

Time for flood safety

Strategy for flood-risk management

RLI 2011/06

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The Councils for the Environment and Infrastructure (Raden voor de Leefomgeving en Infrastructuur, RLI) advise the Dutch government and Parliament on strategic issues that are concerned with our overall living and working environment. Three separate councils work together under the RLI umbrella: the Council for Rural Areas; the Council for Transport, Public Works and Water Management; and the Council for Housing, Spatial Planning and the Environment. The Councils are independent, and offer solicited and unsolicited advice on long-term issues of strategic importance to the Netherlands. Through their advice, the Councils aim to contribute to a broadening and deepening of the political and public debate, and to greater quality in decision-making.

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This is the translation of the first part 'Advice' of the advisory report.
The second part 'Analysis' is only available in Dutch.

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A short film 'Time for flood safety' explains the content of the report.
This can be viewed on www.rli.nl.

Recommendations

1 Introduction: Purpose of this flood safety advisory document

The Netherlands has to be protected against floods even better than at present. The risks are increasing; not only the probability of flooding, but also the consequences of a dike breaching in terms of economic damage and the number of casualties. But how can we better ensure that our country is protected against flooding?

1.1 Background: Flood safety policy is no longer adequate

The Dutch delta is one of the safest in the world, the result of a centuries-long battle to push back the water and reclaim land. Over the past 50 years, considerable effort has gone into improving the Netherlands' defences against floods. A few examples are the Delta Works, the 'Room for the River' Programme, and strengthening the so-called 'Weak Links' in the coastal defences. These projects will be completed soon, but that is not the end of the story. Being safe does not mean we can sit back and relax. Water keeps presenting us with new challenges, and this requires us to take a new approach.

Increasing risks: Possibility of flooding, with consequences now more serious

The past few years have made clear that, if the Netherlands continues with its present policy, the country will be inadequately protected against floods in the future. The sea level is rising¹, the rivers are carrying more water, and we have to deal more frequently with extreme weather conditions, such as heavy downpours and long dry spells. Our country has also become more vulnerable, so that if a flood were to occur, there would be a larger number of casualties and greater economic damage. The impact of a potential flood has therefore increased as a result of population growth and greater economic capital.

¹ An average of 1.74 mm each year between 1900 and 2000 (Holgate, 2007).

EU Flood Risk Directive, National Water Plan, and Delta Programme all started

Several major floods in Europe around the turn of the century spurred the European Commission to develop a flood-risk management policy. In 2007, this resulted in adoption of the EU directive on the assessment and management of flood risks (Flood Risk Directive, FRD). With the National Water Plan (NWP; Ministry of Transport, Public Works and Water Management et al., 2009a), the Dutch government took the first step towards adapting its flood safety policy. In December 2010, the Dutch House of Representatives adopted the plan. In addition, the Delta Programme got underway, encompassing the updating of the safety standards for primary flood defence structures² and the strengthening of the dikes. These developments are reason for the Councils for the Environment and Infrastructure (RLI) – to review the current policy on protection against flooding.

1.2 How can the Netherlands be better protected against flood risks?

The State Secretary of Infrastructure and the Environment requested the Councils for the Environment and Infrastructure to issue recommendations on the safety standards for primary flood defence structures in the context of flood safety policy, and from a governmental and societal perspective.

The Councils have taken a broad interpretation of this request and have made recommendations covering the entire safety system for flood risk management, including standardisation of primary flood defence structures. The central issue is therefore how to provide a better guarantee for flood safety in the Netherlands. To this end, the Councils are extending their recommendations to include a strategy for minimising flood risks. The advisory report is restricted to areas inside the dikes.

² Primary flood defence structures are structures, such as dunes and river dikes, that protect the country against 'outside water' (e.g. sea, rivers).

2 Recommendation: Focus policy on flood risks

The Councils advise the State Secretary to broaden the scope of current policy from protection against high water levels to minimising flood risks. This expansion to a risk-based approach does encounter several obstacles, such as the cooperation between institutions and the current system of standards.

2.1 Dutch national government has to maintain multi-layer safety approach

The chosen direction for the National Water Plan is to expand flood safety policy from solely protection against high water levels (i.e. preventing floods) to the principle of multi-layer safety (i.e. preventing floods and limiting their impact).

Multi-layer safety is a sound basis for a risk-based approach

Multi-layer safety involves not only taking into account the probability of a flood (breach in a dike), but also spatial planning and disaster mitigation, with the aim of limiting damage and casualties in the event of a flood. Naturally, flood protection remains the top priority.

The Councils consider multi-layer safety a sound starting point for a risk-based approach. Nevertheless, they find in actual practice that the emphasis is still too much on meeting the dike standards, instead of on the safety of the area inside the dike or the dike hinterlands. This does not prompt government bodies to factor flood safety into spatial planning, or to prepare for a flood and the recovery after such a disaster. After all, the objective of flood safety is primarily to prevent social disruption; in other words, to identify the major risks, and to adopt measures to limit them and ensure a rapid recovery.

Significant system change needed to minimise flood risks

The Councils feel that it is not enough to maintain and update the current policy directed towards protection against high water levels. The time has now arrived to take the next step. It is important to implement a safety philosophy centred on minimising flood risks. Previously, significant systemic shifts occurred in response to a disaster, such as the Zuiderzee Works after the Zuiderzee flood in 1916, and the Delta Works in response to the 1953 North Sea

flood. Dutch government policy is currently not to wait for the next disaster, but to be one step ahead of it. Success in this context requires more than just expenditure on new flood defence structures. It also needs investments in the other aspects of risk management: damage prevention, emergency response measures, preparedness, and recovery.

2.2 Risk-based approach facing hurdles

The Councils have identified five barriers for the extension of the flood safety policy to minimising flood risks.

- Institutional obstacles: Policy-makers continue to have little interest in limiting the social disruption caused by floods. Although duties and responsibilities are mandated by law, this does not encourage collaboration. Municipalities, provinces, regional water authorities and security regions all differ from each other in scale and do not coincide with dike ring areas³. This situation increases the difficulties of a coherent policy. There is also a lack of incentive to organise flood protection, sustainable spatial planning, and disaster mitigation as a cohesive whole.
- There is little risk consciousness among the general population: Government campaigns have hardly increased awareness of the safety risks or civil society's self-reliance.
- Doubts exist concerning a new system of standards: A legal safety standard exists for each dike section as regards to the probability of exceedance⁴. As a result, the focus is biased towards protection against high water levels. The government wants to harmonise the system of standards with the flood risk approach. Accordingly, it is considering a transition from a safety standard based on the probability of exceedance for a dike section to a standard based on the probability of flooding for each dike ring area⁵. Opinions differ on the necessity and timing of such a transition.

3 A dike ring area is an area enclosed by a system of dikes, dams and other flood defence structures.

4 The probability, for each dike section, of the water rising to a higher level than the dike is calculated to withstand.

5 The probability that a water barrier gives way because of any of a number of possible different failure mechanisms, resulting in the overflowing of a dike ring area or a part thereof.

- It is difficult to prioritise dike improvement plans, although this is necessary from a financial perspective: Currently, an unfit section of a dike has to be repaired, irrespective of how risky the situation is and whether other measures or measures at another location might improve safety more with greater efficiency.
- The distinction between test and design instruments for dikes is not sharply defined: Dike sections are now tested once every six years to verify whether they are up to standard. A regular risk analysis at the national level is lacking. The Water Act makes no distinction between the test standard and the design standard.

3 Four recommendations for a new strategy

To remove the above obstacles and hence provide a better guarantee of flood safety in the future, the Councils present four recommendations: make minimising flood risks the core element of the flood safety policy; set priorities centrally and implement measures decentrally; establish limits and standards that support the risk-based approach; and strengthen the provision of information to the general public and government bodies.

3.1 Make minimising flood risks the core element of the Netherlands' flood protection policy

Define minimising flood risks as a duty of all government bodies concerned

The Councils advocate making minimising flood risks by government bodies the core element of flood safety policy. What is at stake is not so much the safety of the dikes themselves, but the safety of the areas behind the dikes. This requires a change of perspective, away from reducing the risk of water flooding over a dike (protection against high water levels) to a comprehensive approach. As well as the prevention of floods, such an approach includes managing the consequences of a flood and being prepared for carrying out recovery activities (see Figure 1). In this way, social disruption can be limited.

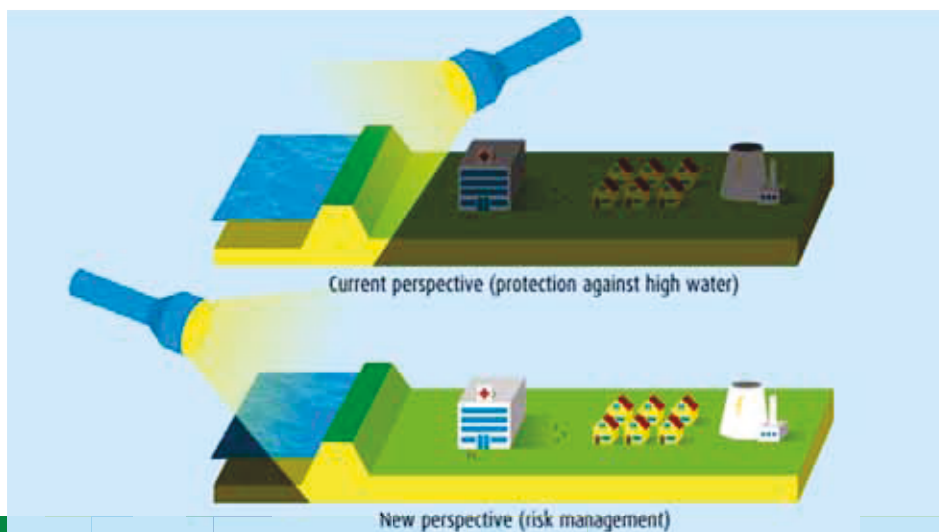


Figure 1. Change of perspective

In this context, risk is defined as “probability x effect”, with effect being split into exposure and vulnerability. These components reflect the probability of a flood due to a dike giving way, as well as the development and impact of the flood. The speed at which people and property become exposed to water, together with the depth of the water after flooding, determines the degree of danger and the locations where damage will occur. The vulnerability of people and property also determines the extent of the actual damage and the number of casualties. Being prepared for recovery following an emergency is a responsibility of the central government, insofar as essential infrastructure and facilities of national importance are affected.

Mitigating flood risks is not the responsibility solely of the national government. All government bodies bearing responsibility must make a permanent effort to improve flood safety. This responsibility should be included as an explicit objective in the policy plans for flood safety, all the more so because the Dutch government designates it as being of national importance. The scale alone on which action is necessary makes this clearly a communal issue.

Apply the EU Flood Risk Directive

The EU directive on the assessment and management of flood risks (Flood Risk Directive, FRD) lends support to the flood risk approach. It describes the risk-based approach as a cyclical management process comprising five aspects: damage prevention; high-water protection; preparedness; emergency response; and recovery. The Councils agree with this definition. Each aspect involves implementing measures to mitigate the flood risks.

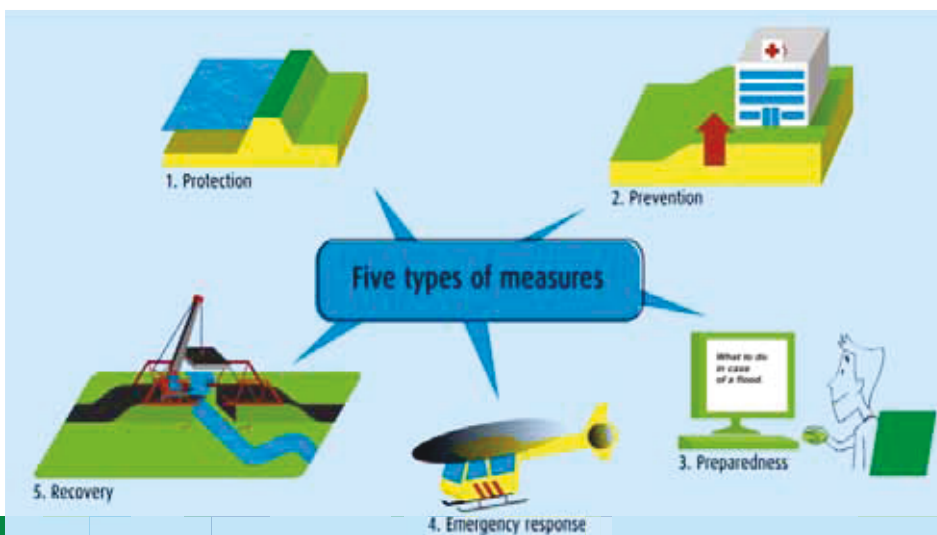


Figure 2. Five aspects of flood risk management

3.2 Set priorities centrally and implement measures decentrally

Make a national risk analysis

The Councils recommend making a national risk analysis to identify the weak spots and to set priorities for funding. The objective of the analysis is to establish where funding is most urgently needed. Based on the outcome, central government sets priorities for the funding schedule. The Dutch government performs the risk analysis at regular intervals (every 12 years⁶ for example) and uses the results for planning and funding purposes. Three components of risk form the focus for the national risk analysis: probability of flood, exposure, and vulnerability.

Specify measures at the dike ring level

Subsequently, a comparative assessment should be performed for each dike ring to determine the best way to limit risk. The parties involved – water authorities, municipal and provincial governments, and security regions – should apply an area-based approach, with the provincial government concerned leading the dialogue. As input for each dialogue, the parties make a detailed analysis of the distribution of flood risk over the area enclosed by the dike ring in question. Again, the three components of risk are considered in this process. This analysis provides the basis for deciding how and where in the area or dike ring an intervention will have the greatest effect. The parties can select from all five types of measures to limit flood risks (see Section 3.1 and Figure 3), the set of measures then being translated into a flood risk management plan. How local government applies the budget allocated by the central government depends on the comparative assessments at the dike ring level. Raising additional funding for other functions or societal objectives is a task for the region itself.

Employ the Water Test

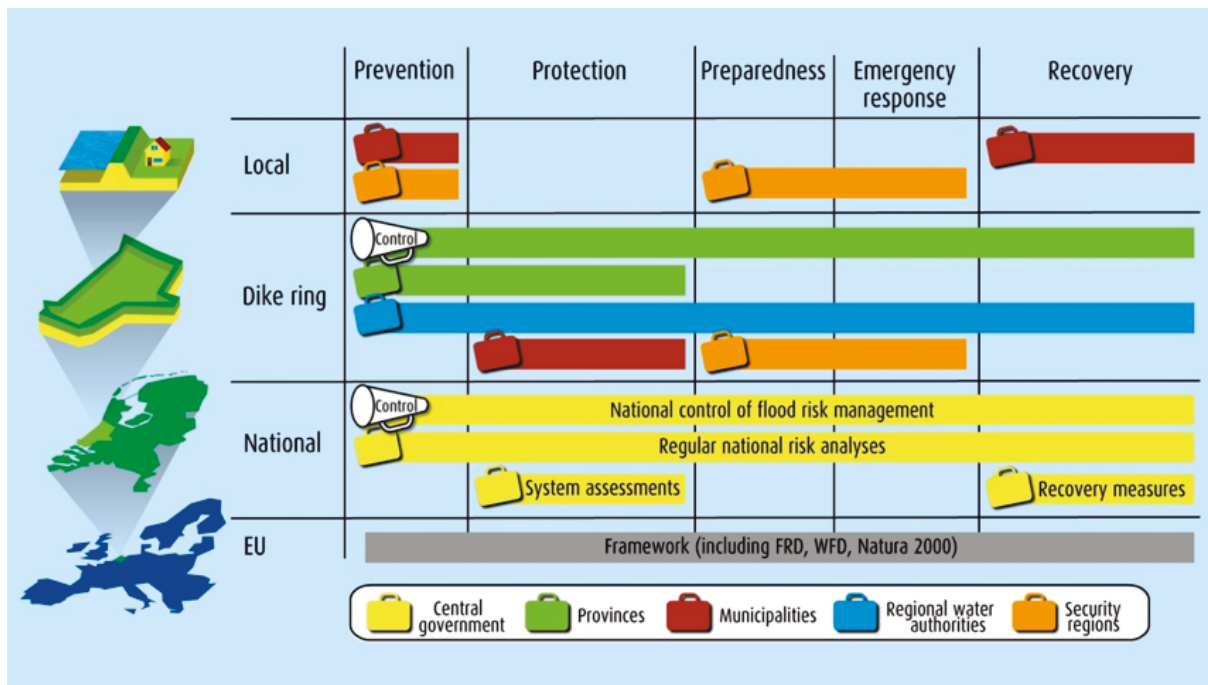
The Councils consider it important that the results of analysing the flood risks be factored into the spatial planning. The Water Test is a suitable instrument in this context, provided it is applied earlier in the planning process than at present, and at all levels of government, i.e., municipal, provincial and national.

⁶ This interval is more in line with the time needed to realise a land-use plan.

Equally, when implementing flood safety measures, spatial development of the area concerned has to be taken into account as well. With the right approach, flood safety measures can also enhance spatial quality. In addition, municipalities and security regions have to devote extra attention in their policies to the location, vulnerability, and recovery potential of essential functions such as road and rail systems, drinking water and electricity supplies, and other aspects of the infrastructure. One must also consider, for example, whether it is better not to carry out construction in vulnerable areas or to use spatial planning for reducing vulnerability, such as building hospitals at locations that remain accessible in the event of a flood.

Figure 3 shows the responsibilities of the parties at different levels of government.

Figure 3. Responsibilities of parties



3.3 Establish limits and standards that support the risk-based approach

Develop limits that express the risk and anchor them in legislation

To enable the Dutch government to fulfil its responsibility for coherent national flood safety and to set priorities in order to attain this, the Councils consider it essential that the government adopts limits for acceptable risk. Indicators for this are flood probability, group risk, and the costs and benefits to society.

Initiate the transition to a new standard for primary water defences

This is the moment to take the decision to move to a standard for flood probability by dike ring, instead of a standard based on the probability of exceedance by dike section, which the Netherlands is still using. The time is ripe for applying the new standard, as it is in line with an approach based on flood risk. A standard based on flood probability would lead to the explicit identification of more water defence failure mechanisms than just flooding due to high water levels. Moreover, such a standard applies to the strength of the entire dike ring, not just a section of a dike. The Councils recommend defining a more detailed integrated risk-based approach in the next two years, and recommend agreeing on an implementation timetable with the parties involved.

Develop a set of testing instruments for determining risk

When the Dutch government establishes the framework, it should also verify that the parties involved satisfy the framework's criteria. Supervision of this has to be the task of an independent party, such as the Inspectorate of Transport, Public Works and Water Management (IVW) of the Ministry of Infrastructure and the Environment⁷. The Councils advocate the development of a set of testing instruments covering all aspects of risk management. This means broadening the supervisory task that is currently assigned to the IVW.

⁷ The government intends to transfer the supervision of the testing process (evaluation of the test results) from the provincial authorities to the State (State Secretary of Infrastructure and the Environment, 2011).

3.4 Strengthen the provision of information to the general public and government bodies

Aim to introduce up-to-date communication resources

The exchange of information within civil society on the subject of flood risks, as well as between government and civil society, should be reinforced and supported. The information should be tailored to the circumstances of the local population concerned. The possibilities for deploying up-to-date information and communication resources to assist the general population in the face of an acute threat should be determined. The national government should ensure that those systems are designed to continue functioning during and after a flood disaster (including situations of power failure).

Strengthen the knowledge infrastructure for flood risks

The knowledge available nationally and internationally on flood risks, damage and casualty risks, and the physical data on dikes and dike ring areas should be brought together and made accessible. A databank could be a vehicle for this. The exchange of knowledge with other policy fields, such as spatial planning and disaster mitigation, should be promoted. This should include knowledge on the behaviour of civilians during and immediately after an emergency. Responsibility for this should be assigned to an existing knowledge institute. The national government should guarantee the exchange of information between government bodies and give support to local authorities, which is normal practice in other domains of external safety.

This is a translation of the first part of the original advisory document. The second part, Analysis, is only available in Dutch. To accompany this advisory document, a short film has been made. This can be viewed on www.rli.nl.

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