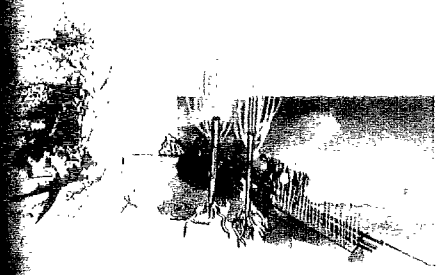
Maintain freshwater resources



Dynamic control of water levels



Prevent eutrophication



Restore banks

The IJsselmeer, the Markermeer, the chain of inland lakes between Kampen and Almere known as the Randmeren, the Amsterdam-Rhine Canal and the North Sea Canal. All man-made water systems and all part of the same storage basin: the vital Blue Heart of the Netherlands. Fed by the various branches of the Rhine and by the regional waters, the Blue Heart plays a crucial role in the water management of the northern half of the Netherlands. The Heart is engineered in accordance with current ideas, but its present infrastructure is not completely up to date. It takes no account of the wish to meet the rapidly increasing demand for water by eventually abstracting more surface water. Nor does it take account of rises in sea level. The management of water levels is unnatural, but cannot be changed without modifying the infrastructure of the surrounding areas. Where the rivers flow out into the sea, there is a sharp division between fresh water and salt. Demand for recreational uses is increasing and will have to be controlled. At the same time, commercial shipping is also of growing importance. More and more claims are being made on the limited space available. It is time to work together with the provincial authorities most closely involved to develop an integrated scenario for the future development of the IJsselmeer area.

What are the aims?

Central and provincial government need to reach a consensus on the long-term development of the IJsselmeer area. The scale and openness of the Blue Heart offer scope for almost every conceivable water-related function and its ecological features and potential for water-based recreation will make it an area of international importance. Flood protection will continue to be guaranteed. The close relationship between the IJsselmeer area and the surrounding water systems will be preserved.

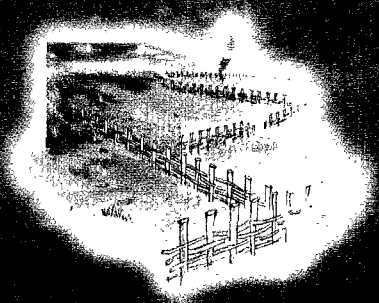
What are we going to do?

- Investigate the best form of water management for the Blue Heart, paying due attention to the requirements imposed by its functions in relation to flood protection, water supplies and reserves, wildlife and recreation. Developments should provide scope for a more natural way of managing water levels and for maximising open spaces.
- Work together with the provincial authorities most closely involved to develop an integrated scenario for the development of the IJsselmeer area, taking account of the strategic hydrological function of the area both now and in the future.
- Increase the use of surface water for public water supplies. The IJsselmeer and Markermeer should play a key role in this respect.
- Review ordinances on water levels in the Blue Heart (beginning in 2000).
- Make room for recreational facilities (subject to the conditions laid down in the Green Space Structure Plan), especially in the Randmeren, the Markermeer, and the southern part of the IJsselmeer.
- Investigate and plan habitat creation projects in consultation with the region, examining in particular the potential for the creation of a brackish water zone alongside the closure dike across the IJsselmeer. Construct wildlife-friendly banks elsewhere in the Blue Heart, in combination with dike strengthening.
- Extend the National Ecological Network in the Randmeren by means of area-specific policies to reduce nutrient loads, improve fish stocks and enhance natural water purification through bankside engineering measures.
- Develop large-scale wetland areas with recreational potential in the IJsselmeer and the Randmeren, based on ideas in relevant policy documents.

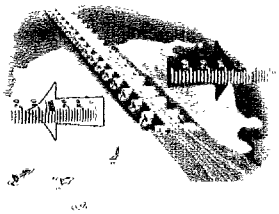
3.5 The southern delta

Guarantee flood protection

Restore links *between* delta waters



Prevent erosion of salt marshes and mud-flats



Modify management of Haringvliet sluices

The southern delta was originally an area of interconnected estuaries but has suffered great changes over recent decades. Over the years it took to implement the Delta Project (designed to protect against flooding), policy came increasingly to be directed at maximising the conservation of the area's valuable ecological features. This led both during implementation and in the years thereafter to parallel investments in the conservation and (where necessary) restoration of healthy water systems in the Eastern Scheldt, Grevelingen, Veerse Meer, Western Scheldt, Volkerak-Zoommeer and Haringvliet-Hollandsch Diep. The compartmentalisation required for greater flood protection produced sharp divisions which can also make an area vulnerable from the hydrological and ecological points of view. Partial restoration of the links between the systems would not only increase their resilience but also restore saline gradients and so provide opportunities for further enhancement of the existing ecological values.

What are the aims?

The natural processes in the Delta are to be restored and enhanced. There will be a greater exchange of water between the various compartments. Natural, gradual transitions will be restored and water levels will fluctuate in a natural way. Flood protection will be maintained.

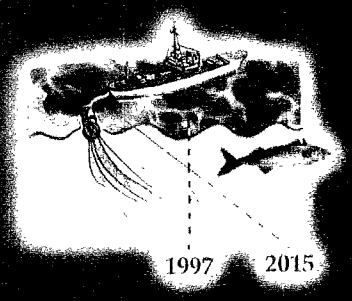
What are we going to do?

- Cooperate with the Flemish region of Belgium on the development of a joint long-term scenario for the use and engineering of the Western Scheldt estuary.
- Explore the potential for enhancing the estuarine character of the Eastern Scheldt by modifying the intake of river water from the Volkerak-Zoommeer.
- Establish policy for water management in the Volkerak-Zoommeer in 2000 on the basis of an evaluation of the 1996 decree on water levels and additional research covering the whole catchment area.
- Strive to achieve more natural saline gradients through a decision on the permanent partial opening of the Haringvliet sluices and restoration of strong tidal influences, based on information in the Environmental Impact Statement.
- Create large-scale wetland wildlife areas with recreational potential in the southern delta, on the basis of ideas in relevant policy documents.

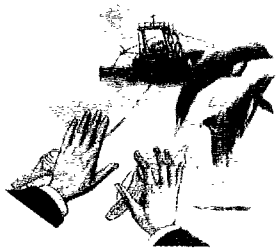
Coast and sea

Develop in harmony with the sea

Free interplay of water, sand and sediment



Prevent illegal discharges



Reduce damage from over-fishing

Coast and sea. Places where we can still experience open spaces and the free interplay of water and sand. A precious legacy. Water quality in the North Sea and coastal zone has improved markedly over the last decade, but this needs to be more clearly reflected in a restoration of the ecosystem. The coast and North Sea are subject to ever more intensive use. Such development must be sustainable and should not restrict the evolution of the coastline. The North Sea, Wadden Sea and coast need room to absorb the expected rise in sea level.

What are the aims?

The main policy aim for the coast is to avert the threat of flooding while maintaining and, where possible, increasing the scope for natural processes to occur. Movements of water and sediment must be as free as possible. In duneland areas, gradients, water seepage and movement of wind-blown sand must be restored. Intertidal areas must evolve to absorb the rising sea level.

The coastal zone will be subject to intensive use. All the dunes will be designated as nature conservation areas and intensive recreation will be concentrated in attractive beach resorts. The dunes will retain their importance in relation to public water supplies. Where different functions compete (flood protection, economic interests and the quality of coastal habitats), tailor-made solutions will be delivered via an area-specific approach. Plans to move terrestrial functions to sites offshore will be subject to the precautionary principle as it has evolved in the international and national policy field (including OSPAR, the North Sea Ministers' Conference and the Green Space Structure Plan). This means that the first step in planning and design will be to identify the consequences for the coast and the sea, to define the uncertainties surrounding these and to decide what to do about these consequences and uncertainties. This approach will permit better control of adverse impacts. Policy for the North Sea will be directed at sustainable development of the water system and sustainable use. A balance will be struck between the fishing industry and ecological aims through the adoption of an integrated approach to fisheries and the ecosystem. This will be based on the precautionary principle and an ecosystem approach. Commercial fish stocks will exceed the safe biological minimum. Shipping will be conducted safely and illegal discharges will become virtually a thing of the past. Pollution of the North Sea from diffuse sources, including atmospheric deposition, will be further reduced. The sand extraction policy for the North Sea will be up-dated. Government, users and interested parties will reach a consensus on the strategy to be pursued in the management and use of the North Sea and will cooperate closely on its implementation.

The Wadden Sea will remain a wetland area of international importance. The stress will be on the restoration and development of natural processes and ecological features in this intertidal area. Gradual transitions will be restored between land and water and between fresh water and salt. Human uses will be controlled with the aim of minimising their impact on wildlife and the environment. Within the constraints imposed by the need for sustainable protection and development of the Wadden Sea as a nature conservation area, there will still be scope for human activities of an economic and recreational type.

What are we going to do?

- Strive to ensure effective cooperation between the authorities responsible for the coast and sea. The first step will be to reach consensus on the management of the North Sea.

- Pursue a government policy of responsible and sustainable fishing: gear fisheries effort to the available stocks and fish more selectively.
- Further reduce the nitrogen load on sea and coastal waters (RAP/NAP objectives), and further reduce pollution from diffuse sources.
- Develop a government view on the future of the coast and coastal development and enshrine this view in national spatial planning policies (5thPolicy Document on Town and Country Planning).
- Publish the next National Policy Document on the Coast during the second half of 1999.
- Consult with provinces, municipalities and water control boards about controlling building activities in the coastal zone with a view to preserving and, where possible, increasing the resilience of the coast. For the duration of these consultations, interim controls will be in force in order to prevent any irreversible developments. As a rule, consent will not be given for the erection of new permanent structures in the coastal zone, although an exception will be made for areas where continuous building already exists.

Where fresh water meets salt

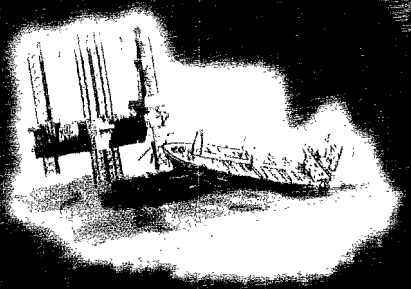
In the north-east of the province of Groningen, on the border with Germany, the Dollardzijlvest water control board is working on plans to increase the storage capacity of a river called the Westerwoldse Aa by creating a brackish intertidal area on the landward side of the dikes. This will both avert the threat of flooding and blur the dividing line between fresh water and salt. The plan will result in the loss of agricultural land but will have positive benefits in terms of water management and habitat creation.

Another example of action to increase temporary storage capacity and restore saline gradients can be found at Kroon's Polders on the island of Vlieland. There, two polders were opened up to the Wadden Sea in 1996. This was the first move in the direction of developing a dynamic, open landscape which will be flooded intermittently both by fresh water (from a duneland stream) and by the sea (at high tides). Despite the intermittent flooding, the area will remain accessible via footpaths.

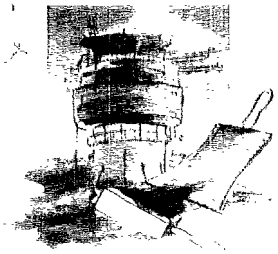
Oceans

Safeguard biodiversity

Expand international *cooperation*



Prevent extraneous influences



Clean up pollution

Oceans are not simply cold, wet, empty spaces. They contain great, and sometimes still unexplored, natural resources; they produce massive amounts of oxygen and have a decisive influence on our climate.

The oceans are still largely unscathed and their mineral resources are universally recognised as part of the common heritage of all mankind. But they are also increasingly subject to direct or indirect influence by human activities. To make matters worse, they are freely accessible and therefore exposed to the risk of over-exploitation of their biological and non-biological resources. This could lead to their becoming the ultimate dustbin for the wastes and residues of human activities. For this reason, the Netherlands will continue to strive to ensure sustainable use of the oceans, both within international organisations and through concrete action.

What are the aims?

As a delta nation heavily dependent on water, the Netherlands has a strong interest in ensuring the sustainable use of the oceans. It also possesses considerable relevant expertise. For this reason, the government wishes - while recognising its own limited resources - both to improve its knowledge of the balance between use functions and features of oceanic systems and to continue to contribute to the preservation of that balance, both regionally (in the North-East Atlantic) and worldwide. Where possible, use can be further optimised. Where necessary, safeguards must be created for the conservation of biodiversity (e.g. coral reefs) and the sustainable use of strategic natural resources. To this end, the government envisages a policy with the following main features:

- Effort to achieve broader or improved coordination between the existing forms of global cooperation on the marine environment, including biodiversity and sustainable use, and further globalisation of agreements on regional seas.
- Specific cooperation on the prevention of extraneous influences (substances and organisms) on the high seas, on cleaning up pollution (oil and chemicals) and on dealing with the results of accidents and other legacies from the past.
- Continuing work on improving scientific understanding of the behaviour of the oceans.
- Investment in knowledge transfer to less developed countries in order to increase their ability to act for themselves.

What are we going to do?

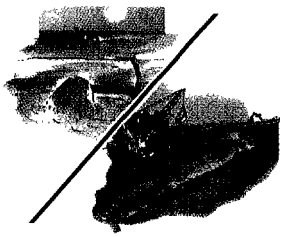
- *Cooperate with EU partners to encourage research (particularly within EUROGOOS) on the* interactions between ocean currents, storms, climate change and rising sea levels.
- Work under the London Convention to ensure that dumping of wastes at sea, where still permitted, is minimised by the use of training and auditing.
- Make an active contribution to the establishment of a worldwide convention on pollution by persistent organic pollutants (POPs).
- Contribute to a wider dissemination of knowledge about the oceans, in part via government development cooperation activities.

4. Themes

Apart from defining the water systems and the policies to be developed for them, this document also addresses some specific topics on which policy decisions are widely expected.

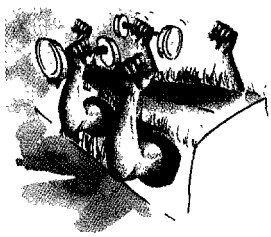
Flood protection

Conserve landscape, ecological and historical features



Develop new approach to flood protection

Reduce risk of flooding



Complete current dike strengthening

Without dikes and dunes, more than half of the Netherlands would be regularly inundated. So the extensive system of dikes and dunes is essential to the safety and habitability of the country and an absolute precondition for healthy economic development. The Dikes Act is the statutory basis for flood protection.
For centuries, flood protection was virtually synonymous with dike building and maintenance. However, the floods of recent years have taught us that sustainable protection means more than periodic dike strengthening. It can best be achieved by working hand in hand with natural processes wherever it is possible to do so. We need to step back and give the rivers, estuaries and coast more room to evolve.

What are the aims?

In a country like the Netherlands, flood protection must never be neglected. The management and maintenance of flood defences must always be a top priority. Climate changes are likely in future to lead to higher design water levels. Our water systems need room to evolve if they are to cope with uncertain and unforeseen future developments. For the rivers, this means water conservation throughout the entire catchment area and enlarging the flow area of the river rather than embarking on a further round of dike strengthening. Where the coast is concerned, it means extensive sand nourishment instead of 'hard' engineering structures. Around the IJsselmeer, the offshore bank protections will also be used to achieve the required standard of flood protection. In the regional water systems, the capacity of the collecting and transporting systems will be enlarged. Room for water also means that we may sometimes need to take a step back and, for instance, stop building in the winter flood plains of the rivers, on the beaches and in the dunes facing the sea. And reserve land now for possible future use to maintain flood protection.

Where flood defences are concerned, measures relating to the sea defences have the highest priority (risk to human life, little advance warning of flooding), followed by those in the IJsselmeer area and the diked sections of the rivers (risk to human life, more advance warning). Measures along the undiked sections of the rivers have a lower priority because they present no risk to human life.

But there is no such thing as absolute safety. Whatever we do, we may at some time face a water level which our flood defences are simply not designed to withstand. We must learn to live with the awareness of that residual risk and be prepared to cope with such circumstances if they occur.

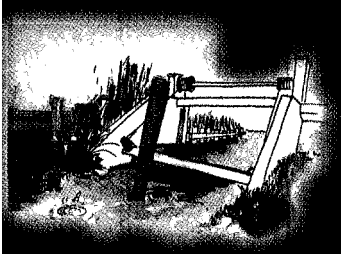
What are we going to do?

- Complete the Delta Plan for the Great Rivers.
- Decide whether the Markermeer should be accorded the status of water lying outside the primary dikes.
- Assess the safety of the primary defences (dike authorities; first round: now to 2001; second round: 2001-2006). Develop safety standards for non-primary flood defences, including those around collecting and transporting systems (provinces and water control boards).
- Identify the possible consequences of changing to an approach based on flood risk for areas within ring dikes (Technical Advisory Committee on Water Defences, TAW). On this basis, the government will then decide whether this change - which is mentioned in the Dikes Act - is actually to be made.
- Initiate a debate about residual risks. Cooperate with provinces, municipalities and water con trol boards to develop plans to deal with the threat of any real flood emergency.

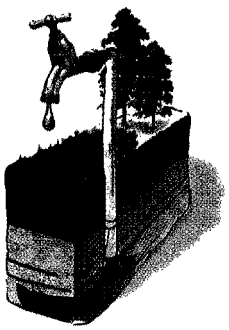
Water depletion

Conserve wetlands

Retain water



Prevent rapid drainage



Reduce groundwater abstraction

Around 1990, a total of 6,000 km² of Dutch wildlife areas and countryside were regarded as suffering from water depletion. The figures belie the Netherlands' watery reputation. Water depletion is in fact one of the main causes of deterioration in habitat quality in the Netherlands. The Third National Policy Document on Water Management recognised the problem and since its publication there has been a widespread effort to combat it. The rehabilitation of the affected land calls for measures both within the areas and outside them. Surrounding areas may have a broad range of uses, from residential to agricultural. For this reason, many areas suffering from water depletion may require an integrated approach extending far beyond the borders of the area itself - an integrated approach which brings together the necessary quality and quantity standards from wetlands to regional water systems. This kind of approach is necessary but complicated. Central government will continue to encourage and support it throughout the plan period.

What are the aims?

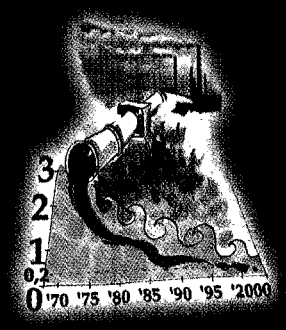
To meet the objectives laid down in the Water Evaluation policy document: by 2000 a 25% reduction in the area of countryside suffering from water depletion as compared with the 1985 figure, and by 2010 a 40% reduction in that figure. In order to achieve this, an integrated approach will be developed to deal with water depletion in relation to other water management issues. Eventually, target groundwater levels will be achieved throughout the country.

What are we going to do?

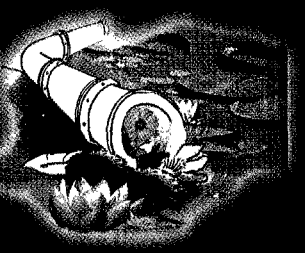
In the course of the plan period, the broad approach to combating water depletion will take the following form:

- Central government will encourage the combination of habitat restoration projects and increased water conservation. This will also reduce the influence of non-indigenous water.
- The provinces will establish the target groundwater situations by 2002.
- In accordance with the Policy Plan for Domestic and Industrial Water Supplies, the provinces will specify in their water management plans how they intend to stop the nationwide increase in groundwater abstraction by the year 2000. Reallocation of groundwater abstraction licences will alleviate the impact of such abstraction in areas suffering from water depletion. As regards independent industrial abstraction of groundwater, the aim must be to reduce groundwater use by the year 2000 by at least 40% of the prognoses for that year.
- Provinces and municipalities will be asked to use their physical planning policies to support the effort to combat water depletion and to prevent any increase in the area of land affected by water depletion.
- Water control boards will be asked to indicate in their management plans how they intend to use their management policies to achieve the target groundwater situation for the various uses and in particular for wildlife areas affected by water depletion.
- The GEBEVE scheme to promote area-specific action to combat water depletion in protected nature areas or areas with valuable wildlife features will be extended by a year. Financial sup port for efforts to combat water depletion will continue beyond the year 2000, with central government making approximately NLG 20 million a year available for this purpose. This central government contribution will be part of a future new interministerial scheme for area-specific policies.
- The provinces will be asked to report on progress and achievements every two years.

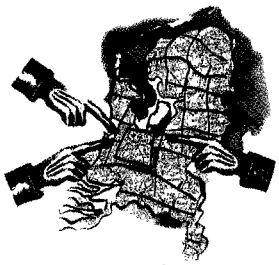
Emissions



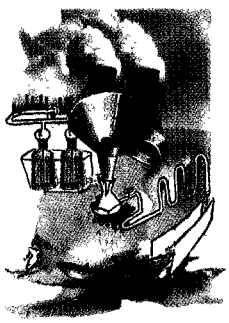
Cherish the precautionary principle



Tackle pollution at source



Area-specific approach



Treat wastewater

Even though there has been a clear reduction in point discharges from industrial and communal sources over recent years and a substantial improvement in the quality of water and recently formed sediments, water and aquatic soils are still far from clean enough. To make further progress in reducing emissions, the stress must now be placed on tackling diffuse sources: in particular agriculture, building materials, shipping and atmospheric deposition. Measures will be directed primarily at reducing, modifying or prohibiting familiar uses of environmentally damaging products and materials. This will be achieved in part via international and national agreements but efforts will also be made to introduce measures at regional level wherever possible.

In striving to achieve further reduction of emissions from industry, the stress will be placed on long-term solutions such as a responsible choice of products and raw materials, clean technologies and the closure of substance cycles. In the shorter term, the emphasis will be on improving corporate environmental management.

The agreement to include nitrogen removal in the treatment of sewage will continue to demand heavy investments over the next few years, while the reduction of storm overflows from sewerage systems and efforts to tackle the remaining untreated discharges in rural areas will be major tasks in the plan period.

What are the aims?

Discharges of hazardous (noxious, persistent and bio-accumulating) substances should end by the year 2020 (Esbjerg, 1995). The life cycle management approach, from raw material through to end product and wastes, will therefore be central to efforts to tackle emissions. Major elements in this approach will be the use of environmentally friendly products and clean technologies, and the closure of substance cycles. In weighing up the merits of different measures to reduce emissions to water, consideration will be given to their long-term effectiveness, their impact on other compartments of the environment in addition to water, and their effect on the sustainable use of raw materials. Even if they are sometimes slower to take effect, sustainable measures will be preferred to short-term solutions. Further pollution reduction and the monitoring of such efforts will be achieved in close consultation between the authorities and target groups. Alongside an approach tailored to the various target groups, an area-specific approach will be an essential addition to the generic policy setting priorities for tackling diffuse sources. Target groups at national and regional level will themselves be responsible for producing action plans within the policy frameworks established by government.

What are we going to do?

- *Pay greater attention to life cycle management in reducing emissions from both point and* diffuse sources.
- Agriculture: implement policies on fertilisers and pesticides, pursue tighter pesticide approval policies and follow up on covenants with target groups.
- Navigation and offshore industry: reduce serious accidental discharges and emissions associated with offshore activities, reduce spillage during loading and unloading, reduce sewage discharges by pleasure boats and passenger vessels and promote an alternative to antifouling paints.
- Construction industry: promote the use of sustainable building materials in new developments and renovation projects.
- Industry: coordinate permitting and enforcement with corporate environmental managemen systems and company environmental plans, encourage the use of clean technologies and

preventive measures, implement the method for total effluent assessment, implement covenants, and encourage use of permits for major issues.

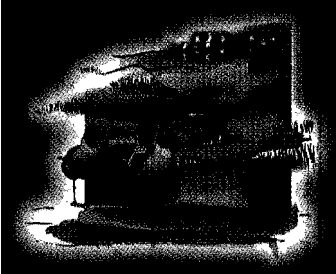
- Sewage: complete the programme of nitrogen removal in sewage treatment plants, reduce storm overflows from sewerage systems depending on the functions of the water into which they discharge, and reduce the use of pesticides in parks and gardens managed by public and other authorities.

The ditch next door

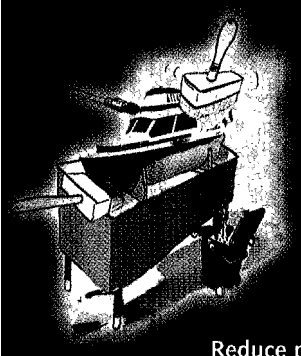
Summer 1996, Biddinghuizen, east Flevoland: the usually panoramic view is interrupted by dark green six-foot-high hedges of hemp plants. Some new kind of landscape architecture? Guess again! This is a new field border management project in which farmers plant a barrier crop around the edges of their fields to prevent crop sprays drifting over into adjacent ditches.

This new approach has brought immediate and encouraging results: 50% less pollution of surface water. Even so, it is not yet certain that hemp is the best crop to use in this respect. Winter wheat, maize or elephant grass might in some cases work even better.

Aquatic soils

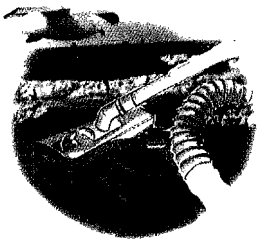


Sediments - a natural necessity



Reduce pollution

Develop clean-up techniques/re-use



Remove contaminated aquatic soils

The quality of recently formed aquatic soils shows distinct improvement compared with that of earlier sediments, but even so there is still widespread pollution. This substantially increases the cost of maintenance dredging to ensure adequate river discharge and navigational depth. In addition, the restoration of water systems requires not only clean water but also uncontaminated aquatic soils.

The main solution is to tackle the sources of pollution, but there is also a need to remove severely contaminated aquatic soils. The government has earmarked NLG 600 million for this (115 million in the 1999-2002 period and 485 million in 2003-2010). Over the next few years, consideration will be given to replacing the rigid classification of dredging spoil with a more flexible approach by which spoil would be dispersed where this would do no harm to the recipient system, treated (separation, purification, use) where financially feasible, and dumped only as a still indispensable, but environmentally sound and cost-effective, last resort.

What are the aims?

Eventually it must be possible once again to use dredging spoil produced by maintenance work on shipping channels, ports, canals, ditches etc. as a valuable raw material for a variety of uses. This will reduce the need for treatment and make dumping a thing of the past.

What are we going to do?

- Explore the potential for storing dredging spoil in deep pits located, for example, in the river flood plains.
- Build a large spoil storage depot in the Hollandsch Diep and other depots in Limburg and Zeeland.
- Use simple sand-separation techniques at large storage sites.
- Give further encouragement for re-use of dredging spoil, either immediately or following treatment.
- Draft a 10-year scenario for the remediation of aquatic soils.
- Promote active management of aquatic and other soils.
- Continue for the time being - subject to conditions - with the dispersal of slightly contaminated (class 2) spoil both on land and in surface waters and amend regulations accordingly.
- Conduct remedial dredging in some urgent cases in government-managed and regional waters.
- Encourage the municipalities to catch up with necessary dredging.
- Review the classification and assessment of dredging spoil.

5. Administrative structure

The Third National Policy Document on Water Management introduced the concept of integrated water management. To put this concept into practice, it was thought necessary to create water control boards able to apply a fully integrated approach to managing the quantity and quality of water. The creation of such all-in water control bodies required mergers between existing boards and this has considerably reduced the number of water control boards. The basic principles of NW3 still apply. The modifications proposed here are a question of 'fine-tuning': shifting the emphasis from a debate on structure to the optimisation of implementation. This may mean that some operational duties relating to the management of groundwater and waterways have to be delegated from the provinces to the water control boards.

What are the aims?

The treatment of domestic sewage and effluent from small businesses is a task for government. Responsibility for it will be in the hands of the water control boards. Efficient management will be vital. Large companies can continue, as now, either to treat their own effluent or to have it treated by third parties.

The structure of representation in the water control boards should be simplified and the system for funding water management needs to be modernised.

Some operational duties relating to the management of groundwater and waterways will be transferred to the water control boards within the framework of their administrative functions.

The division of responsibilities between municipalities and water control boards as regards urban water management will be clarified. It will also become clear whether the management of sewerage systems, including individual treatment plants in rural areas, can be transferred to the water control boards.

What are we going to do?

- Create a statutory basis for water control boards to be responsible for the treatment of domestic sewage and effluent from small businesses. Enable boards to compete on an equal footing for contracts to treat industrial effluent.
- Investigate whether the efficiency of sewage treatment can be improved if the water control boards issue concessions allowing third parties to carry out treatment or if the efficiency of treatment activities is regularly monitored by a regulatory body.
- In the course of the plan period, examine the role and position of the water control boards and the conditions under which they would wish to operate in relation to the treatment of industrial effluent. The examination will be conducted in the light of the Cohen Committee's report on contract activities by the public sector and may entail consideration of changes in the system of levies imposed under the Pollution of Surface Waters Act.
- Evaluate the Water Boards Act, focusing on issues such as the simplification of the system of responsibilities. This evaluation will take account of the outcome of the review of water management funding.
- Strive to coordinate the operations of water management authorities, municipalities and water

supply companies with an eye to achieving synergy in terms of environmental and efficiency improvements.

- Explore the potential and preconditions for the use of section 12 of the Public Works Act 1900 in relation to measures not directly connected with the construction or modification of hydraulic engineering works (e.g. ecological corridors).
- Amend the Water Management Act to clarify the division of responsibilities between municipalities and water control boards as regards drainage and water removal in urban areas.
- Review the division of responsibilities between municipalities and water control boards with a view to achieving a clear demarcation as regards drainage and water removal duties.
- Conduct trials of sewerage management by water control boards in rural areas.
- Develop a consensus on water management between municipalities and water authorities.
- An effective means of achieving this is the inclusion of a section on water in development plans.
- Based on the Provinces Act, have the provinces delegate some of their operation duties regarding groundwater management to the water control boards within the framework of their administrative functions; this will be dependent on local situations and circumstances.
- Have provinces delegate waterway management to the water control boards.

6. Instruments

Social trends have become more complex, faster-changing and often larger in scale. Policy on the physical environment, of which water management policy is a part, cannot escape the consequences of these developments. At provincial level, various moves have been made in the direction of a more integrated planning process. This good example deserves to be followed. Research has been conducted concerning the potential for introducing a levy on various diffuse sources and has shown it to be in fact very limited. To combat water depletion, the area-specific (GEBEVE) scheme will be extended for another year (to 2000). For the time being, no moves will be made in the direction of unifying statutory provision but a project will be launched to improve the coordination of the various pieces of legislation relating to water. Developments concerning the financing of water management and European legislation may, however, eventually produce a further integration of the present national legislation. The process of public consultation will be used in the preparation of the various plans relating to the major water systems.

What are we going to do?

- Investigate whether there is any point in amending the Water Act, Environmental Management Act and Spatial Planning Act to ensure better coordination between the different plans.
- Amend the Water Act to clarify the division of responsibilities concerning the problems caused by high water-tables in urban areas.
- Investigate the potential for a new toxicity tax under the Pollution of Surface Waters Act.
- Extend the GEBEVE scheme by one year (to 2000), after which it will be absorbed into an interministerial scheme for area-specific subsidies.
- *Create sufficient physical space for the conservation of a natural coastline despite rising* sea-levels. The existing legal and administrative instruments will be modified wherever necessary to enable the chosen 'Room for the Rivers and the Coast' policy to be implemented in practice.
- Create a communications strategy on water (central government, Association of Provincial Authorities, Union of Local Authorities, Association of Water Boards).
- In the course of the plan period, produce proposals for funding the management of flood defences.
- Amend the Pollution of Surface Waters Act to make it possible to experiment with coupling sewerage and other charges to water consumption.
- Create new legislative instruments for use outside the 12 mile zone. This is necessary to control new initiatives for the development of off-shore structures.

7. International water policies

States sharing the catchment areas of transborder river systems have a shared responsibility for the quality and functioning of those systems and for organising and supervising their use. This includes responsibility for flood protection and for the seas into which the rivers discharge. This responsibility should be expressed at the most appropriate level of scale, within the framework established by international covenants, rules and agreements reached at a higher level or in a broader context. Public accountability is an important aspect of this responsibility. There is a need for rationalisation of international consultations and improved coordination between the forums in which it takes place, in order to increase consistency and prevent duplication of effort.

What are the aims?

For each water system/level of scale there should be a single forum, pursuing an integrated approach. The division of responsibilities between the different forums should be consistent, there should be close cooperation between them, and processes of consultation should be clear and transparent.

The basic terms of international water management policies should be established in general forums such as the EU and the UN. But the identification and, where possible, resolution of problems should take place at the level of regional seas or river basins and parts of them, with action programmes serving as frameworks for integration. Particular problems can be tackled at EU or UN level where desirable. There should be effective feedback mechanisms for this, as well as between the various area-specific organisations. There also needs to be regular bilateral cooperation (between neighbouring countries and other strategically important partners) and national cooperation (between lower tiers of government and interest groups). The international forums should themselves maintain an open attitude towards the outside world.

Dutch water management expertise should be systematically deployed in other countries, with a particular focus on the sustainable development of water systems.

What are we going to do?

- Promote mergers between different international forums dealing with the same water system, especially as regards the Rhine, the Maas and the Scheldt, with the aim of improving integration.
- Strive to achieve the rapid establishment of an EU framework directive on water placing the key emphasis on coordination of the various relevant directives and on subsidiarity, a clear structure, transparency and the reduction of bureaucracy.
- Work to achieve more systematic involvement of lower tiers of government and international non-governmental organisations in the work of international river basin commissions.
- Present to parliament in 1999 an action plan setting out the priorities for Dutch efforts in the field of water management elsewhere in the world (Minister of Transport, Public Works and Water Management).

8. Financial and economic consequences

8.1 Introduction

Effective water management is essential to the habitability of the Netherlands and therefore a basic precondition for the continuing economic health of the country. It is important that public confidence in our flood defences should be fostered and maintained, even in the face of the apparent threat associated with climate change.

Apart from averting the direct threat to public safety posed by major floods, it is also extremely important to regulate water levels in order to prevent minor flooding and water damage. Such incidents disrupt not only the private and working lives of individuals but also agricultural and building activities. Effective control of groundwater is essential to innumerable parts of the country's economy and ecology. Agriculture, for example, is heavily dependent on efficient water management, both as regards the ability of farmers to till the soil (for which groundwater levels should not be too high) and as regards the productivity of the land (groundwater levels must be neither too high nor too low, and salinity must not be excessive). Finally, it is obviously vital to the national economy that ports should be accessible and waterways navigable.

Quantity is therefore important, but the quality of the water systems cannot be ignored either. For example, safe bathing water is an increasingly important economic factor. The availability of good quality water is essential not just to agriculture, wildlife and fishing, but also to certain parts of industry and to private households. From the ecological point of view, sustainable systems have an important economic as well as intrinsic and amenity value. After all, the perceived quality of the environment can translate into a major economic factor, for example by helping to attract new firms to an area. Viewed in this light, the economic development of the Netherlands depends in part on the creation of a high quality environment. This includes the safe and efficient remediation of contaminated aquatic soils, the creation of recreational areas and the further development of the National Ecological Network of protected areas.

The development and maintenance of a safe and habitable country with healthy and resilient water systems requires concerted effort. This inevitably has financial and economic consequences. To reach the right decisions, we need to understand these. This means understanding not only the cost of the measures required to achieve proposed policies and the way they will affect the budgets of the various tiers of government, but also their impact on different sectors of society.

An important point in this respect is that the policies in this document are heavily based on those in the Third National Policy Document on Water Management (published in 1990) and the Water Evaluation policy document (published in 1993). The maintenance (and where possible

intensification) of those policies provides a firm basis for the policies in this Fourth National Policy Document. Recent years have seen substantial new injections of resources to enable the achievement of integrated water management on the ground. These have benefited not only the work of central government but also that of regional water management by the water control boards, provinces and municipalities.

The Third National Policy Document on Water Management led first and foremost to an intensification of measures to restore water systems and to encourage their re-engineering in recognition of their various functions (most especially their ecological role). Additional structural resources of up to around NLG 60 million a year were made available for this within the national budget. An incentive scheme (REGIWA) was established for a period of four years for the regional waters and this helped to produce a structural increase in the regional water management authorities' annual budgets for restoration and re-engineering measures.

The Third National Policy Document made additional funds available not only for restoration and re-engineering but also to deal with aquatic soils. Resources increasing to over NLG 50 million a year were made available for this and research was promoted both on the incidence of contaminated sediments and on their dredging, remediation and treatment.

The Water Evaluation policy document featured both water depletion and aquatic soils as key themes and produced a further injection of resources into the latter area. The assignment of additional resources in the national budget made it possible to start work on two large-scale storage depots in addition to the existing Slufter storage depot for dredging spoil from the Rotterdam region. The IJsseloog spoil storage depot in the Ketelmeer has since come into operation. The Water Evaluation policy document also led to the introduction of the GEBEVE scheme to promote area-specific action to combat water depletion in protected nature areas or areas with valuable wildlife features.

Finally, the period leading up to the publication of the government proposals for NW4 saw the investment of substantial additional resources in water management policy, with a view to protecting the country against flooding from the rivers.

The principle observed in formulating the policies in this document is that cost increases should be kept within reasonable limits. Where costs are imposed on the private sector, industry's ability to pay will be taken into account in the implementation of the policy. In the case of both companies and private individuals, the government policy of avoiding excessive increases in local charges will be a factor.

In estimating the financial consequences, a distinction is drawn between the maintenance of current practices and the introduction of supplementary measures.

Current practices

Maintenance of current practices means implementing current water management policies within the current financial framework. This is taken as the reference point when calculating the costs of implementing supplementary measures. Where central government is concerned, estimates of the financial consequences of maintaining current practices are based on the National Budget for 1998.

In the case of the water control boards, the basis is the 1997 estimates and multi-year projections. For the other tiers of government, the various sectors of industry and private households, the term 'current practices' means the present level of spending plus expenditure on measures which have already been agreed within government and for the implementation of which budgetary provision has been made over the next few years.

Supplementary measures

This policy document also describes measures which are supplementary to the maintenance of current practices, demand extra financial resources and contribute to the achievement of current objectives as laid down in documents such as the Third National Policy Document on Water Management, the Water Evaluation policy document, the Delta Plan for the Great Rivers and the Second National Policy Document on the Coast. For example, supplementary measures need to be taken by provinces and water control boards in order to achieve the agreed 40% reduction in water depletion by 2010.

The estimates of the costs[1] involved in maintaining current practices and introducing supplementary measures refer back to the measures identified in sections 3 and 4 of this document. To clarify the knock-on effects of these costs, subsection 8.2 identifies the consequences of maintaining current policies for the municipalities, water control boards, provinces and central government (in that order). Subsection 8.3 then outlines the financial consequences of supplementary measures for the various tiers of government and subsection 8.4 explains the financial and economic consequences for the various sections of society.

The policies presented in this policy document can all be implemented within the existing framework of resource allocation in the national budget.

8.2 Estimates of public expenditure on current practices

The cost estimates for urban water management relate to the management of the sewerage system in urban areas and in the surrounding rural areas to be connected to the system. Total annual costs are currently in the region of NLG 1.5 billion. Maintenance of current practices demands an overall investment of NLG 13.2 billion over the 1996-2005 period: around NLG 7.5 billion for replacement and renovation and NLG 5.7 billion to reduce storm overflows from sewerage systems.

[1] *Annual costs comprise interest and depreciation on investments and operating costs in terms of maintenance, energy etc. Interest charges are calculated on the basis of the (expected) actual commercial interest rate plus the additional risk premium. In accordance with the budgetary system employed by central government, annual expenditure by central government is shown as cash payments (in other words, even investment spending by central government is shown in the year in which payments are made). The cost estimates in the policy document are given in constant prices (at 1998 price levels).*

In addition, to improve the quality of the regional waters, it is important to tackle the issue of untreated domestic discharges of raw sewage. Where this is done by connecting outlying households to the sewerage system, the costs will be met primarily by the municipalities. Where connection is not possible, discharges must be equipped with individual treatment facilities and this will be done at the expense of the households concerned (see subsection 8.4). New connections to the sewerage system are currently expected to demand a total investment of NLG 3.3 billion over the 1996-2005 period.

The total annual costs to municipalities as a result of these investments (totalling around NLG 16.5 billion) are expected to amount to NLG 2.1 billion in 2005: an average annual increase of 5% over the 1998-2006 plan period. This increase is entirely due to policies already agreed in the Third National Environmental Policy Plan.

At the request of parliament, work will be done over the coming period to identify the trends in municipal expenditure in these areas and their consequences for local charges.

There is at present no clear picture of the financial consequences of the policies on aquatic soils for the dredging work done by municipalities.

Estimates of the cost to water control boards of maintaining current practices are based on a survey of water control boards concerning trends in the cost of regional water management over the 1995-2001 period. The figures for 1995 are based on the accounts for that year, while those for 1996 and 1997 are based on the relevant annual budgets and those for subsequent years on the multi-year projections of the water control boards. Since the policy document covers the period through to 2006, the 2001 multi-year projections are used for the years between 2002 and 2005. In the case of water quality measures, the estimates for 2002-2005 are adjusted upwards to take account of current agreements about the completion of the nitrogen removal programme in 2005.

Unless otherwise stated, the water control boards' cost estimates do not include the contributions of other government bodies and third parties. These are described in the sections on the other tiers of government.

The water control boards' budgets and multi-year projections take account of pay and price increases. Since the other cost estimates in this policy document are expressed in constant prices, the water control board figures are converted to 1998 price levels.

Figure 1: Water control board spending in each area of activity (current practices)

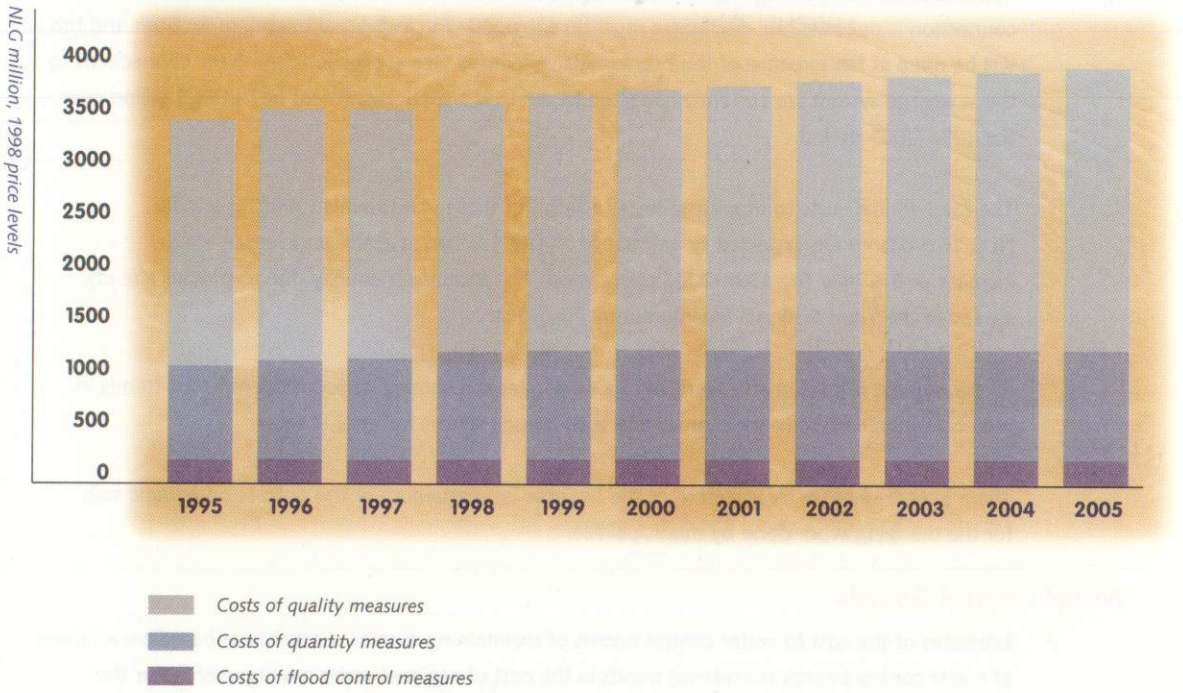


Figure 1 shows the trend in expenditure by water control boards for the maintenance of current practices in each of their areas of activity over the 1995-2005 period.

Water quality

Water quality management is the largest category of expenditure by the water control boards. Over the 1995-2001 period, a total of NLG 7.4 billion will be invested, most of it in sewage treatment plants. Relatively small proportions of this sum will take the form of specific investments relating to aquatic soils, the restoration of regional water systems and urban water management.

The nitrogen removal programme for sewage treatment plants is due to be completed in 2005.

Towards the end of the plan period (1998-2006), annual expenditure on water quality management is expected to be rising at a rate of approximately 1.8% a year.

Flood defences

Over the 1995-2001 period, the water control boards will invest almost NLG 2 billion in flood defences (including contributions from other tiers of government and third parties). The lion's share of the investment will be in the primary flood defences. This will consist both of routine work and of dike strengthening under the Delta Plan for the Great Rivers.

Total annual expenditure on flood defences is expected to rise slightly (by 0.6% a year) over the 1998-2006 period.

Water quantity

Over the 1995-2001 period, the water control boards will also invest almost NLG 2 billion in water quantity management. Relatively small proportions of this sum will take the form of specific investments relating to aquatic soils, water depletion and urban water management.

Total annual expenditure on the management of water quantity is expected to rise by 0.9% a year over the 1998-2006 period.

All the provinces except Groningen have now decentralised their operational water quality management tasks, leaving them with a primarily strategic function in this field. This is expressed chiefly through the planning process (provincial water management plans), although they also have a number of executive responsibilities in the field of groundwater management (under the Groundwater Act) and the management of inland waterways (in some cases delegated to the water control boards). Finally, they also subsidise dike strengthening work along the major rivers.

Maintenance of current practices will have the following financial consequences.

Flood defences

The resources available for investment in improving flood defences are passed by the provinces to the water control boards as their contribution to the planned improvement works. In total, the provinces will contribute around NLG 1.3 billion towards the implementation of the Delta Plan for the Great Rivers. Given the speed at which these works need to be completed, the decentralised dike subsidies will be insufficient to finance the whole of the current dike strengthening programme under the Delta Plan. The provinces will therefore need to take out additional loans for this purpose. Since these will have to be repaid, an equilibrium between income and expenditure will only be restored somewhere in the period between 2015 and 2020.

In addition to expenditure on the Delta Plan for the Great Rivers (averaging approximately NLG 250 million a year through to the end of 2000), an annual contribution of over NLG 20 million will also be given to the water control boards for the maintenance of the flood defences.

Waterway management

Expenditure on inland waterway management and the related quantitative management of surface water will total approximately NLG 180 million a year. Spending on the Friesland-Groningen canals will be funded by central government since these canals function as national waterways. In the case of some of the waters recently transferred in the context of Brockx-nat, the costs of management and maintenance will continue to be met during a transitional period. The others have been the subject of a one-off payment by central government.

Groundwater management

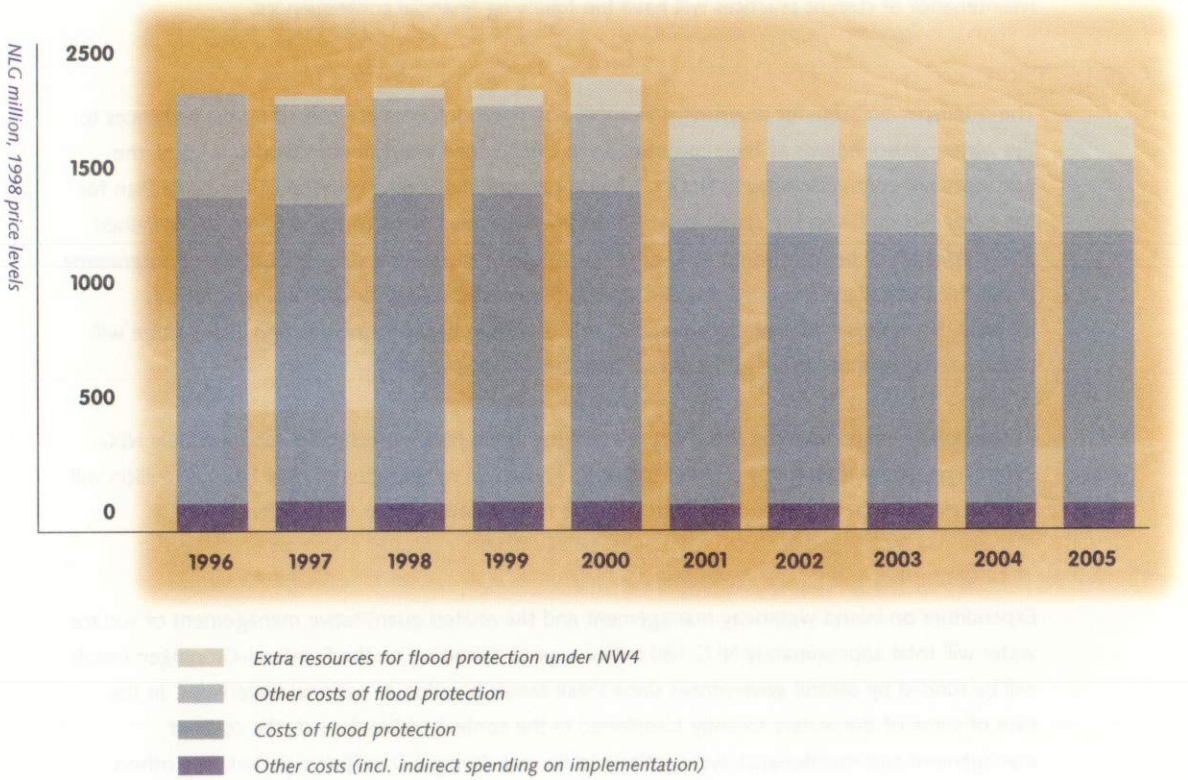
Expenditure on strategic and operational groundwater management totals approximately NLG 26 million a year and is partially funded out of income from groundwater charges. The increase in groundwater charges means that these will in some cases be able over the next few years to cover administrative expenses and the costs of projects to combat water depletion. In the course of the plan period, this may produce an increase in annual expenditure amounting to around NLG 20 million.

With the exception of groundwater management (where a slight increase in expenditure will be compensated by a small rise in groundwater charges), and taking account of the loans needed to finance the Delta Plan for the Great Rivers, the provinces are not expected to incur any structural cost increases as a result of maintaining current practices.

Central government

Estimates of the financial consequences to central government of maintaining current practices are based on the National Budget for 1998. Annual estimates for 1999-2002 are based on the corresponding parts of the multi-year projections included in that Budget, while those for subsequent years are all based on the figure for the final year in those projections (2002). Figure 2 shows central government expenditure on water management over the period between 1995 and 2006, broken down into a number of important policy areas.

Figure 2: Central government spending in each area of activity (current practices)



Maintenance of current central government practices will have the following financial consequences.

Central government expenditure on water management currently totals around NLG 2.2 billion a year. Approximately 6% of this is general expenditure on staff and equipment which cannot be ascribed to specific areas of water management.

Water management and inland waterways

A relatively large proportion of spending on water management (approximately 70%) goes on the main water systems, inland waterways and ports and harbours. This figure represents total expenditure, including the necessary human resources for construction, management, maintenance, monitoring, policy-making and implementation, and advance research. From 2001 on, spending on water management and inland waterways will decline (to around 65% of the total), partly because of the conclusion of the current round of special investments in the main and subordinate networks of inland waterways.

In 1996, around NLG 93 million was spent on the physical improvement and restoration of these government-managed waters. The multi-year estimates show spending declining to around NLG 73 million by 2001. Of this, more than NLG 200 million a year will be required for the management of aquatic soils. This includes the dredging of approach channels, waterways and harbours to maintain navigational depth, the construction and management of disposal sites for dredging spoil (including treatment of dredgings containing sand), and the remediation of aquatic soils.

In order to protect the economic function of waterways and ports, it will be important to catch up with the backlog of maintenance dredging as quickly as possible. However, this depends on the availability of sufficient spoil storage capacity. In addition to constructing a relatively small spoil storage depot in the North Sea Canal area (Averijhaven), the main priority for the plan period is to complete the construction of the IJsseloog depot in the Ketelmeer and to construct a depot in the Hollandsch Diep. Depending on the cost of the latter, consideration will also be given to the construction of depots in other government-managed waters in the course of the plan period. The preparation of such depots will remain a priority.

In action to remove heavily contaminated sediments, priority will be given to the Ketelmeer and the Hollandsche IJssel, as well as to sites where remediation can be combined with maintenance or construction work. Central government will also make around NLG 20 million available for the removal of contaminated spoil from regional waters.

The policy of treating spoil before disposing of it will be achieved by creating facilities at the large storage depots for the removal and recycling of sand from dredging spoil. The financial resources for this will have to be found within the existing budgets for the management of aquatic soils.

In addition to fulfilling its own management responsibilities, central government currently contributes NLG 150 million a year to pay for regional water management. This contribution relates primarily to the costs of maintaining those waterways for which responsibility has been transferred to the provinces, water control boards and municipalities as part of the move towards decentralised government and to the costs of land development as related to water management.

Flood defences

Around NLG 500 million a year is currently available for central government work on flood defences. This figure represents total expenditure, including the necessary human resources for construction, management, maintenance, monitoring, policy-making and implementation, and advance research.

In future, the policy of dynamic coastal management will demand additional financial resources, particularly to compensate for sand deficits in deep waters. The present budget includes financial provision for spending on this within the plan period.

Sustainable flood protection along the major rivers can only be guaranteed by increasing the absorption capacity of the river basin (particularly in Germany) and by allowing the rivers more room to expand (in the Netherlands). The plans to increase their discharge capacity must be implemented if the agreed safety level is to be maintained in the area around the rivers in the face of the expected higher design discharges after the year 2000. In the run-up to this policy document, a sum of NLG 3 billion was earmarked for this in the National Budget for 1998. NLG 1.2 billion of this will be available in the period up to 2015 for use in increasing the discharge capacity of the rivers and NLG 0.56 billion for increasing the breadth and depth of the Maas. Like the 1998 National Budget, the multi-year series assume that the latter works will be completed (as part of the Delta Plan for the Great Rivers) in 2015. This is a change from the earlier government expectation that the works would be completed in 2005. A total of NLG 1.25 billion has been set aside to fund the renewal of the stone revetments on the coastal flood defences, since it was realised in 1997 that the revetments used on many of the defences were too light to meet current safety standards.

8.3 Estimates of public expenditure on supplementary measures

The policies described in this Fourth National Policy Document on Water Management will lead not only to the maintenance of current practices based on existing policy, but also in some cases to a new approach or to an intensification of current activities. The financial consequences of these changes are outlined below.

Urban water

The policy of dealing in a new way with urban water (for example, wherever possible keeping rainwater separate from the sewerage system and disposing of it by means of subsurface infiltration, opting for sustainable building materials and methods, etc.) is not expected to call for extra financial resources. These measures are no more expensive than other forms of provision (such as storage/settling basins) to reduce overflows from the sewers.

The move to pay more attention to the amenity value of water in urban areas, for example by reserving more space for water in urban development sites, will impact on the price of building lots. The financial consequences of this have not been estimated since they will depend to a great extent on local circumstances and on the way in which municipalities interpret the policy.

Water depletion

Action to combat water depletion is already a frequent component of other projects, for example those relating to changes in land use. Since it is impossible to quantify the proportion of such projects which contributes directly to combating depletion, the necessary investments are for technical reasons charged in full to the water control boards. The knock-on effect of this on the

local headtax determines the upper limit: contributions from changing land use and other sources are likely to make the forecast trend in charges (see subsection 8.4) lower than the calculations suggest.

A proportion of the necessary investment has already been made in recent years and more will be made over the next few years, thanks in part to the GEBEVE scheme[2]. It is assumed that a further sum of approximately NLG 1.4 billion[3] will need to be invested from the year 2000 onward in order to achieve a 40% reduction in water depletion. This investment will involve additional expenditure eventually amounting to around NLG 100 million a year (by 2010).

Figure 3: Costs to water control boards of supplementary measures as compared with expenditure on current practices

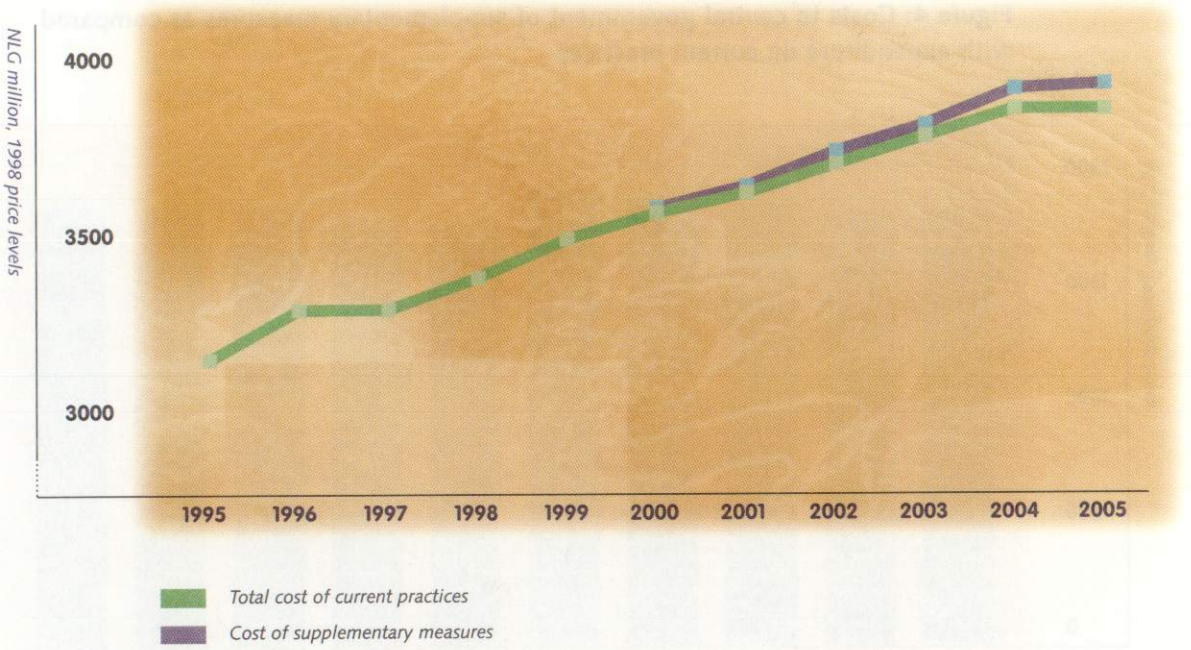


Figure 3 shows these additional financial consequences as compared with expenditure on current practices. It is clear that the extra cost of reducing water depletion will produce only a very small increase in total expenditure by the water control boards (1.3% in 2005).

Sewage treatment

Generic measures for more radical treatment of public sewage are not immediately necessary, though further measures (fourth step treatment) may be required to meet quality targets at regional and local level. These may have a local financial impact but are not expected to increase total national costs to any significant extent.

[2]The calculation is based on the assumption that the GEBEVE scheme will be extended by one year to use up the resources earmarked for subsidies but not yet spent.

[3]Various calculations put the costs of re-engineering water systems to combat water depletion somewhere between NLG 0.65 and NLG 1.4 billion. Since this policy document adopts the highest estimate, the actual costs of implementation may well prove to be less.

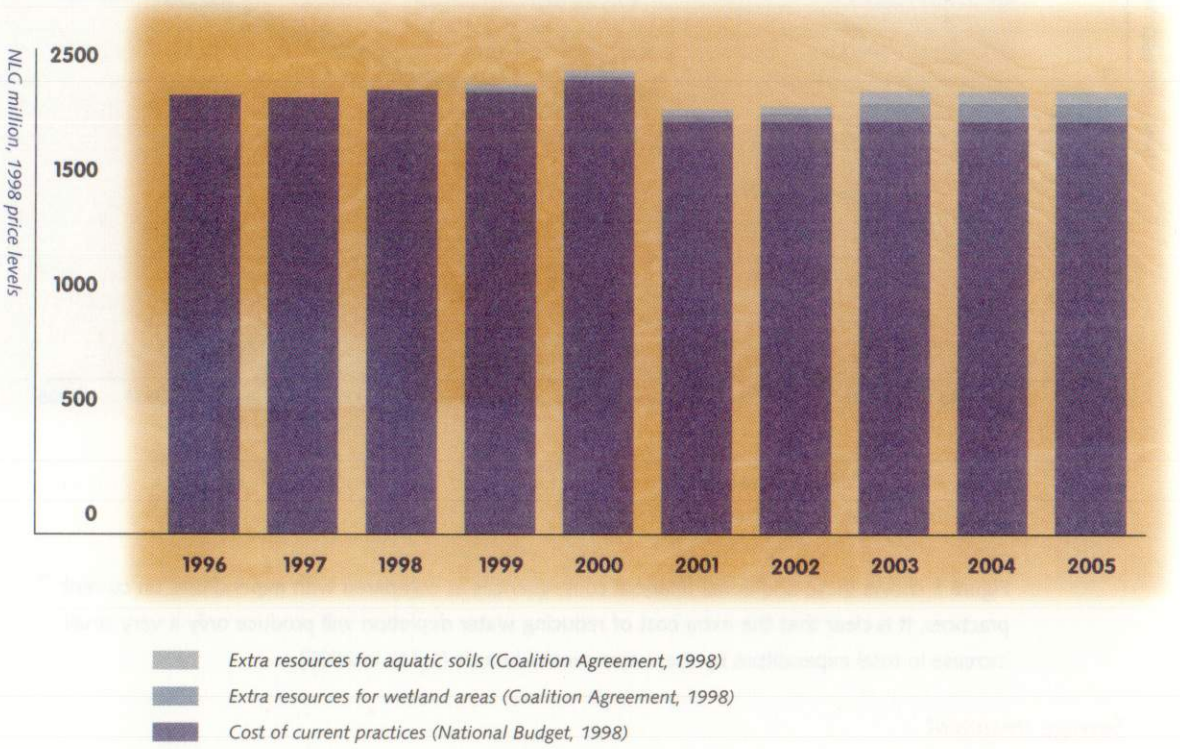
Provinces

For the provinces, the policies in NW4 will not lead to any additional measures with financial consequences.

Central government

During the preparation of the government proposals for NW4, central government made extra resources available for the theme of 'flood protection' (see subsection 8.2) and included these in the National Budget for 1998. In the Coalition Agreement, the government announced new investment in the physical and economic infrastructure of the country and in the environment. A proportion of this investment will directly benefit water management. Figure 4 shows the extra resources announced in the Coalition Agreement and available for supplementary measures by central government.

Figure 4: Costs to central government of supplementary measures as compared with expenditure on current practices



Wetland areas

Over the period between 1999 and 2010, there will be an extra investment totalling NLG 800 million in wetland areas (NLG 100 million of it by the end of 2002). NLG 560 million will be invested in the acquisition and development of land close to urban agglomerations for the purpose of creating wetland areas of international standing. These will also be designed for recreational use and will complement the riverside wildlife areas to be created under the Delta Plan for the Great Rivers.

Aquatic soils

In the period through to 2010, the government will invest an extra NLG 600 million in the remediation of aquatic soils. The majority of the resources made available under the Coalition Agreement will be used to create the disposal and treatment facilities required to deal with all the dredgings removed by central, provincial and local authorities from waters under their control. NLG 20 million will be reserved for the programmed removal of contaminated sediments in regional and municipal waters, while remediation work in severely contaminated regional waters is to be stepped up to some extent (NLG 10 million).

From 2003, action on aquatic soils is to be further intensified. The Coalition Agreement earmarks NLG 485 million for this purpose over the period from 2003 to 2010 (averaging over NLG 60 million a year). The pace of cash payments will be geared to achieving this within the total amounts available over the entire period.

8.4 Financial and economic consequences for individual sectors

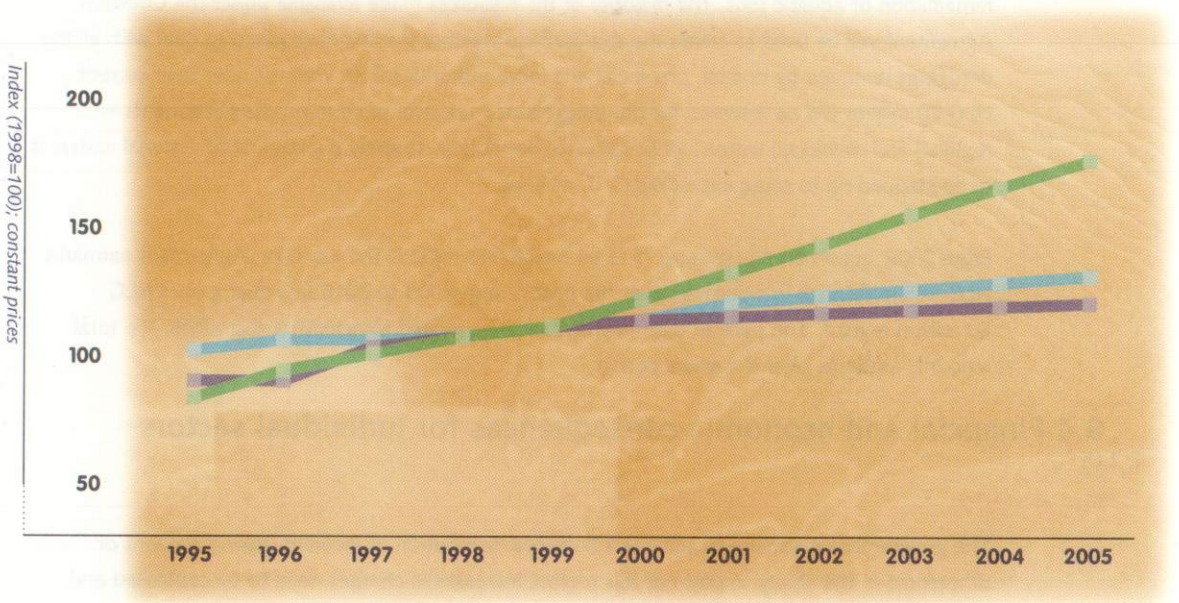
The government is striving to achieve a balanced distribution of incomes, taking account of differences in the ability to pay. For this reason, increases in charges need to be controlled and differentiated. The joint policy document on local government taxation issued by the Ministry of Finance and the Ministry of the Interior indicates the importance of a sustained and concerted effort by central government, the provinces, municipalities and water control boards to control the overall burden of public expenditure.

The water management policy has direct consequences for the local tax burden, since a proportion of the costs are passed on to households via the specific pollution tax and the headtax imposed by the water control boards to finance their water quality and water quantity management activities. In addition, municipalities impose sewerage charges to cover the costs of managing the sewerage system. The policy document says that the introduction of new or intensified policies should be accompanied by an explanation of their consequences for spending by the municipalities. However, it also notes that existing legislation is expected to produce a further rise in environmental levies and water control board charges.

Figure 5 shows the trend in each of the charges on households over the 1995-2006 period. Increases are largely generated by existing regulations, as explained in subsection 8.2: Estimates of public expenditure on current practices. Only a small proportion of the increase comes from supplementary measures (the increase in the headtax as a consequence of action to combat water depletion, see subsection 8.2).

Trends in charges are shown in Figure 5 as a national average. Local trends may vary as a result of geographical, hydrological, demographic or other factors. For example, charges may be higher in those areas where most action is required to combat water depletion. On the other hand, the implementation of current policies (such as the conclusion of the nitrogen removal programme) can actually help to reduce differences in local charges. In addition, trends in charges may sometimes differ from the average as a result of changes in the number of people paying charges in the particular municipality or water board area, for example following a change in local policy on exemptions.

Figure 5: Trends in revenue from domestic water charges



Revenue from water control board headtax in 1998: NLG 590 million

Revenue from pollution tax in 1998: NLG 1319 million

Revenue from sewerage charges in 1998: NLG 991 million

Sewerage charges

The biggest rise will be in sewerage charges. Over the 1995-2005 period, these are expected to rise by an average of 6% a year. This continuing trend is partly the result of existing agreements on additional maintenance to deal with backlogs, the reduction of storm overflows from sewerage systems and the connection of outlying discharges to the sewerage system. An additional cause is the continuing trend among municipalities to expect revenue from sewerage charges to cover an increasing proportion of the costs of maintaining the sewerage system. (In 1994, 79% of the costs were funded out of such revenue. In 2005 the figure is expected to be 90%.) In addition to sewerage charges, households also bear the costs of individual treatment of domestic discharges other than into the sewers. In the case of some 100,000 homes, the benefits to the environment cannot justify the cost of connection to mains sewers. The cost of individual treatment facilities for each of these will be between NLG 10,000 and NLG 15,000.

Pollution tax

There was a large increase in the burden of pollution tax on households during the first half of the nineties. This was due partly to the removal of phosphate and nitrogen in sewage treatment plants and partly to the implementation of environmental measures. The cost of sediment removal and treatment rose disproportionately over the 1990-1995 period, from 13 to 21% of the total.

During the 1998-2006 plan period, maintenance of current practices will produce an annual rise in pollution tax of around 2.4%. This figure takes account of existing agreements concerning the completion of the nitrogen removal programme in sewage treatment plants by 2005.

Headtax

The burden of headtax on households also increased greatly over the 1990-1995 period. However, this was due not only to an increase in water control board expenditure on water quantity management but also to a large extent to the way the headtax was calculated. A relatively sharp increase in headtax is expected between 1997 and 1998 because the 1997 figure is based on budget figures and the 1998 figure on multi-year estimates. Over the plan period (1998-2006), the headtax for households is expected to increase by approximately 1.4% a year. This increase is largely due to action to reduce water depletion by 40% before the end of 2010. It takes no account of any rise in headtax that may result from payments made by water control boards to compensate farmers for losses caused by higher water tables.

The increase in sewerage charges, pollution tax and headtax will together produce an increase in revenue from charges amounting to over 3% a year over the 1998-2006 period. This means that charges on individual households will rise over that period by an average of NLG 89.

Over the 1990-1995 period, industry made considerable investments in the treatment of effluent. This has increased the environmental costs of many companies. Over the next few years, further measures will be generated by existing agreements on emission reductions. This may mean that corporate spending on water quality will continue to increase over the next few years.

Now that the main remediation programmes are largely complete (or almost so), the top priority will be to exploit the opportunities for industry to practice continuing innovation in the environmental as well as the economic field. After all, further reduction of emissions from all sources is required to achieve the final targets and it is important to ensure that increased production or the introduction of new substances does not create new problems for the environment. Extra attention must also be paid to achieving non-polluting production processes and closed substance cycles (see subsection 4.3: Emissions). The key priority in this respect will be to identify ways to coordinate environmental improvements with corporate innovation plans and investment cycles. In individual cases, this may mean abstaining from short-term remediation in favour of more sustainable long-term solutions. Recent or forthcoming investments are the result of existing policy.

Although this policy document indicates the need for further reductions in emissions, this is not expected to entail any additional financial costs to industry since emission reduction will become an increasingly normal part of new processes and the associated investments. The environmental costs will then no longer be separately identifiable. Now that environmental policy is becoming an integral part of corporate environmental management systems and plans (and therefore the responsibility of individual enterprises), this fact is not so much an objection as a logical and welcome development.

This policy document is in line with existing agricultural policies on reducing emissions of pesticides and fertilisers. In the case of nutrients, these reductions are laid down in the Integrated Policy Memorandum on Manure and Ammonia. The policies in that document are directed both at cutting atmospheric emissions of ammonia and at reducing the amount of nutrients entering the soil. The aim of the latter is to protect groundwater quality and prevent leaching and run-off into surface waters. Over recent years, policies on manure have increased costs to farmers and this upward trend is likely to continue during the plan period, given the phased intensification of measures in this area. In view of the integrated character of these policies, it is not possible to specify the costs of reducing the pollution of surface water by these substances. The policies in this document will not generate any additional costs to the agricultural industry in this regard.

Where crop protection is concerned, measures will be taken to cut emissions in accordance with the Multi-Year Crop Protection Plan. For the plan period, the policy document provides for the implementation of measures under the existing order in council concerning cultivation under glass and the future one on field crops and animal husbandry. The relevant policies in this document will not generate any additional costs to agriculture.

Policies on combating water depletion will have indirect consequences for agriculture, in that the increased costs to the water control boards will affect the headtax. This will increase costs to the agricultural industry by around NLG 20 million over the plan period. In addition, action to combat water depletion may affect crop yields on individual farms. Such impacts will be heavily dependent on local circumstances. Action to combat water depletion may cause losses to agriculture if water tables rise. Various exploratory studies suggest that a 40% reduction in water depletion may be expected to produce financial and economic losses totalling between NLG 30 and 100 million per year. However, the effects of action against water depletion will also have positive effects in the form of reduced drought damage and lower irrigation costs in dry periods. Another important point is that action to combat water depletion is linked to protected wildlife areas, which are generally part of the National Ecological Network. Agriculture is expected gradually to disappear in these areas, or at least to become less intensive. Depending on the rate of progress in this direction, losses resulting from higher water tables may be less substantial than currently calculated. From the financial point of view, it will therefore be desirable wherever possible to integrate action to combat water depletion with projects to change land use.

The agreements made in the context of the convention on ship-generated wastes will shortly be implemented within national legislation (see subsection 4.3: Emissions). Arrangements will be made for the collection and treatment of ship-generated wastes to be financed by means of a levy on fuel.

PAH emissions will be greatly reduced by the effect of the decree on coatings containing PAHS, made under the Dangerous Substances Act. High-PAH coatings will be replaced by low-PAH alternatives. The total annual costs of this for inland navigation are expected to amount to about NLG 1.5 million.

Apart from ship-generated wastes, the main emissions from shipping are those of TBT from antifouling paints. An international working party headed by the Netherlands is currently working on proposals to reduce the use of TBT-based paint. No indication can yet be given of the financial consequences.

Over recent years, the lack of adequate disposal facilities for contaminated spoil has led to a backlog of maintenance dredging in a number of waterways. Consequently, the required minimum clearance of several decimetres under the keel has been reduced to virtually zero. This means that several decimetres less displacement is available for cargo than in the normal situation. The Dutch Aquatic Outlook shows that failure to catch up on the maintenance backlog will eventually (by 2015) result in an increase of around NLG 60 million in the annual costs of inland waterway transport. The cost of dredging to maintain the depth of seaports is a major item in port management budgets and has gradually increased over the last decade. The policies in this document will not produce any further cost increase, particularly because the provisions for dispersal of class 2 spoil are retained.

Now that the use of TBT-based antifouling paint has been banned in the recreational shipping field, copper-based paints have become the most popular and other biocides are also being used. Unfortunately, these too cause damage to water systems. For this reason, further restrictions will be introduced on the use of antifouling paint on pleasure craft.

Emissions of bilge water, sewage and chemical wastes from pleasure craft must also be reduced. To achieve this, more waste collection facilities must be provided in water sports centres. This will require investment by the sector totalling several million guilders. Efforts will be made to identify ways in which central government can assist.

In many yachting harbours and marinas, necessary maintenance dredging has been neglected because of the lack of spoil storage space and facilities for treatment at a reasonable price. The extra costs of removal and treatment of contaminated nautical spoil may lead to increased charges to the recreational boating field. However, the information available about the extent of this problem and the costs of removing and treating this spoil is as yet insufficient to enable these consequences to be quantified.

The policy of combating water depletion also demands action on the part of water supply companies. In this respect, the policy document follows on from the Policy Plan for Domestic and Industrial Water Supplies. Policies on the abstraction of groundwater are designed to stabilise this by 2000. However, alternative forms of drinking water production (including abstraction of surface water and bank infiltration) are more expensive and the Dutch Aquatic Outlook indicates that domestic water charges will therefore increase by around 9 cents per m^3 by 2015. This annual rise of less than 1 cent per m^3 will produce a marginal increase in the current price of drinking water (NLG 1.60 - 3.25 per m^3).

In addition to direct financial and economic consequences, the policy will eventually work through to produce a macro-economic impact. On the one hand, the investments required for the implementation of the policy will provide a boost to the economy (for example, the investments generated by flood protection works will have a positive effect on turnover and employment in the civil engineering sector). On the other, the financial consequences for firms and households will have a negative knock-on effect in terms of slowing down economic growth. The overall macro-economic consequences are therefore expected to be marginal.

The economic importance of achieving the aim 'to have and maintain a safe and habitable country and to develop and maintain healthy and resilient water systems which will continue to guarantee sustained use' is unquantifiable, but its achievement is certainly essential to the quality of life in the Netherlands and therefore an absolute precondition for the future health of the Dutch economy.